

# Hunger in the Land of Plenty: The Punjab Scenario

*Dr. Pawan Kumar Sharma*

*Population Research Centre, CRRID, Chandigarh*

*Dr. Manisha Bhatia*

*Krishi Vigyan Kendra, Fatehgarh Sahib, Punjab Agricultural University*

## Abstract

Hunger, commonly referred to as a desire to eat food, is multifaceted in nature. Raw or self-declared hunger is subjective in nature, whereas chronic or endemic hunger may be measured objectively using different indicators namely calorie consumption, below normal body mass index, child wasting and stunting and micronutrient deficiency. This paper examines the situation of endemic hunger in the Indian state of Punjab, which also has an abundance of food. The underlying premise is that Punjab should be free from it. Secondary data from various sources, such as the National Family Health Survey, the Census of India and government records were used. Punjab has been disproportionately prominent with respect to endemic hunger. A higher proportion of children suffering from growth retardation, low body weight and anaemia, is a bad omen for Punjab. This is reflection of the fact that there is something wrong with the state development model. The proportion of children suffering from anaemia is on the rise with increasing levels of anaemia among women in 2005-2006 and 2020-2021 period. The pace of progress in the struggle against hunger in the state through public efforts is quite slow. Overall, the state is yet to fully translate its agriculture-induced growth into improved nutritional conditions.

**Key words:** Hunger, National Family Health Survey, Under-nutrition, Punjab, district

## INTRODUCTION

Hunger is a physical feeling of discomfort or pain caused by inadequate consumption of dietary energy. It becomes chronic when people do not consume sufficient calories (dietary energy) on a regular basis to lead a normal, active and healthy life. There are basically two types of hunger - raw hunger and chronic or endemic hunger. In raw hunger, stomach should be filled every few hours. It is self-declared hunger, through which people judge their own capacity to fill the physiological need to satisfy their hunger. In endemic hunger, the human body gets used to having less food than needed for healthy development, and after sometime does not even require more food. This it is not self-reported, recognized or expressed by children or adults (Saxena, 2009). This leads to subtle impairments that affect the growth of the human body. The resultant micronutrients deficiencies are often considered as hidden hunger. People with chronic hunger are undernourished as well (Gupta and Rohde, 2004).

Although hunger is most directly reflected in inadequate food intake, but insufficient food intake and a poor diet overtime leads to low birth weight, stunting and underweight children. Calorie intake is the closest proximate aspects of hunger, but it ignores the other effects of hunger, such as low body weight and mortality. The Global Hunger Index (GHI) recognizes the interconnectedness of these dimensions of hunger. To understand the multifaceted nature of hunger, GHI scores are based on four component indicators - undernourishment, wasting in children under five years of age, stunting and under five-year child mortality. Based on the values of these indicators, the GHI determines hunger on a scale of 100-points, where **0 is the best possible score (no hunger) and 100 is the worst.** Each country's GHI score is ranked in terms of severity, from the lowest to extremely alarming.

According to GHI developed in 2022 by **Concern Worldwide and Welthungerhilfe**, the global progress against hunger has largely stagnated in recent years. The 2022 GHI score for the world is considered moderate, but at 18.2, it shows only a slight decline from the 2014 score of 19.1. There has been a consistent decline in the GHI score at the global level. It has declined from 29.0 in 2000, 24.3 in 2007, 19.1 in 2014 to 18.2 in 2022. Of the 121 countries, five countries suffer from an alarming level on the GHI Severity Scale (35.0 to 49.9), 31 countries have serious levels of hunger (20.0 to 34.9), 36 countries have moderate level of hunger (10.0 to 19.9) and 49 countries have low level on hunger ( $\leq 9.9$ ). In India, the GHI score dropped from 38.8 in 2000, 36.3 in 2007 to 28.2 in 2014 and then increased to 29.1 in 2022.

