

## **Hunger and Under-nutrition in Green Revolutionary State of Punjab**

**Manisha Bhatia**

*Krishi Vigyan Kendra, Langroya, SBS Nagar,  
Panjab Agricultural University,  
Ludhiana, INDIA.*

### **Abstract**

The paper attempts to understand the state of affairs pertaining to hunger and under-nutrition in the green revolution State of Punjab. The basic hypothesis is that such a State should be free from this malady. Low weight, thinness, stunting among children and body mass index level among adults, incidence of micronutrient deficiencies including anaemia across different segments of population are the indicators used for the purpose. Various Secondary data sources including NFHS, DLHS, NNMB, NSSG and primary data from different government departments have been put in service. Analysis defy the hypothesis as the State figured disproportionately on these indicators. One-fourth of children were found underweight and one-eighth of adults had BMI below the normal levels. No less than 80 per cent of the children, 33 per cent of women and 40 per cent of the pregnant women suffered from anaemia. Consumption of lower levels of proteins and micronutrients continue to persist among different segments of population. It is ironical that despite the fact that the green revolution has improved productivity, availability and access of food in the State there has been not been a commensurate decrease in the levels of hunger and under-nutrition not to mention other states where agriculture is still to make headway. The State needs to strengthen its efforts to fight against endemic hunger and under-nutrition. The immediate goal should be a concerted emphasis on exclusive breastfeeding, initiation of micronutrient supplements and increased use of oral rehydration therapy along with other interventions including regular deworming.

## 1. Introduction

Hunger is “an uneasy sensation exhausted condition, caused by want of food”. In simple terms hunger is the compelling need or desire for food. Hunger is used as an alternative, even as a proxy, for malnutrition and under-nutrition. Hunger basically is of two types - raw hunger and chronic or endemic hunger. Feeling the need to fill the belly every few hours is the raw hunger. The second type of hunger chronic or endemic is not felt in the form of hunger pangs rather it leads to some subtle deficiencies affecting the development of human body. The deficiencies in micronutrients are often referred as hidden hunger. People who are chronically hungry are undernourished. Thus, hunger and malnutrition both are appalling problems that need to be resolved. Making food available to hungry people is vital but is unlikely to tackle the malnutrition. While a lack of food can cause both hunger and malnutrition, malnutrition is often caused by other things including the lack of care or poor health (Gupta, Rohde, 2004).

The Global Hunger Index designed in 2006 by International Food Policy Research Institute (IFPRI) recognized the interconnection of these dimensions of hunger and captured the performance on three dimensions of hunger – lack of economic access to food, shortfall in the nutritional status of children and child mortality (Menon, Deolalikar and Bhaskar, 2009). The Global Hunger Index calculated, thus, is indicative of the availability, affordability and accessibility of food and also suggestive of hidden hunger. On the Global Hunger Index-2010 India with a score of 31.7 was ranked at 67<sup>th</sup> position out of 84 countries placed above Bangladesh (25.2) but below Pakistan (21.7), Nepal (20.6), Myanmar (15), Sri Lanka (15), China (7.1) and Mauritius (5) among the neighbouring countries. This score was poorer than many of the sub-Saharan African countries with a lower GDP than India's. Per capita income of Kenya was 1.8 times lower than that of India's but its hunger score was 1.1 times better than India's score. A similar situation prevailed among other sub-Saharan African countries including Cameroon, Nigeria and Sudan.

## 2. Objective and Methodology

The paper endeavours to analyse the hunger and nutrition conditions existing in the state of Punjab among different vulnerable segments of its population. The paper looks into the food and non-food contributory factors manifested itself in an intake of essential calories, proteins, fats, and micronutrients, affecting growth of individuals due to under-nutrition or over-nutrition in Punjab. This is under the backdrop of the fact that if these goals are achieved in the best performing State of Punjab than other states can follow its model to achieve the Millennium Development Goals targeted for country by 2015. The paper is based on the data collected through secondary sources including surveys such as National Family Health Survey (NFHS), District Level Household Survey (DLHS), National Nutrition Monitoring Bureau (NNMB) and National Sample Survey Organisation (NSSO). Discussion in the paper is organised into three sections. Section-1 of the paper looks into the nutritional status of children

including the child feeding practices in the state of Punjab. Section-2 discusses the nutritional status of adults, both among men and women. Section-3 analyses the micronutrient deficiencies related to iron & folic acid, fluoride, iodine and vitamin-A.

