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**Food Security and Nutritional Status  
of Children in Maharashtra**

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**Sayed Unisa, Aparajita Chattopadhyay,  
Prakash Fulpagare and Atreyee Sinha**



(Established in 1956)

Capacity Building for a Better Future

INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES

Mumbai, India

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May, 2016

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**Suggested Citation:** Unisa, Sayeed, Aparajita Chattopadhyay, Prakash Fulpagare and Atreyee Sinha, 2016. "Food Security and Nutritional Status of Children in Maharashtra", Working Paper No. 12, International Institute for Population Sciences, Mumbai.

**IIPS Working Paper No. 12**

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## **Introduction**

Food security "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2012). Food security was understood to apply at the national level, with a state being food secure when there was sufficient food to sustain a steady expansion of food consumption and to offset fluctuations in production and prices. The three components of food security are—availability (having sufficient quantities of appropriate food available), accessibility (having adequate income or other resources to access food), and utilization/consumption (having adequate dietary intake and the ability to absorb and use nutrients in the body). These three components provide the basis for food security policies, and programs in developing countries.

Historically, in India, efforts were being made to achieve food security among the population. Public Distribution System (PDS) was started during British India at the time of World War-II to control famine and to have access to food by all households (FAO). This system was continued in independent India too. However, the PDS policy was changed as part of economic programmes of the Government of India and a new approach named as targeted PDS (TPDS) was introduced in 1997. Another scheme known as Integrated Child Development Services (ICDS) scheme was launched in 1975 as one of the largest and unique programmes for early childhood development. National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme in 1995, and this is popularly known as Mid-Day-Meal Scheme (MDMS) (Department of School Agency and Literacy). National Food Security Act of 2013 has been passed to provide an adequate quantity of quality food at affordable prices to people to live a life with dignity (Government of India, 2013). In this context, it is worthwhile to examine the food security at national and sub-national level to see the impact of these schemes on the child nutrition.

There has been a paradigmatic shift in the concept of food security, from food availability and stability to household food insecurity (Sen,1981; Radimer et al., 1992; World Food Council, 1992). Food security, though used interchangeably with nutritional security, is

not same. Factors that contribute to the household food insecurity are environmental, contextual and social, policy & programme related to the availability of food (Radhakrishna, 2005; Campbell, 1991; Ruel et al., 1999). Food insecurity is necessary, but not sufficient for nutrition security. Nutrition security considers care, health, and hygiene practices in addition to food security. The FAO defines nutrition security as “A situation that exists when secure access to an appropriately nutritious diet is coupled with a sanitary environment, adequate health services and care, in order to ensure a healthy and active life for all household members” (FAO, 2012). In many studies, socioeconomic status of the household is identified as a primary risk factor of food insecurity. Limited income of the households coupled with increasing living expenses (housing, electricity, education of children and medical expenses etc.) may increase the probability of household being food insecure (Zalilah and Tham, 2002; Broughton et al., 2006; Abdul and Perera, 2011). In case of cultivators, income is dependent on agriculture production and it is affected by weather conditions. Moreover, many of the cultivators face the decrease in the landholding size over the period due to divisions among the family members. Interestingly A. Sen, in his doctoral work in 1980s, elaborated the basic need to understand the importance of food security. “Poverty and Famines: An Essay on Entitlement and Deprivation,” brought to the forefront the importance of food access in determining food security by highlighting historical examples of famine conditions in countries with sufficient national food supplies (Sen, 1981). Under conditions of high food prices and low demand for wage labor, even if food supplies are sufficient, the poor inhibit their access to available food. Emblematic of this shift in thinking, later food security concept was revised to encompass the components of availability and accessibility (UN 1975, FAO, 1983). Household food insecurity has been associated with decreased household food supply, especially of pulses, milk, fruits and vegetables. Also, food insecurity has been negatively associated with women's food intake (Matheson et. al, 2002). The nutrition deficiencies during pregnancy, lactation can contribute to inappropriate growth attainment such as stunting and underweight among young children (Institute of Medicine, 1991; Abalo, 2009; Coleman-Jensen, et al., 2013). Food insecurity may lead to insufficient dietary intake that can lead to nutrition deficiencies among children (Kendall et al. 1996; Olson, 1999; Cook et al., 2004). There has been growing interest in the hypothesized link between food insecurity and malnutrition among children (Zalilah and Tham, 2010; Matheson et al., 2002; Nakabo-Ssewanyana, 2003; Bhattacharya, et al., 2004; Osei, 2010, Gillespie, 2013 Baker-French, 2014). Recent evidence makes it clear that in a resource-poor setting, a child experience adverse impact of nutritional deficiency in early life i.e., the period beginning with the woman's pregnancy and continue until the child is 2 years old (Osei et al., 2010; Coffey et al., 2014).