Even before the pandemic, hunger was spreading and the progress in nutrition was lagging behind. Global hunger worsened considerably in 2020, largely because of the impact of Covid-19. About one-tenth of the world's population was estimated to be undernourished in 2020 (WHO, 2021). Moreover, a significant number of people are short of food or have reduced their intake. Reduced calorie intake and poor nutrition have long-term effects on the cognitive development of young children (World Bank, 2022). In fact, due to factors of poverty, inequality, unsustainable food systems, lack of investment in agriculture and rural development, inadequate safety nets and poor governance, the progress in combating hunger is showing signs of stagnation or reversal. The world as a whole cannot be expected to reach a low level of hunger by 2030, according to GHI projections.

At 29.1 India is also among the 31 countries in which hunger has been identified as serious. This score has decreased from 38.8 points in 2000, considered alarming. However, despite this, India's ranking fell to 107<sup>th</sup> position in the GHI of 121 countries in comparison to its 94<sup>th</sup> position in 2020. Even small neighbouring nations were better placed than India on the hunger index. In terms of ranking, the country was behind most of its neighbouring countries Pakistan (99<sup>th</sup>), Nepal (81<sup>st</sup>), Bangladesh (84<sup>th</sup>) and Sri Lanka (64<sup>th</sup>). China has considerably reduced the prevalence of hunger to improve its ranking. With a GHI score of less than five, it was one of the highest ranked countries in the world. India's GHI figures depict a bleak picture of the country more despite rapid progress in the production of various products such as wheat, rice, fruits and vegetables. As a matter of fact, India is the world's largest producer of milk and edible oils and the second largest producer of wheat and sugar.

The **proportion of undernourished people** and the **under-five child mortality rate** are **now at comparatively low levels.** Although **stunting** among children has declined significantly, from 54.2 per cent in 1998- 2002 to 35.5 per cent in 2017-2021, but it is **still**

**considered very high.** Stunting fell mainly in response to improvements in the coverage of health and nutrition interventions, household conditions (such as socioeconomic status and food security), and maternal factors (such as mothers' health and education) (Avula et al., 2022). According to the latest figures, India has the highest rate of child wasting (19.3 per cent) among all the countries in the index. However, India has shown an improvement in other indicators such as the under-five mortality rate, the prevalence of stunting in children and the prevalence of undernourishment due to inadequate nutrition. In India the states that perform well economically were found to be having high levels of hunger (Menon, Deolalikar and Bhaskar, 2009). Of the four parameters to measure hunger, child wasting and child stunting contributed more than undernutrition and under five child mortality to the GHI score for India. This holds true in State Hunger Index Scores for almost all states of India (Nina, 2016). Consequently, it is essential that states in India tackle the problem of child nutrition.

The Government of India has taken several initiatives to combat endemic hunger among different segments of its population. Most of these efforts are designed to control endemic hunger among the vulnerable group of women and children. These included Integrated Child Development Services launched in October 1975, National Food Security Act, 2013, Food Safety and Standards (Fortification of Foods) Regulations, 2016, Pradhan Mantri Matru Vandana Yojana launched in 2017, National Nutrition Mission, Poshan Abhiyan in 2018 and Anemia Mukta Bharat in 2018. Nutritional Rehabilitation Centres across the country under the National Health Mission have been established to provide facility-based care for children with severe acute malnutrition and medical complications. Although these programmes are theoretically expected to improve nutritional outcomes, however, empirical studies do not demonstrate conclusive relationships (Desai and Vanneman, 2015). Overall, the pace of many of the actions taken by governments to reduce the prevalence of hunger has been very slow. This situation is worrisome. This is a cause for concern.

The issue of hunger is gaining prominence in an economically prosperous state of Punjab, which is otherwise one of developed states of India from an agricultural point of view. In fact, Punjab is recognized for having launched green revolution, with the highest growth rate in food production. Of the food deficit state Punjab became a food surplus. It is matter of pride that Punjab is the most important contributors to the central reserve of rice and wheat. But the moot question stemming from such a situation is whether the increase in food production has reduced hunger in the state of Punjab? In this perspective, the paper attempts to assess and explain the emerging hunger scenario across the state and districts of Punjab. The paper is based on the data collected through secondary sources, namely the National Family Health Surveys (NFHS), the Census of India and Punjab Government records. Relevant data from these sources have been used for assessing the hunger problems at state and district levels.