### 3. Nutritional Status

Before discussing the nutritional status of children and adults in the State it is pertinent to discern the food consumption pattern of men and women in Punjab. Appropriate food intake practices determine the nutritional status of an individual. A glance at the food consumption patterns of a community is imperative to ascertain its nutritional status. Food consumption pattern among the adults in the state reveals that men here are more likely to consume milk or curd, pulses or beans, dark green leafy vegetables and fruits than their counterparts while women mostly consume pulses or beans, green leafy vegetables and other vegetables more frequently. Around 60 per cent of them consume milk or curd, though the consumption of fruits, eggs and chicken, meat or fish is a little low (Table 1). Differentials in the food consumption patterns on the basis of gender clearly favoured men.

**Table 1:** Food Consumption of Adults in Punjab.

Type of food	Frequency of Consumption							
	Daily		Weekly		Occasionally		Never	
	Male	Female	Male	Female	Male	Female	Male	Female
Milk or curd	68.6	59.0	17.2	11.7	11.0	19.4	3.2	9.9
Pulses or beans	75.2	53.4	23.4	31.6	1.1	14.8	0.2	0.2
Dark green leafy vegetables	76.7	60.1	22.0	25.1	1.1	14.7	0.0	0.1
Fruits	23.0	15.4	48.4	22.2	28.1	58.3	0.4	4.1
Eggs	5.4	2.1	27.6	6.7	30.6	20.5	36.3	70.7
Fish	1.4	0.2	12.5	1.6	30.2	14.6	55.7	83.6
Chicken/Meat	1.6	0.3	17.1	3.5	40.1	20.8	41.1	75.4
Fish or chicken/ meat	1.8	0.3	18.2	3.9	39.3	20.5	40.6	75.2

*Source:* International Institute for Population Sciences, Mumbai, 2006

Nutrient wise consumption of calories and proteins declined as per the NSSO and NFHS data, both in rural and urban areas of Punjab during 1971-1994 but it increased thereafter (Table 2). In urban areas, the fat intake was more or less the same during 1972-94 which increased thereafter. The consumption of fats in rural Punjab has also increased over a period of time.

**Table 2:** Per Capita Intake of Calorie, Protein and Fat Per Diem in Punjab, 1972 to 2005.

Years	Unit	Rural	Urban
<b>1972-73 (NSSO 27th Round)</b>	Calorie (Kcal)	3493	2783
	Protein (0.0 gm)	85	70
	Fat (0.0 gm)	50	52
<b>1983 (NSSO 38th Round)</b>	Calorie (Kcal)	2418	2089
	Protein (0.0 gm)	74.7	61.8
	Fat (0.0 gm)	59.8	53.7
<b>1993-94 (NSSO 50th Round)</b>	Calorie (Kcal)	2677	2100
	Protein (0.0 gm)	79	63
	Fat (0.0 gm)	52	49
<b>2004-05 (NSSO 61st Round)</b>	Calorie (Kcal)	2763	2614
	Protein (0.0 gm)	82.3	77
	Fat (0.0 gm)	72.5	74.2

*Source:* Compiled from Various volumes of NSSO, Department of Statistics, Government of India

In fact prevalence of obesity among men and women is escalating in Punjab in line with the developed economies. The food pattern of the men and women is likely to make them obese.

#### 4.1 Nutritional Status of Children

Undernourished children do not grow as quickly as healthy children. Mentally they may develop slowly. On the other hand, healthy children grow up into healthy adults who are strong, more productive and an asset for the nation. Three standard indices of physical growth including height-for-age (stunting), weight-for-height (wasting) and weight-for-age (underweight) describe under nutrition levels among children. In Punjab, 35 per cent of children in 2005-06 were stunted indicating undernourishment for some time, 10 per cent were wasted indicating inadequate recent food intake or recent episodes of illness and 24 per cent were underweight having both chronic and under nutrition. The incidence of stunting was bit higher among rural children (35 per cent) as compared to the children in urban areas (33 per cent). The incidence of stunting remained almost at the same level of 45 per cent during 1992-93 and 1998-99 but declined thereafter to 35 per cent in 2005-06, a fall of 11 per cent points. 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. Thereafter it increased marginally by two per cent points in 2005-06. The proportion of underweight children came down steadily from 40 per cent in 1992-93 to 25 per cent in 1998-99 thereafter the decline has been sluggish in 2005-06.

