

# Food Security in India: A Case Study of Kandi Region of Punjab

Savita Ahlawat and Dhian Kaur

**Abstract**—Banishing hunger from the face of earth has been frequently expressed in various international, national and regional level conferences since 1974. Providing food security has become important issue across the world particularly in developing countries. In a developing country like India, where growth rate of population is more than that of the food grains production, food security is a question of great concern. According to the International Food Policy Research Institute's Global Hunger Index, 2011, India ranks 67 of the 81 countries of the world with the worst food security status. After Green Revolution, India became a food surplus country. Its production has increased from 74.23 million tonnes in 1966-67 to 257.44 million tonnes in 2011-12. But after achieving self-sufficiency in food during last three decades, the country is now facing new challenges due to increasing population, climate change, stagnation in farm productivity. Therefore, the main objective of the present paper is to examine the food security situation at national level in the country and further to explain the paradox of food insecurity in a food surplus state of India i.e in Punjab at micro level. In order to achieve the said objectives, secondary data collected from the Ministry of Agriculture and the Agriculture department of Punjab State was analyzed. The result of the study showed that despite having surplus food production the country is still facing food insecurity problem at micro level. Within the Kandi belt of Punjab state, the area adjacent to plains is food secure while the area along the hills falls in food insecure zone.

The present paper is divided into following three sections (i) Introduction, (ii) Analysis of food security situation at national level as well as micro level (Kandi belt of Punjab State) (iii) Concluding Observations

**Keywords**—Availability, consumption, food security, poverty.

## I. INTRODUCTION

**F**OOD security is an important factor that guarantees human security, and is one of the seven pillars of the United Nation's (UN) Development Programme's original concept of human security, along with economic, health, environmental, personal, community, and political security. The notion of food security is as old as humanity, as the establishment of human communities always depended on access to food. However, in order to incorporate different elements, this concept has continuously undergone significant changes through time [1]. The roots of concern about food security can be traced back to the Universal Declaration of Human Rights by UN which recognized that "everyone has the right to a standard of living adequate for the health and

well-being of himself and of his family, including food" [2]. Therefore, food security has existed in international development literature since the 1940s. Later in 1970s, the operational concept of right to food was introduced by Food and Agricultural Organization (FAO) as food security.

The World Food Conference (1974) defined food security as 'Availability at all times of adequate world food supplies of basic foodstuff to sustain a steady expansion of food consumption and to offset fluctuations in production and prices' [3]. According to this definition, unavailability of food is the only reason behind food insecurity. However, in reality, nations have enough food in terms of availability, yet there are countries in the world, regions within countries, villages within regions, households within villages and individuals within household that are not able to meet their food needs. Therefore, this definition reflects a paradoxical situation i.e. individual food insecurity in a food secure nation where the term *food security* was only focused on the volume and stability of national and world food supplies.

Later in the mid of 1980's issues of entitlement were also added in the concept of food security after Sen's (1981) theory on food entitlement which replaced earlier theories that stressed shortages in food availability as causes of food insecurity. According to Sen, people are usually starved mainly because of lack of the ability to access food rather than because of its availability [4]. Therefore, in the late 1980s, the issues of both availability and stable access to food were also incorporated in the definition [5]. FAO (1983) also expanded this concept and indicated that access to stocks is as essential condition of food security as the existence of stocks: "ensuring that all people at all times have both physical and economic access to the basic food they need" [6]. Later, World Bank report (1986) on "Poverty and Hunger" focused on the temporal dynamics of food insecurity and explained difference between chronic food insecurity and transitory food insecurity [7].

During 1990s a third dimension – food utilization - also became prominent in food security discussions. This dimension is determined primarily by people's health status. The most widely accepted definition of food security is given by Food and Agricultural Organization in its report on 'The State of Food Insecurity' (2001), "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" [8].