## NUTRITIONAL STATUS

### Children

According to the UNICEF report, undernourishment is the main causes of child mortality worldwide, and is estimated to cause at least half of all child deaths (De, 2019). At the same time, healthy children become healthier adults who are stronger, more productive and a national asset. Three standard indices of physical growth, including height-for-age (stunting),

weight-for-height (wasting) and weight-for-age (underweight) describe undernourishment levels in children.

In Punjab, 25 per cent of children in 2020-21 were stunted, indicating undernourishment for some time, 11 per cent were wasted, indicating insufficient dietary intake or recent episodes of disease, and 17 per cent were chronically underweight and undernourished (Table 1). The nutritional situation of the rural children was somewhat better than that of urban children. This is evidenced by the fact that the incidence of stunting, wasting and being underweight was lower among rural children than among urban children.

**Table 1: Nutritional Status of Children in Punjab, 1992-1993 to 2020-2021**

Years	Type of Area	Stunted	Wasted	Underweight
1992-93	Total	45.2	20.8	39.9
1998-99	Total	45.2	8.1	24.7
2005-06	Total	36.7	10.2	24.9
2015-16	Total	25.7	15.6	21.6
	Rural	24.5	16.1	21.1
	Urban	27.6	15.0	22.4
2020-21	Total	24.5	10.6	16.9
	Rural	23.9	10.0	16.4
	Urban	25.7	11.7	17.9

**Source:** National Family Health Survey, Various Volumes, International Institute for Population Sciences, Mumbai.

The impact of stunting remained about the same level as 45 per cent in 1992-93 and 1998-99 but subsequently decreased to about 25 per cent in 2015-16 and 2020-21, a fall of 21 per cent points during the last three decades or so. The proportion of wasted children came down from 21 per cent in 1992-93 to 8 per cent in 1998-99, a decline of 13 per cent points. It virtually doubled in 2015-16 compared with 1998-99. Thereafter, it decreased to five per cent points during 2015-16 and 2020-21. The proportion of underweight children has decreased steadily from 40 per cent in 1992-93 to 25 per cent in 1998-99, after which the decline has been slow until 2015-16. Over the 2015-16 and 2020-21, this proportion decreased by five per cent points. This trend is positive albeit at a slower pace.

### Adults

Among other things, anthropometric measurements of body size, weight and proportions indicate present or past nutrition and may be markers of future diseases (Evans, 1999). These can be used for assessment of children's growth. BMI (body mass index) is generally regarded as a good indicator and is used in the assessment of chronic energy deficiency of adults (Bhattacharya, Pal, Mukherjee and Roy, 2019). Various anthropometric measurements and combinations of measurements provide information on body composition and fat distribution and, hence, nutritional status. In the current state of affairs, nutritional status of children has been deduced from stunting, wasting and underweight, whereas in case of adults it is based on the BMI. The international standard for the assessment of adult body size is the BMI. BMI is an index that establishes a relationship between a person's weight and height. It is used to evaluate the thinness and obesity. This represents the weight in kilograms divided by the height in square meters ( $\text{kg}/\text{m}^2$ ). The dietary spectrum ranges from chronic energy deficient to obesity. A chronic energy deficiency is indicted by a BMI of less than  $18.5 \text{ kg}/\text{m}^2$ , whereas a person with BMI greater than  $25 \text{ kg}/\text{m}^2$  is considered overweight. The BMI of  $30 \text{ kg}/\text{m}^2$  or greater is an indicator of obesity.

A little above one-fifth of the women and men in Punjab were thin, i.e. they had a BMI below normal in 2005-06. This proportion has come down to about one-tenth among both men and women in 2015-16 (Table 2). However, in 2020-21, this proportion again rose by one per cent in women and 1.6 per cents in men. The incidence of thinness was slightly higher among both women and men in rural areas than their counterpart in urban areas in 2015-16 and 2020-21.