**Table 3:** Nutritional Status of Children in Punjab, 1992-2006.

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	34.7	10.2	23.6
	Rural	35.4	10.0	25.9
	Urban	32.9	10.7	19.6

*Source:* International Institute for Population Sciences, Mumbai, 2005-06.

At district levels 14 districts had about 30 to 50 per cent underweight children. Southern parts of the State had shown higher prevalence of underweight children, their proportion was particularly high in Muktsar district (DLHS-II, 2006).

**Child feeding practices:** It is well documented that mother's milk is the best food for the newborn child and it has significant impact in reducing the mortality in infants. Breast milk is important for physical and mental development of child as it not only improves nutritional status of young children but also reduces morbidity and mortality. It is, therefore, desirable that an infant should begin to breastfed as soon as possible after birth. World Health Organisation (WHO), United Nations Children Fund (UNICEF) and Reproductive and Child Health (RCH) Programme recommend that breastfeeding should be initiated soon after birth.

In Punjab 10-18 per cent of infants are undernourished during first six months of life (NFHS-3). The reason for such undernourishment is lower proportion of children who are exclusively breastfed for first six months of their lives. NFHS-3 indicates that only 36 per cent of the infants in the State are exclusively breastfed during first six months of their lives. DLHS reported a rise in exclusive breastfeeding by 9.3 per cent points during its third round (2007-08) as compared to its second round (2002-03).

Almost half of the children in the rural areas are exclusively breastfed as compared to 40 per cent in urban areas. Due to strong preference for sons in Punjab women stop breastfeeding a girl at a younger age to increase the chances of having another child earlier with the hope that the next child will be a boy. In contrast with the general notion that awareness for exclusive breastfeeding is more among educated mothers, the NFHS-3 data reveals that in Punjab 42.4 per cent of children of illiterate mothers are exclusively breastfed as compared to 27.3 per cent of children whose mothers have received formal education of matric and above.

The timings and type of supplementary food introduced in an infant's diet also has a significant effect on the child's nutritional state. At about six months the nutrient requirement of an infant increases which needs to be supplemented as breast milk alone would not be adequate to provide the required nutrient intake for infants. NFHS-3 data reveals that only half of the children in Punjab received supplementary food making the children vulnerable to infections leading to higher child mortalities. The

proportion of children receiving supplementary food was higher among mothers who were educated up to matric and above than that among the illiterate mothers.

#### 4.2 Nutritional Status of Adults

Anthropometric measurement concerned with measurement of body height, weight and proportions, among other things is one of the direct methods of nutritional assessment. The international standard for assessing body size in adults is the Body Mass index (BMI). BMI is an index that relates an individual's weight to his/her height. It is used to assess both thinness and obesity. It is defined as weight in kilograms divided by height in meters squared ( $\text{kg/m}^2$ ). The spectrum of nutritional status is spread from chronic energy deficiency to obesity. Chronic energy deficiency is indicted by a BMI of less than  $18.5 \text{ kg/m}^2$  while an individual with BMI of more than  $25 \text{ kg/m}^2$  is considered overweight. BMI of  $30 \text{ kg/m}^2$  and above indicates obesity.

**Table 5:** Nutritional Status of Adults (BMI below Normal) in Punjab.

Years	Type of areas	Ever-married Women	Ever-married Men
1998-99	<b>Total</b>	16.9	n.a.
2005-06	<b>Total</b>	13.5	12.0
	<b>Rural</b>	14.5	11.2
	<b>Urban</b>	11.8	13.4

*Source:* International Institute for Population Sciences, Mumbai, 2006; *Note:* n.a. not available.