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Despite the fact that food security is considered as an elementary human right, it is becoming the most critical issue of the development agenda in the developing world, for example, India. Today at the global level, food production has increased more steadfastly than the population, which has been clearly evident through scientific research. Against this reality, hunger still persists in many parts of the world, with almost 870 million people chronically undernourished (in terms of dietary energy supply) in the period of 2010–12. The vast majority live in developing countries, where about 850 million people, or slightly fewer than 15 per cent of the population, are estimated to be undernourished. Particularly in India out of 1.2 billion population an estimated 320 million people go to bed hungry. India has 25 percent of the world's hungry population and an estimated 43 per cent of children under the age of five years are malnourished [9].

In this paper we are studying food security in India at national level and also at micro level in Kandi belt of Punjab. This region is selected for the study as it shows the paradox of food insecurity in a food surplus state i.e. in Punjab. It also explains the regional variations in food-grains production within a state. For this study, firstly, we analyzed food-grains availability data at national level as well as state level from 1966-2012 which indicated that after the famous Green Revolution, production increased in Punjab and collectively in India. But from last one decade food-grains production is almost stagnant which challenges the food security of the country in future. Secondly, share of agriculture in Gross Capital Formation (GCF) and State Domestic Product (SDP) is also analyzed which showed a declining trend and non-agriculture sectors are receiving increased share.

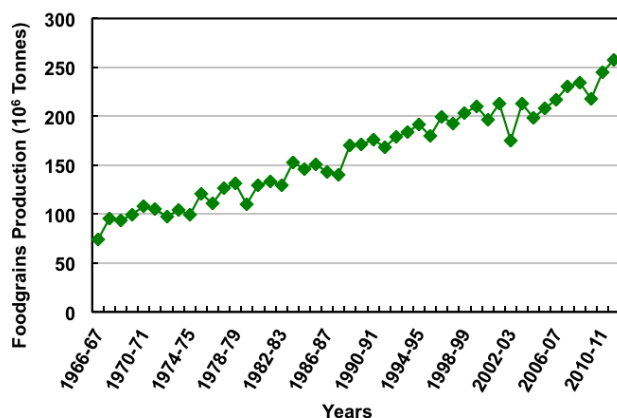


Fig. 1 Food-grains Production in India (1966-2012)

## II. FOOD SECURITY SCENARIO AT NATIONAL LEVEL

India is one of the south-Asian developing countries. A large majority of the poor and food insecure people live in this part of the world and the incidence of malnutrition is very serious [10]. In India the status of food security has undergone a significant change. Agriculture plays a crucial role in the economy of the country. Increasing agricultural production for achieving food security for all has been the central focus of

India's agricultural development strategy since independence in 1947. After Green Revolution, due to substantial increase in the production of food grains, the country is largely self-sufficient in food production and imports only a very small part of the food requirement. It has the world's largest area under cultivation for wheat, rice, and cotton, and is the world's largest producer of milk, pulses, and spices [11]. Before independence the growth rate of agriculture was only 0.3 percent but after independence and particularly from 1966 onwards, the growth rate jumped to 2.8 percent. Its production has increased from 74.23 million tonnes in 1966-67 to 257.44 million tonnes in 2011-12. Fig. 1 shows the trend of food-grains production in India since 1966.