Ironically, while Punjabi women and men appear less likely to be undernourished, they are more likely to be at higher risk from other extreme of malnutrition i.e. overweight or obesity. Approximately 31 per cent of women and 28 per cent of men in Punjab were overweight in 2015-16. Obesity among both men and women rose in 2020-21 compared to 2015-16. The proportion of obese women has increased by 9.5 per cent, while that of men increased by 4.4 over this period. Not only was a higher proportion of overweight women a cause for concern, but equally critical was an alarming increase in their proportion. Over the past 15 years, the proportion of overweight men increased from 22 per cent in 2005-2006 to 32.2 per cent in 2020-21, a rise by 10.2 per cent points. Over the same period, this proportion in women went up by 12 percent points. Women and men living in urban settings were more likely to be overweight than their rural counterparts in 2015-16 and 2020-21.

**Table 2: Percentage of Adults Below and Above BMI Levels in Punjab, 2005-2006 to 2021-2021**

Years	Type of areas	BMI below normal (< 18.5 kg/m <sup>2</sup> )	BMI below normal (< 18.5 kg/m <sup>2</sup> )	BMI above normal (≥ 25.0 kg/m <sup>2</sup> )	BMI above normal (≥ 25.0 kg/m <sup>2</sup> )
		Women	Men	Women	Men
2005-06	Total	18.9	20.6	29.2	22.2
2015-16	Total	11.7	10.9	31.3	27.8
	Rural	13.5	12.3	30.6	25.0
	Urban	9.0	8.9	32.4	32.1
2020-21	Total	12.7	12.5	40.8	32.2
	Rural	13.1	13.5	38.8	30.2
	Urban	11.9	11.2	44.3	35.2

**Source:** National Family Health Survey, Various Volumes, International Institute for Population Sciences, Mumbai.

This rise in obesity in Punjab may be attributed to lifestyle changes, involving reduced physical efforts. The growing popularity of processed food and fast foods, the reliance on television for recreation and consumption of more of energy rice food has made their own contribution to growing obesity. The share of grain, pulses and nuts in people's diets has more or less remained stable. The consumption of sugar, oils, fats and animal products rose. A much higher prevalence of alcoholism among men in the state is another vital factor in increasing obesity among them. A rapid increase in the tendency to gain weight should be a warning sign of decision makers because it is one of the causes leading to degenerative diseases like diabetes, coronary artery diseases, hypertension, cardiovascular diseases, malignancy, sleeplessness, respiratory and orthopaedic disorders.

#### MICRONUTRIENT DEFICIENCIES

Micronutrient deficiencies ('hidden hunger') has the potential to affect economic and overall development because affected populations are unable to reach their full mental and physical potential, have poor capacity of work, and susceptible to infection (Bharadva et al., 2019).



Micronutrient deficiencies, particularly in children, have a significant impact on the overall health and well-being of society and potential targets for supplementation. Anaemia or iron and folic deficiency are the most common micronutrient deficiencies in children, which needs constant vigil. The causes of anaemia usually include undernourishment, poor absorption of iron and folic acid and infestation of hookworms.

Two out of every three children in 6-59-month age group in the state were anaemic in 2005-2006. They have reduced by about 10 per cent points over the last decade. However, disturbing situation turned out to exist because of the marked increase in the proportion of anaemic children in 2020-21. The share of these children rose to 71.1 per cent in 2020-21, an increase of 14.5 points.

The share of anaemic women aged 15-49 years has consistently increased since 2005-06. It went from 38 per cent in 2005-06 to 53.5 per cent in 2015-16, a 15.5 per cent points increase. Although anaemia among women increased in 2020-21, the rate of increase decreased. During 2015-16 and 2020-21, this share increased by 5.2 per cent points (Table 3). There has been a positive trend towards anaemic men in the state. Compared to the years 2005-06 and 2015-16, where the proportion of men with anaemia increased by 12.3 per cent points, it decreased by 3.3 per cent points during 2015-16 and 2020-21. This situation calls for a concerted effort on the part of the state government to eliminate the deficits that lead to anaemia, especially among children.

**Table 3: Status of Anaemia among Men, Women and Children in Punjab, 2005-2006 to 2020-2021**

Target Group	2005-06	2015-16	2020-21
Children age 6-59 months who are anaemic (<11.0 g/dl) (in %)	66.4	56.6	71.7
Women age 15-49 years who are anaemic (<11.0 g/dl) (in %)	38.0	53.5	58.7
Men age 15-49 years who are anaemic (<13.0 g/dl) (in %)	13.6	25.9	22.6

Source: National Family Health Survey, Various Volumes, International Institute for Population Sciences, Mumbai.