In Punjab around one-fifth of the women and men were thin i.e. they had BMI below normal in 2005-06. The incidence of thinness was slightly higher among women in rural areas than their counterpart while in case of men it was slightly higher among urban men as compared to their counterparts in rural areas. The prevalence of thinness among women in Punjab has come down from 17 per cent in 1998-99 to 13 per cent in 2005-06 (Table 5).

However, there is another distressing phenomenon taking place in the state as regards the nutrition. Even though both the Punjabi women and men seem less likely to be undernourished but they are more prone to higher risks of the other extreme of malnutrition i.e. overweight or obesity. Two out of every five women in Punjab were obese in 2005-06. This proportion was highest among all Indian states. Not only higher proportion of obese women was the cause of concern but equally critical was alarming increase in their proportion. During a span of about six years, the proportion of obese women rose from 30 per cent in 1998-99 to 38 per cent in 2005-06. Urban women (45 per cent) as compared to their rural counterparts (33 per cent) were more prone to obesity (Table 6). The pattern was same for Punjabi men with corresponding figures of 34 and 27 per cent.

**Table 6:** Nutritional Status of Adults (BMI above Normal) in Punjab.

Years	Type of areas	Ever-married Women	Ever-married Men
1998-99	Total	30.2	n.a.
2005-06	Total	37.5	30.3
	Rural	32.9	27.4
	Urban	45.4	34.1

*Source:* International Institute for Population Sciences, Mumbai, 2006 *Note:* n.a. not available.

This rise in obesity in Punjab may be attributed to increased urbanisation, mechanisation of jobs, transportation, availability of processed and fast foods, dependence on TV for leisure, less physical activity lifestyles and consuming more energy dense nutrient poor diet. The share of cereals, legumes, pulses and nuts in people's diet has more or less remained stable. The consumption of sugar, oils, fats and animal products have increased. Socio-economic conditions prevailing in the state has brought in changes in the dietary intake, food consumption patterns and physical activity levels. The high prevalence of alcoholism among men (43 per cent) in the state probably is a vital contributory factor for rising obesity among them. Rapid increase in the tendency of gaining weight should be a wake-up call for the policy makers as obesity itself may not be a specific disease but it certainly is one of the causes leading to degenerative diseases like diabetes, coronary artery diseases, hypertension, cardio vascular diseases, malignancy, sleeplessness, respiratory and orthopaedic disorders. Early policy interventions are required to arrest the incidence of obesity before it reaches the stage of being an endemic.

#### 4. Micronutrient Deficiencies

Specific micronutrient deficiencies influencing children include iron deficiency anaemia, Vitamin-A deficiency, iodine deficiency disorder and fluoride deficiency. This section examines the fact as whether the state of Punjab suffering from the dual burden of obesity and undernutrition also bear a health burden arising from poor micronutrient deficiencies.

##### 4.1 Anaemia

**Anaemia among children:** Anaemia or iron and folic deficiency is most common micronutrient deficiency among children which needs constant vigil as its deficiency can lead to impaired cognitive performance and behavioural and motor development and ultimately affecting their academic performance. Anaemia also leads to reduced immunity and increased morbidity among children. The reasons associated with anaemia are undernourishment, poor absorption of iron and folic acid and infestation of hookworms. Table 7 reveals that almost 80 per cent of children in Punjab in the age group of 6-35 months were anaemic; 50 per cent among them are moderately anaemic,

7 per cent had severe anaemia. Among all districts severe anaemia was widespread among children (16 per cent) in Ferozepur district. Almost no change in the level of anaemia among children at the state level during the span of almost six years from 1998-99 to 2006-06 portraying a perturbing situation indicates poor implementation of different schemes meant to get rid of such deficiencies.

Hookworm infestation perhaps is one of the contributory factors of anaemia especially among rural children in Punjab. Barefoot walking, unhygienic habits and use of untreated water generally lead to infestation of hookworm which feeds on blood inside the guts thus leading to deficiency of blood in the body. Low dietary intake and poor iron and folic acid intakes are major factors responsible for high prevalence of anaemia. On both the parameters, the picture is grim in Punjab as only 10 per cent of children ate iron rich food and only five per cent were given iron supplementation under National Anaemia Prophylaxis Programme (NAPP) started by Government of India.