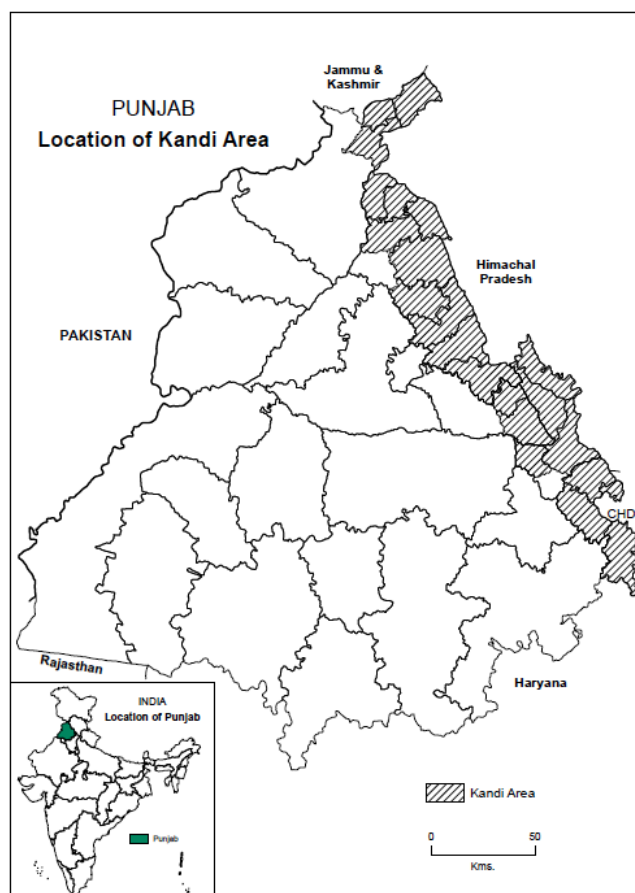


Fig. 2 Location of region being studied in this paper

The per hectare yield of total food grains has also increased from 644kg in 1966-67 to 2059kg in 2011-12. No doubt, food grain production has witnessed a steady increasing growth rate during the 1970s and 1980s from the rate of previous decades, but the 1990s has witnessed a sharp fall in the growth rate. In fact the growth rate of food grain production during 1990s has been close to the annual population growth rate, which implies a stagnant per capita production level (Table I).

The per capita per day net availability of food-grains in the country from 1951 to 2010 is presented in Fig. 3. This showed that after Green Revolution per capita availability of food-

grains has increased in the country but since 1990s it is declining. But the per capita per day net availability of pulses has declined since the Green Revolution. However, even after achieving adequate food supply at the macro level, there is widespread poverty and malnutrition.

TABLE I  
 ALL INDIA AVERAGE ANNUAL GROWTH RATES OF PRODUCTION AND YIELD OF PRINCIPLE CROPS

Crops	1990-91 to 1999-2000		2000-01 to 2010-11	
	Production	Yield	Production	Yield
Total Food-grains	2.19	2.43	1.95	1.37
Total Pulses	1.06	1.82	4.02	1.21
Coarse Cereals	0.08	2.03	5.0	4.64
Total Cereals	2.29	2.38	1.82	1.69
Rice	2.09	1.36	1.32	1.47
Wheat	4.52	2.87	1.39	0.73

India has 25 percent of the world's hungry population and an estimated 43 per cent of children under the age of five years are malnourished. India's rank on the 2010 Global Hunger Index (GHI) of 67 among 84 countries reflects alarming levels of food insecurity [12]. India's GHI was 23.7 in 2011 lower than it was last year, but it is higher than GHI of 15 years ago. Pakistan, Nepal, Rwanda and Sudan all countries performed better than India. Nearly three-quarters of India's households are dependent on rural incomes. Therefore, food insecurity exists at the household level for millions of people, more so among socially and economically deprived groups and backward and remote regions. The malnutrition problem is much broader than that of access to food. The South Asian Enigma (levels of malnutrition in Asia are higher than in Africa) is well known. India has malnutrition levels almost the levels double those of many countries in Africa [13].

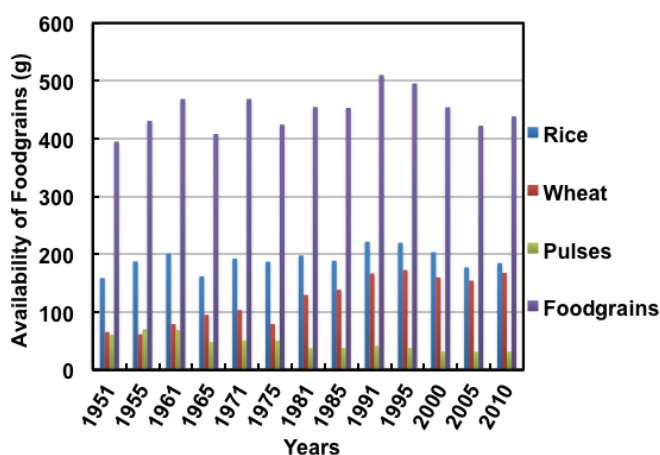


Fig. 3 Per Capita Availability of Food-grains (1951-2010)