Walking bare foot, unsanitary habits and the use of untreated water usually lead to the infestation of hookworm that feeds on blood within the intestine. This causes a lack of blood within the body. Other factors contributing to anaemia include low dietary intake and low intake of iron and folic acid.

The questions must be considered from a broader perspective, not ignoring the social causes deeply rooted in Punjabi society. Discrimination against girls in providing a healthy and nutritious diet in the prosperous state of Punjab has led to low levels of anaemia amongst them. A greater focus on the intake of milk and dairy products leading to deprivation of other nutrients, including iron is another contributory factor to anaemia. To cope with this situation, the right type of education on how to properly cook cereals and pulses to prevent nutrient loss is needed.

#### **DISTRICT-WISE HUNGER INDEX**

Given the lack of data on child mortality under the age of five years at district level, three dimensions were used to measure hunger at the district level. It has been well documented that anaemia reflects hidden hunger. As a consequence, three dimensions include nutritional status of children, the nutritional status of adults, and anaemia among both children and adults (women). Four indicators, described below for which data were made available by the NFHS-5, were used in the calculation of hunger index.

Child Nutritional Status: (i) The percentage of children under five years old who suffer from stunting (low height for age), and (ii) the percentage of children under five years old who suffer from wasting (low weight for height)

Adult Nutritional Status (age 15-49 years): (i) The percentage of women in the age of 15-49 years whose Body Mass Index (BMI) is below normal ( $BMI < 18.5 \text{ kg/m}^2$ ).

Anaemia among Children and Adults: (i) The percentage of children in the age of 6-59 months who are anaemic ( $< 11.0 \text{ g/dl}$ ) and (ii) the percentage of women in the age of 15-49 years who are anaemic.

A regional picture illustrating intra-district variation was obtained by computing the score of the hunger index. The hunger index scores were computed using a three-step process as described below.

- (i) The first step consisted in calculating the values for all indicators at the individual level.
- (ii) Step two was to standardize all indicators calculated in the first step. Each of the five component indicators received a standardized score based on thresholds slightly higher than the highest district-level values observed in the state for this indicator.

For instance, the highest value for child stunting among the children under five years in Mansa district was 36.6 per cent (Table 4). The normalized threshold was set a bit higher, at 40 per cent. In a given year, if a district has a child stunting prevalence of 36.6 percent, its standardized child stunting score is 91.5.

For instance, Mansa = Child stunting 36.6 per cent

Standardized child stunting =  $36.6/40 \times 100 = 91.5$

- (iii) In step three, the standardized scores were aggregated to compute the hunger index score for each district. The aggregate score for each district was divided by five, that is, by the number of total indicators used in calculating the score.

Interestingly of the 22 districts in the state, SBS Nagar with a hunger index score of 59.9 was the best performing district while Muktsar at 82.0 was the worst performing district. There were seven districts with the hunger index score of less than 65. Two of these were placed in Majha, two in Doaba and three in Malwa. Five districts had a hunger index score exceeding 75. It is worth noting that all of these five districts including Fazilka, Faridkot, Muktsar, Bathinda and Mansa were placed in the Malwa region. In other districts, the hunger index score ranged between 65 and 75.