**Anaemia among adolescent girls:** As high as 99 per cent of the adolescent girls in Punjab in the age group of 10-19 years had some form of deficiency pertaining to their anaemia levels; 17 per cent of them were mildly anaemic, 48 per cent were moderately anaemic and 34 per cent were having severe anaemia (DLHS-2, 2006). The incidence of anaemia was higher among rural adolescent girls than among urban adolescent girls. At the district level, more than two-fifths of the adolescent girls in Bathinda, Ferozepur, Moga and Patiala districts were severely anaemic. In fact more than half of adolescent girls in Mansa and Muktsar districts were severely anaemic. Districts with high prevalence were located mainly on western part of the state.

**Anaemia among married women** The requirement of iron is relatively higher among women due to blood loss experienced by them either during menstruation or at the time of delivery. In Punjab, almost two-fifths of the women suffered from anaemia. The reason attributable for high percentage of women suffering from anaemia in Punjab is primarily undernourishment. A cereal based diet with fewer intakes of green leafy vegetables and Vitamin-C and higher consumption of tea and coffee hinder the absorption of iron in the body, thus, leading to its deficiency.

**Table 7:** Status of Anaemia among Women and Children in Punjab, 1992-2006.

	NFHS-II	NFHS-III
<b>Children (6-35 months)</b>	<b>80.0</b>	<b>80.1</b>
<b>Women (15-39 years)</b>	<b>41.4</b>	<b>38.3</b>
<b>Pregnant Women (15-49 years)</b>	<b>37.1</b>	<b>41.6</b>

**Source:** IIPS, Mumbai 2005-06 Note: Hb level for children <11.0g/dl, Women<12.0g/dl and pregnant women,11.0g/dl

A cereal based diet with fewer intakes of green leafy vegetables and Vitamin-C and higher consumption of tea and coffee hinder the absorption of iron in the body, thus, leading to its deficiency. The question arises whether this undernourishment is really attributed to inadequacy of food in Punjab or inadequate intake of nutrients among females. This issue needs to be viewed in a larger perspective by not ignoring the social causes deeply rooted among the Punjabi society. The discriminatory attitude towards girls in providing nutritious and healthy diet in the otherwise prosperous state of Punjab has led to poor anaemic levels among them. Higher emphasis on consumption of milk and milk products leading to deprivation of other nutrients including iron is another contributory factor for anaemia. For tackling such a situation the right kind of awareness on proper cooking of cereals and pulses to prevent nutrient loss is required.

**Anaemia among pregnant women:** The intake of nutrients especially iron need to be increased during pregnancy. Mothers living with constant hunger often give birth to underweight and weak babies, and are themselves facing increased risk of death. Deficiency of iron during pregnancy can lead to premature birth, low birth weight babies and even higher mortalities. It also leads to low immunity in the newborn. The NFHS-3 data indicates that 41.6 per cent of the pregnant women suffered from anaemia in Punjab, this is up by 4.5 per cent points in NFHS-2. The prevalence of moderate anaemia among pregnant women is relatively higher in Muktsar district (68.3 per cent) followed by Mansa (61.5 per cent) and Hoshiarpur districts (61.5 per cent). In Kapurtala district, 14.3 per cent of the pregnant women were severely anaemic (DLHS-2, 2006).

**Fluoride deficiency:** Prolonged intake of water containing excess fluoride causes the crippling disease called fluorosis. Prolonged ingestion manifests itself as dental, skeletal and non-skeletal fluorosis. Malnourished children, pregnant women and lactating mothers are especially vulnerable to fluorosis. In Punjab almost one-tenth of them are at risk of fluoride deficiency. India Nutrition Profile revealed that in rural Punjab there were 2.8 per cent persons suffering from dental fluorosis. Interventions include a diet rich in calcium, Vitamin-C, E and antioxidants.

**Iodine Deficiency:** Iodine is another vital micronutrient. Iodine deficiency disorders have been identified as a public health issue and accorded importance since the mid-twenties. National Iodine Deficiency Disorders Control Programme has concentrated on ensuring the consumption of iodized salt. NFHS-3 showed that 75 per cent of the households in the state having children below five years used adequately iodized salt.