Although India is an agriculture-based country where two third population is engaged in agricultural activities yet the share of agriculture in Gross Capital Formation (GCF) is declining which was 18 percent in 1980-81 now only lies

between 6 to 8 percent (as illustrated in Fig. 4). This shows that non-agriculture sectors are receiving higher investment. On this line, the share of agriculture in GDP is also declining. Since independence, the share of agriculture in GDP has fallen by more than two third from 55% in 1950-51 to 13.9 percent in 2011-12. The contribution of agriculture in GDP is declining at the faster rate; it has dropped nearly 5 percent in last eight years to be 13.9 percent in 2011-12, due to higher growth in other sectors [14]. In order to improve level of food and nutrition security, Indian government has started many programs such as Targeted Public Distribution System including Antayodaya Anna Yojana, nutrition programs like mid-day meals. However, there are a number of gaps and inefficiencies in these programs.

Above discussion shows that despite having surplus food production at national level, the country is facing food insecurity situation at micro level and future of food security in the country also seems dark due to increase in population, declining or almost stagnant food production and climate change etc.

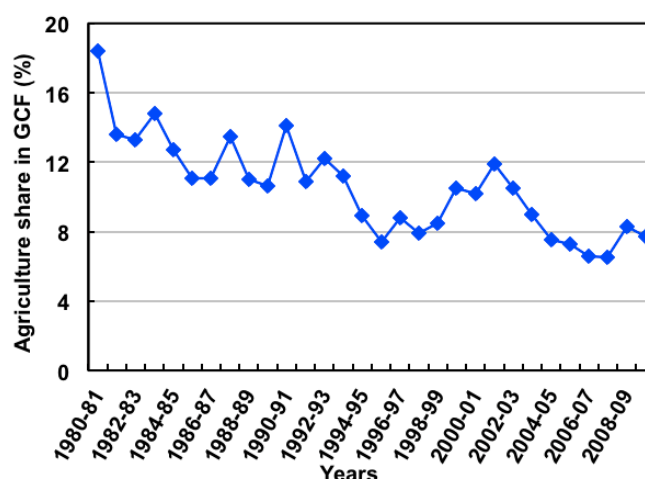


Fig. 4 Share of Agriculture in Gross Capital Formation(1981-2010)

#### A. Food Security in Punjab State

Punjab has a geographical area of 5.04 million hectares and is situated in northwestern part of the country as highlighted in Fig. 2. The state is considered the food bowl of India and it is the second largest producer of food grains after Uttar Pradesh. Agriculture plays an important role in state economy but from last one decade the growth of food-grains production is almost stagnant in the state. Earlier, the agriculture share in Punjab state domestic product was more than the secondary and tertiary sector but this share has been declining from 40.3 per cent in 1970-71 to 15.6 per cent in 2010-11 (Fig. 5).

Against a national average of 40 per cent, almost 85 per cent of the area is under cultivation, of which 97 per cent is irrigated. Agricultural production increased tremendously in this state during last four decades. The food grains production has increased from 3162 thousand tonnes in 1960-61 to 28352 thousand tonnes in 2011-12. The production of wheat and rice

has also increased from 2451 thousand tonnes and 338 thousand metric tonnes in 1966 to 16472 thousand metric tonnes and 10819 thousand metric tonnes in 2012 respectively. On the other hand, production of pulses and oilseeds has declined. Since 1960 the state has continually been contributing wheat and rice in central pool towards strengthening India's self-sufficiency. The contribution of wheat and rice to the central pool has been increased from 2.52 million tones and 4.3 million tonnes in 1980-81 to 8.6 million tones and 10.2 million tonnes in 2011-12 respectively. After Green Revolution the per capita intake of cereals has declined in Punjab. This paradox lies in the diversification of food basket in Punjab in favour of non-cereal food, particularly milk and milk products, egg, meat, fish, vegetables, fruits, etc. [15].