**Table 4: Districts classified by nutritional status of children and adults in Punjab, 2020-21**

Name of districts	Child Nutritional Status		Adults Nutritional Status (15-49 years)	Anaemia (among children and adults)		Severity of hunger (hunger score)
	Children under five years old who suffer from stunting (in %)	Children under 5 years who suffer from wasting (in %)	Women (15-49) with BMI below normal (< 18.5 kg/m <sup>2</sup> ) (in %)	Children aged 6-59 months who are anaemic (<11.0 g/dl) (in %)	All women aged 15-49 who are anaemic (in %)	
SBS Nagar	17.9	12.0	9.8	63.9	49.8	59.9
Rupnagar	15.1	9.1	13.4	65.5	64.5	63.1
Amritsar	19.4	11.9	9.6	73.6	52.1	63.4
Ludhiana	22.1	5.9	10.1	77.9	64.3	63.4
Hoshiarpur	19.3	11.5	10.8	69.6	54.1	63.6
Pathankot	22.1	10.3	11.0	68.3	55.0	63.8
Fatehgarh Sahib	30.0	7.1	9.8	61.5	65.1	64.5
SAS Nagar	26.2	10.7	9.5	63.7	59.5	65.1
Gurdaspur	25.1	9.5	11.1	70.1	55.2	65.3
Sangrur	23.4	10.4	14.1	66.9	52.6	66.2
Jalandhar	24.8	10.3	11.9	69.2	57.0	66.7
Moga	22.0	12.0	13.4	70.3	54.4	68.0
Kapurthala	24.6	12.8	11.5	68.7	54.5	68.1
Barnala	33.8	9.4	13.0	60.6	55.2	68.6
Tarn Taran	23.8	11.3	12.5	70.5	61.7	69.5
Patiala	20.3	9.9	14.0	76.7	65.3	70.1
Firozpur	30.0	12.9	12.6	73.4	61.4	75.0
Faridkot	28.1	10.3	16.3	76.1	63.2	75.7
Bathinda	23.0	15.4	16.5	69.6	59.7	76.1
Fazilka	35.9	9.5	19.4	70	66.9	80.9
Mansa	36.6	12.1	16.1	78.2	60.4	81.4
Muktsar	35.0	13.6	18.4	69	60.9	82.0
<b>PUNJAB</b>	<b>24.5</b>	<b>10.6</b>	<b>12.7</b>	<b>71.7</b>	<b>58.6</b>	<b>64.0</b>

**Source:** International Institute for Population Sciences (IIPS) and ICF. 2021. National Family Health Survey (NFHS-5), India, 2019-21: Punjab. Mumbai: IIPS.

Table 5 compares the hunger index score for 20 districts with the corresponding figures available for both the years 2015-16 and 2020-21. Data for Fazilka and Pathankot were unavailable for 2015-16. Six districts recorded a dramatic change in their ranking when it came to their indices. The change in ranking of the SBS Nagar district over these two years has been notable. With a hunger index score of 72.1, the district was ranked last among 20 districts in the state in 2015-16, but the situation turned around completely in 2020-21. The district with the lowest score of 59.9 was ranked first in 2020-21. Likewise, the ranking of the Rupnagar district improved from 14<sup>th</sup> to 2<sup>nd</sup> and of Ludhiana from 15<sup>th</sup> to 3<sup>rd</sup> during the same period. On the contrary, the ranking of Patiala district dropped from 1<sup>st</sup> to 15<sup>th</sup> place, that of Bathinda from 3<sup>rd</sup> to 18<sup>th</sup> place and that of Tarn Taran from 4<sup>th</sup> to 14<sup>th</sup> place. Of these six districts that experienced dramatic change in ranking during the period four fell in the Malwa region. Although the ranking of Rupnagar and Ludhiana in the region has increased considerable, the ranking of districts of Bathinda and Patiala in the same region has decreased considerably. There were no significant changes in the ranking of the remaining 14 districts in 2015-16 and 2002-21.



**Table 5: Punjab districts classified by rankings in severity of hunger in 2015-16 and 2020-21**

Name of districts	2015-16	Rank in 2015-16	2020-21	Rank in 2020-21	Change in ranking during 2015-16 and 2020-21
SBS Nagar	72.1	20	59.9	1	19
Rupnagar	69.5	14	63.1	2	12
Ludhiana	69.8	15	63.4	3	12
Amritsar	54.9	2	63.4	4	-2
Hoshiarpur	69.5	13	63.6	5	8
Fatehgarh Sahib	62.6	6	64.5	6	0
SAS Nagar	64.6	8	65.1	7	1
Gurdaspur	65.8	11	65.3	8	3
Sangrur	66.6	12	66.2	9	3
Jalandhar	64.3	7	66.7	10	-3
Moga	65.0	9	68.0	11	-2
Kapurthala	65.6	10	68.1	12	-2
Barnala	57.8	5	68.6	13	-8
Tarn Taran	57.1	4	69.5	14	-10
Patiala	50.1	1	70.1	15	-14
Firozpur	70.4	16	75.0	16	0
Faridkot	71.6	19	75.7	17	2
Bathinda	55.1	3	76.1	18	-15
Mansa	71.2	18	81.4	19	-1
Muktsar	70.4	17	82.0	20	-3

**Source:** Calculated by the authors.

An exercise was carried out to identify the correlates that would determine hunger in different districts of the state. The indicators presented in Table 6 cover a wide spectrum of hunger.