**Need for the study:**

Few studies in India has examined aggregate level data on food security and child nutritional status (Gopalan, 1996; Deaton and Dreze, 2009; Coffey et al., 2013; Gillespie, 2013), Yet, the relationship between household food insecurity and nutrition status of children is not that comprehensive, using household level large scale surveys. Evidence from some selected developing and developed countries give adequate emphasis on exploring the pathways of food security and child nutrition (Matheson et al 2002; Saha et al., 2009; Nord et al., 2009; Kamal, et al., 2010; Osei et al., 2010) as food insecurity is having ripple effect on economy and society. No national level survey in India has yet covered food security module. In 2012, a food security module for the first time was included in Comprehensive Nutrition Survey in Maharashtra (CNSM). Data of CNSM has given the scope of analyzing household food security in relation to nutritional indicators of children under two years. Moreover, in the state of Maharashtra an independent State Nutrition Mission known as - the Rajmata Jijau Mother Child Health and Nutrition Mission- in collaboration with UNICEF has been operational during 2005-2010 and the Phase-II of the Mission (2011-2015) is in progress for the improvement of nutritional status of children (Government of Maharashtra).

The need to examine the food security at household level and child nutrition in Maharashtra is pertinent in context of food security bill. Maharashtra has already rolled out its food security bill in 2014. As per World food programme, districts of Maharashtra can be grouped into two categories: One falls in the hilly forested tract and the other is the central dry Maharashtra, i.e. Vidarbha and Marathwada region. As per Food Security Outcome Index (FSOI) status of rural Maharashtra, except Sindhidurg and Ratnagiri, all districts are to some extent food insecure and 8 districts are severely food insecure (IHD, 2010). In context of such food security scenario and child malnutrition, this paper describes the level of household food security in Maharashtra by its administrative divisions and the characteristics of household by food security status to identify the risk factors of food insecurity in rural and urban areas separately. It also explores the relationship between household food security and nutritional outcomes of children under two years in the administrative divisions of Maharashtra. Divisional variation of food security needs to be captured for implementing customized programmes using evidence-based low-cost, high impact nutrition-specific and nutrition sensitive interventions. Hence, there is a need to examine the household food security (not nutritional security) and factors influencing such food insecurity in one of the most prosperous states in India.

## Data and Methods

Comprehensive Nutrition Survey of Maharashtra (CNSM) is a unique research that provides ample data to understand the child feeding practices and food habits along with food security at household level. The study was conducted by the International Institute for Population Sciences (IIPS) as a nodal agency and UNICEF provided the technical and financial support (IIPS and UNICEF, 2013). The survey covered a representative sample from six administrative divisions of Maharashtra covering 2650 children under age two during February -April 2012. The selection of the sample was done separately in rural and urban areas using a multi-stage stratified sampling procedure. The state of Maharashtra is divided into 35 districts, which are grouped into six administrative divisions namely, Amaravati, Aurangabad, Konkan, Pune, Nagpur, and Nashik.

Measures obtained from anthropometry are sensitive indicators of health, development, and growth among infants and young children. So, anthropometric indicators were measured by trained health personnel in this survey. Children's length was measured using a length measuring board with a maximum length capacity of 91 cm and an accuracy of 1 mm. The electronic weighing scale was used to weigh the children with a maximum weighing capacity of 25 kg and an accuracy of  $\pm 10$  gram. Nutritional status is defined in terms of stunting, wasting and underweight. The WHO Global Database on Child Growth and Malnutrition uses a Z-score cut-off point of  $<-2$  SD to classify low weight-for-age, low height-for-age and low weight-for-height as moderate and severe undernutrition, and  $<-3$  SD to define severe undernutrition. The cut-off point of  $>+2$  SD classifies high weight-for-height as overweight in children. Definitions of nutritional status by WHO is given below:

- 
- a) Underweight – Weight for age: Moderate and severe - below minus two standard deviations from median weight for age of reference population; severe - below minus three standard deviations from median weight for age of reference population.
  - b) Wasting –Weight for Height: Moderate and severe - below minus two standard deviations from median weight for height of reference population.
  - c) Stunting –Height for age: Moderate and severe - below minus two standard deviations from median height for age of reference population.