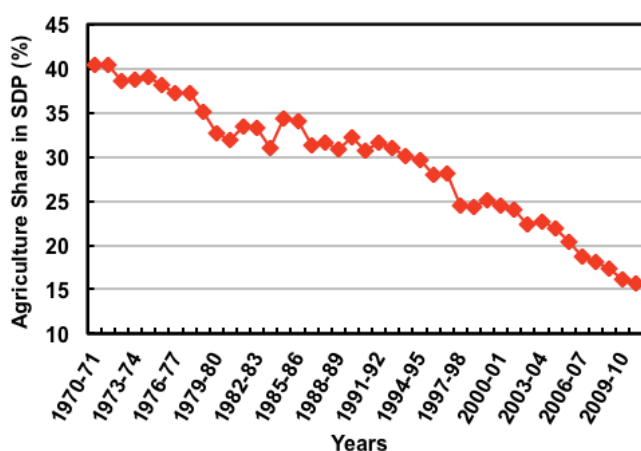


Fig. 5 Share of Agriculture in State Domestic Product

From last decade, indebtedness is also increasing among farmers in Punjab. In last ten years the growth rate of farm debt is faster than farm incomes in the state and it has been shown in a study by Shergill that 72 per cent of farm households are heavily indebted [16]. Despite its best performance, in India State Hunger Index the Punjab state ranks below 33 other developing countries including Gabon, Honduras, and Vietnam. The National Family Health Survey report reveals that one in every five adults in the age group of 15 to 49 years suffers from malnutrition in Punjab [17]. If, the health status of people living in a food surplus state is so worst then the health status of people living in food deficit states can be very well imagined.

#### B. The Kandi Belt and Food Security

Within the Punjab state there are areas which are more food insecure than the rest. The Kandi belt is one of them. Kandi is the name given to the sub-montane region of the Himalayas. Generally, the areas falling at an elevation of more than 300m above mean sea level comprise the Kandi belt in the state. It includes all lands in the Shiwalik Hills together with a narrow strip of largely un-developed farmland in the foothills. The belt lies between the 30° 21' 48" to 32° 30' north latitudes and

75° 31' 12" to 76° 56' 54" east longitudes. It extends over a length of 250 km from north to east direction from Dharkalan block of Gurdaspur district to Dera Bassi block of Mohali district. The width of the belt varies from 10 to 30 km. Bordering Himachal Pradesh in the east, the Kandi belt covers an area of 4600 km<sup>2</sup> in Punjab (nearly 10% of the state's geographical area). This belt falls in five districts of Punjab (Mohali, Roopnagar, Nawanshahr, Hoshiarpur & Gurdaspur (including Pathankot) which cover 21 development blocks. The boundaries of some of these development blocks are not coterminous with the boundaries of Kandi region.

This area is characterized with low hills, undulating topography, steep slopes, poor ground cover and erodible soils. Numerous seasonal flashy streams, called 'choes' dissect the terrain and these are the primary form of drainage networks/system in the Shivaliks. Most of this area is drained into rivers Ravi, Beas, and Sutlej in Punjab. The drainage density in this area is very high, with 7-9 km of drainage channels/guilles per km<sup>2</sup>, leading to problem of soil erosion, flooding and declining productivity. The altitude of the area ranges from 300 metres to 1000 metres.

Climate in the Kandi belt is one of extremes, with very hot, dry summers (April-June) and cold winters. The annual rainfall of the area varies from 845mm to 1500mm with an average of 1078.97mm. Eighty percent of rainfall is received during monsoon i.e. June-September, most of it goes waste through seasonal torrents resulting in acute moisture stress in the summers and the drought like conditions are created during rest of the year. Ground water table is low in this region; therefore, water availability is also a problem for farmers. Soils in this area vary in texture between sandy, sandy loam and loam at surface and loam to clay at subsurface level. On the whole, the fertility of the soils is very low. These adverse climatic conditions have largely contributed to the socio-economic backwardness of the Kandi tract.

According to 2001 census, the population of the area is 25, 61,100 and the area has population density of 300 persons per km<sup>2</sup> against 560 persons per km<sup>2</sup> for the two states together. Nearly one-third of total population belongs to schedule castes. Majority of the development blocks in the region have higher proportion of BPL (Below Poverty Line) population in comparison to most other blocks of the respective states. The literacy rate of the region is 64 % in relation to almost 70% of Punjab state. The main source of livelihood in the area is mixed farming i.e subsistence agriculture supplemented by livestock. Almost 32 percent of total workers are engaged in agriculture. Most of the farmers have small (1-2 ha) or marginal land holdings. High yielding varieties of seeds are rarely used by farmers as the area is more suitable for forest vegetation rather than crop cultivation due to lack of irrigation facilities, undulating character of the terrain, and coarse textured soils. Cropping intensity is low as compared to Punjab, as in most of the area, single crop is grown. The fertilizer consumption per hectare is very less in this area; the

farmers leave the fields fallow for few years to regain the fertility of the soil.