**Table 6: Correlates of Hunger in Punjab**

Name of indicators	Pearson correlation
Non-agricultural workers in rural areas (in %)	.706**
Total Fertility rate	.642**
Female illiterates (in %)	.551**
Poor breastfeeding practices (in %)	.487*
Scheduled caste population (in %)	.467*
Females (above six years) who never attended school (%)	.445*
Untreated water	0.387
Unclean fuel	0.271
Children not given colostrum immediately after birth (%)	0.221
Green revolution intensity	0.068
Women (aged 20-24 years) married below 18 years (%)	-0.060
Open defecation	-0.080
Urban population (%)	-0.115
Sex ratio (females per thousand males)	-0.240
Per capita income (Rs.)	-0.368

\*. Correlation is significant at the 0.05 level (2-tailed). \*\*. Correlation is significant at the 0.01 level (2-tailed).

Hunger is well correlated with non-agricultural workers in rural areas, total fertility rate, female illiteracy, poor breastfeeding practices and scheduled caste population. The correlation proved to be statistically significant. Other factors such as untreated water, unclean fuel, green revolution intensity, low age of women in marriage, open defecation, urban population, sex ratio and per capita income were not found statistically significant.

## CONCLUSIONS

Ironically, despite the fact that the green revolution has improved productivity, there has been no corresponding reduction in hunger levels in the Indian state of Punjab. Endemic hunger does not bode well for Punjab. It demonstrates that something is not right with the state's development model. The state's position on hunger indices for 2020-21 has been disappointing. Still 25 percent of children in the state were stunted, 11 percent wasted and 17 per cent were underweight and 12 per cent of the adults (both women and men) had a BMI below the normal levels. Seven out of every ten children, six out of every ten women and one out of four men were still affected by anaemia. While, the current nutritional status of women and children is worrying, but the pace of improvement is equally worrying. Although there has been a decrease in the proportion of stunted and underweight children in the state but the progress on wasting is too slow. Furthermore, the proportion of anaemic children is on the rise with rising levels of anaemia among women in 2005-06 and 2020-21 period. Thus, the pace of progress in the fight against hunger in the state through various public sector initiatives is quite slow.

There was no consistent level of hunger in different parts of the state. On a scale of 0 to 100 (best to worst performance), Muktsar district with a value of 82 was the worst performer district whereas SBS Nagar Patiala district with a value of 59.9 was best performer in 2020-21. Six districts have experienced a dramatic change in their index ranking scores in 2015-16 and 2020-21. The state's hunger situation with respect to children and adults could get worsen in the future, due to the impact of Covid-19. In the case of children, low-calorie intake and poor nutrition can have long-term effects on their cognitive development.

Overall, the state is yet to fully translate its agriculture-induced growth into improved nutritional conditions. This demonstrates that there is something wrong with the state development model. The government has now to correct the situation. It should now concentrate on combating hunger in the state. This requires a multifaceted approach to preventing and improving the hunger situation. The immediate objective should be to give coordinated attention to all combined factors that determine hunger in children, adolescent and adults. Existing state programmes aimed at alleviating hunger need to be strengthened for universal coverage.