**Vitamin-A deficiency:** Vitamin-A deficiency can lead to blindness. The intake of Vitamin-A rich food is important to prevent its deficiency. NFHS-3 indicates that 56 per cent of the children in the state do not consume Vitamin-A rich food. Government of India targeted to cover all children between nine months to five years of age and increase the coverage of Vitamin-A supplementation programme to 90 per cent by 2009. However, DLHS-3 indicated that 65 per cent of children aged 9 months and above received at least one dose of Vitamin-A supplement. This proportion has

increased slightly from 60 per cent in DLHS-2. There is a lot to be done by the state government on this aspect to meet the targets.

## 5. Conclusions

Not only the present nutritional status of women and children is a matter of concern but equally worrisome is the pace of improvement in these levels. Even though there has been an improvement in the proportion of stunted and underweight children in the State but the progress in this regard is too tiny and too slow. On the other hand, the proportion of wasted and anaemic children is on the rise along with increasing levels of anaemia among pregnant women. This rise in wasted children, prevalence of anaemia and overnutrition has added to the complexity related to nutrition cycle in the state.

The state needs to prioritize its efforts to fight against endemic hunger and malnutrition. The immediate goal should be a concerted emphasis on exclusive breastfeeding, initiation of micronutrient supplements and increased use of oral rehydration therapy along with other interventions including deworming. Public health institutions and Punjab Agricultural University, the two key players, can play a vital role in this regard. Public health institutions under the umbrella of National Rural Health Mission should promote and ensure complete antenatal care services, natal and postnatal care services along with administration of micronutrient supplements. The Punjab Agricultural University through its vast network of Krishi Vigyan Kendras should promote nutrition education to enable the Punjabi people to feed and nourish themselves adequately as a matter of long term goal. Punjab Agricultural University also can play a major role in diversification of fruits and vegetable production. On the whole, the state has not fully translated its agricultural-led economic growth into improvements in nutritional conditions. Inclusive economic growth coupled with targeted short-term and long-term strategies are critical to confine the endemic hunger and malnutrition in the state.

The state needs to prioritize its efforts to fight against endemic hunger and malnutrition. The immediate goal should be a concerted emphasis on exclusive breastfeeding, initiation of micronutrient supplements and increased use of oral rehydration therapy along with other interventions including deworming. Public health institutions and Punjab Agricultural University, the two key players, can play a vital role in this regard. Public health institutions under the umbrella of National Rural Health Mission should promote and ensure complete antenatal care services, natal and postnatal care services along with administration of micronutrient supplements. The Punjab Agricultural University through its vast network of Krishi Vigyan Kendras should promote nutrition education to enable the Punjabi people to feed and nourish themselves adequately as a matter of long term goal. Punjab Agricultural University also can play a major role in diversification of fruits and vegetable production. On the whole, the state has not fully translated its agricultural-led economic growth into improvements in nutritional conditions. Inclusive economic growth coupled with

targeted short-term and long-term strategies are critical to confine the endemic hunger and malnutrition in the state.

## **References**

- [1] Ahmed, S.I. and M. Bhatia (2007), National Family Health Survey III Punjab (A Preliminary Analysis of Health and Family Welfare Indicators), Chandigarh, Population Research Centre, CRRID
- [2] Gupta, A and J.E. Rohde (2004), Infant and Young Child Undernutrition, Where Lie the Solutions, Economic and Political Weekly, December 4, 2004, pp. 5213-5216.
- [3] International Institute for Population Sciences (2006) Nutritional Status of Children and Prevalence of Anaemia among children, Adolescent Girls and Pregnant Women, District Level Household and Facility Survey (DLHS-II), 2002-04, India, Mumbai: IIPS.
- [4] International Institute for Population Sciences (2009), District Level Household and Facility Survey (DLHS-III), 2007-08: India, Punjab: Mumbai: IIPS.
- [5] International Institute for Population Sciences and Macro International (2008), National Family Health Survey (NFHS-III), India, 2005-06: Punjab, Mumbai: IIPS.
- [6] Menon, P., A. Deolalikar and A. Bhaskar, 2009, India State Hunger Index : Comparison of Hunger Across States, Washington, D.C., Bonn and Riverside
- [7] 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
- [8] Singh I and K Grover (2003), Nutritional Profile of Urban Pre-School children of Punjab, Anthropologist, Volume 5 No.3.