The per capita availability of food grains in the Kandi belt is low which is 1871gm/day and is much below the average of 3188 gm/day for Punjab. The per hectare yields of major crops like wheat (3373 kg/ha) and rice (3390 kg/ha) are low as compared to state average (wheat-4208 kg/ha, rice-3870kg/ha). This is largely due to undulating topography, poorer soils, and poor or near absent irrigation facilities. Due to poor agricultural production the availability of food is not adequate. This is also accompanied by poor levels of utilization of food as the region lacks in supply of drinking water, sanitation and health care facilities.

along the hills are food deficit due to disadvantageous physical factors while areas adjacent to plains are food surplus because of relatively plain area, better availability of irrigation facilities.

### III. CONCLUDING OBSERVATIONS

In summary, we have analyzed the patterns of food-grains availability in Kandi region. The study in this paper concludes that it is basically the physical constraints that lead to lower availability of food-grains and hence food insecurity in the concerned region.

The state government should take short and long term measures to ensure availability and accessibility of food to each and every person in the study area. As the food-grains production is not sufficient, crops suited to local conditions should be supported by the government. Also access to food can be increased through employment generation by growth in labour intensive sectors and/or through social protection programmes. Government policies (Public Distribution System, Targeted Public Distribution System etc.) need to be improved in the area.

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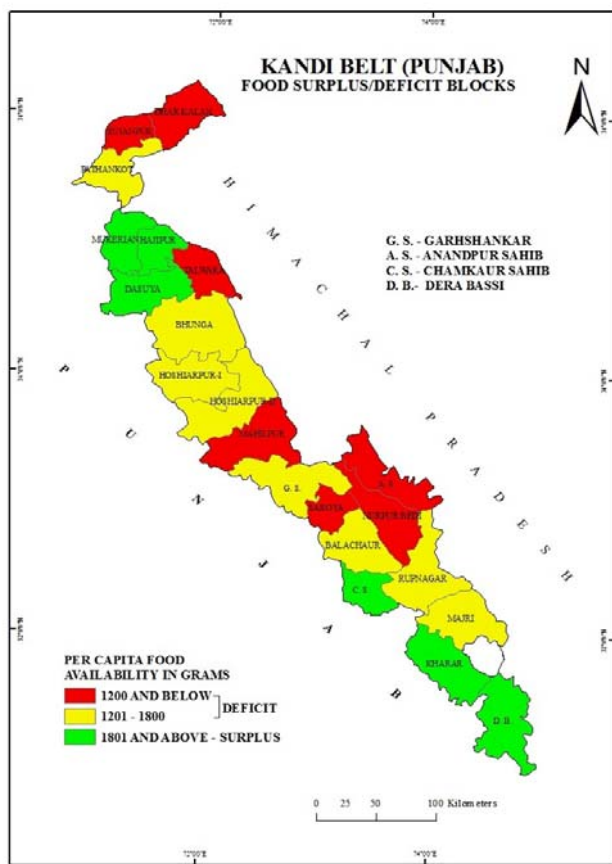


Fig. 6 Areas of Food surplus/Deficit

In the Kandi region food-grains surplus and deficit blocks were computed by using this formula:

$$\text{Food\_Availability(per\_head\_per\_day)} = \frac{\text{total\_foodgrains\_production}}{\text{total\_population} \times 365}$$

The result concludes that, two- thirds of the development blocks falling in this belt are still food deficit. Fig. 6 shows the food surplus and deficit blocks of the region. Only one block (Chamkaur Sahib- 3865gm/day) has per capita per day availability of food-grains more than the state average (3188 gm/day). Generally the areas falling in north and north-east