## REFERENCES

- Avula, R., P. H. Nguyen, L. M. Tran, S. Kaur, N. Bhatia, R. Sarwal, A. de Wagt, D. N. Chaudhery, and P. Menon (2022). Reducing Childhood Stunting in India: Insights from Four Subnational Success Cases." *Food Security* (April 1): 1–13. <https://doi.org/10.1007/s12571-021-01252-x>.
- Bharadva, K., S. Mishra, S. Tiwari, B. Yadav, U. Deshmukh, K. Elizabeth and C. R. Banapurmath (2019). Prevention of Micronutrient Deficiencies in Young Children: Consensus Statement from Infant and Young Child Feeding Chapter of Indian Academy of Pediatrics, *Indian Pediatrics*, Vol. 56, July 15, 2019.
- Bhattacharya, Ankita, Baidyanath Pal, Shankarashis Mukherjee and Subrata Kumar Roy (2019). Assessment of Nutritional Status using Anthropometric Variables by Multivariate Analysis, *BMC Public Health*, 19: 1045.

- De, Partha and N. Chattopadhyay (2019). Effects of Malnutrition on Child Development: Evidence from a Backward District of India, *Clinical Epidemiology and Global Health*, 7 (2019), 439-445.
- Department of Statistics. *Various volumes of National Sample Survey Office (NSSO)*, Government of India.
- Desai, Sonalde and Reeve Vanneman (2015). Enhancing Nutrition Security via India's National Food Security Act: Using an Axe instead of a Scalpel? *India Policy Forum*, Vol 11: 67-113.
- Economic Advisor to Government of Punjab (2016). *Statistical Abstracts of Punjab*, Economic and Statistical Organization, various volumes.
- Economic Advisor to Government of Punjab, *Punjab at a Glance- District wise*, Economic Advisor to Government of Punjab, various volumes.
- Evans, J.E. (1999). Nutritional Assessment, *Anthropometry*, 1<sup>st</sup> Edition, pp. 1357-1363.
- Gupta, A and J.E. Rohde (2004). Infant and Young Child Under-nutrition, Where Lie the Solutions, *Economic and Political Weekly*, December 4, pp. 5213-5216.
- International Institute for Population Sciences (IIPS) and ICF (2021). *National Family Health Survey (NFHS-5), India, 2019-21: Punjab*. Mumbai: IIPS.
- International Institute for Population Sciences (IIPS). *Different volumes of National Family Health Survey (NFHS-5), Punjab*. Mumbai.
- K. Von Grebmer, J. Bernstein, N. Hossain, T. Brown, N. Prasai, Y. Yohannes, F. Patterson, A. Sonntag, S.-M. Zimmermann, O. Towey, C. Foley (2017). *Global Hunger Index: The Inequalities of Hunger*. Washington, DC: International Food Policy Research Institute; Bonn: Welthungerhilfe; and Dublin: Concern Worldwide.
- Menon, P., A. Deolalikar and A. Bhaskar (2009). *India State Hunger Index: Comparison of Hunger across States*, Washington, D.C., Bonn and Riverside.
- Ministry of Women and Child Development, Government of India, ICDS and Nutrition in the Eleventh Five Year Plan (2007-12). *A Report of Working Group and Development of Children for the Eleventh Five Year Plan*, New Delhi.
- Puri, Raghav (2017). *India's National Food Security Act (NFSA): Early Experiences*, Lansa Working Paper Series, Volume 2017, No 14.
- Registrar General of India (2011). *Census of India*, Various volumes.
- Saxena, N.C. (2009). *Hunger, Under-nutrition and Food Security in India*, Policy Brief Series 7, Centre for Legislative Research and Advocacy, February 2009, New Delhi.
- Singh, Nina (2016). Hunger Amidst Plenty: The Case of Haryana, *Transactions*, Vol. 38, No. 2, 2016.
- United Nations (2021). <https://www.who.int/news/item/12-07-2021-un-report-pandemic-year-marked-by-spike-in-world-hunger>, accessed on 10<sup>th</sup> March 2022.
- United Nations. Transforming Our World: *The 2030 Agenda for Sustainable Development*-A/RES/70/1. New York, USA; 2016. Available: [https://sustainabledevelopment.un.org/content/documents/21252030Agenda for Sustainable Development web.pdf](https://sustainabledevelopment.un.org/content/documents/21252030Agenda%20for%20Sustainable%20Development%20web.pdf).
- World Bank (2022). <https://www.worldbank.org/en/topic/agriculture/brief/food-security-and-covid-19>.

\*\*\*\*\*