Stunting, or low height for age, is caused by long-term insufficient nutrient intake and frequent infections. Stunting generally occurs before age two, and effects are largely irreversible. These include delayed motor development, impaired cognitive function and poor school performance. Nearly one third of children under five in the developing world are stunted.

Wasting, or low weight for height, is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage and/or disease. There are 24 developing countries with wasting rates of 10 per cent or more, indicating a serious problem urgently requiring a response. Underweight is a combined index of stunting and wasting.

Household food security was measured using the tool (9 main questions followed by nine follow-up questions) developed by Food and Nutrition Technical Assistance (FANTA) project (Coates et al., 2007). Considering several literatures on food security, FANTA and partners identified a set of question that are well tested in many developing nations and can effectively identify food secure and insecure households (Frongillo, 1999; Hackett, 2008). These questions in the survey were asked only to person responsible for food preparation (responsible women in the house) as well as efforts were made to have strict privacy during this module canvassing.

Based on the questions of household food security, the Household Food Insecurity Access Prevalence (HFIAP) indicator was computed (Coates et al., 2007). The information generated by the HFIAP can be used to assess the prevalence of household food insecurity (access) in varying administrative units and to detect changes in the household food insecurity (access) situation of a population over time (e.g., for monitoring and evaluation).

Household food insecurity access was measured using items from the validated Household Food Insecurity Access Scale (HFIAS) that was specifically developed for use in developing countries [Maxwell, 2008; Frongillo et al, 2006; Coates et al., 2007; Knueppel et al, 2010]. The HFIAS consists of 9 items specific to an experience of food insecurity occurring within the last month. Each respondent indicated whether they had encountered the following at household level due to lack of food or money to buy food in the last one month: (1) worried about running out of food, (2) lack of preferred food, (3) the respondent or another adult had limited access to a variety of foods due to a lack of resources (4) forced to eat un preferred food due to lack of resources, (5) eating smaller portions, (6) skipping meals, (7) the household ran out of food, (8) going to sleep hungry, and (9) going 24 hours without food. Endorsed items are then clarified with reported estimates of the frequency of food insecurity

(rarely, sometimes, and often). Scores range from 0 to 27 where higher scores reflect more severe food insecurity and lower scores represent less food insecurity. To determine the status of food insecurity the average HFIAS score was computed and then household food insecurity access prevalence (HFIAP) categories (food secure, mild, moderately and severely food insecure) was generated (Mulusew, 2015). Three questions on household's inability to eat preferred food, inability to eat a variety of food, and inability to eat the food of choice captures the domain of insufficient quality of food. The domain of perception that food is of insufficient quantity is captured by asking whether the respondents had to eat smaller meals or whether they had to eat fewer meals. Three questions on whether the respondents had no food to eat, had to sleep without food and had to go day and night without food captures the domain of reduction in food intake (see appendix I).

Thus, the HFIAP indicator categorizes households into four levels of food security: food secure, mildly insecure, moderately insecure, and severely food insecure based on the response of the household in nine questions and combining them with specified methods as suggested by FANTA. The categorization scheme is designed to ensure that a household's responses can place them in a single, unique category. Households that experience no food insecurity, but rarely experience some anxiety over sufficiency of food are categorized as food secure. Households that worry about not having enough food frequently as well as households that sometimes in last one month could not have their preferred food or have to eat to eat limited variety of food, or food that they really do not want to eat are categorized as mildly food insecure. Households that frequently have to eat food of limited choice and sometimes have to eat lesser quantity of food are categorized as moderately food insecure. Those households that have no food to eat or have to starve day and night are categorized as severely food insecure. The section on food security was administered to the person in the household who was most involved with the food preparation and means, though the respondent was to answer on behalf of all the household members. For all the questions on food security, a reference period of one-month period prior to survey was used

The paper analyzed the food security access condition by background characteristics like religion, caste, wealth and land holding, type of house, administrative regions. Then, thorough logistic regression analysis, we explained the main factors of food insecurity (Security). Further, we looked into the determinants of stunting and underweight (wasting being too small in number, is excluded) by food security, controlling pertinent factors like child and mother related characteristics, food consumption and food security along with administrative regions.

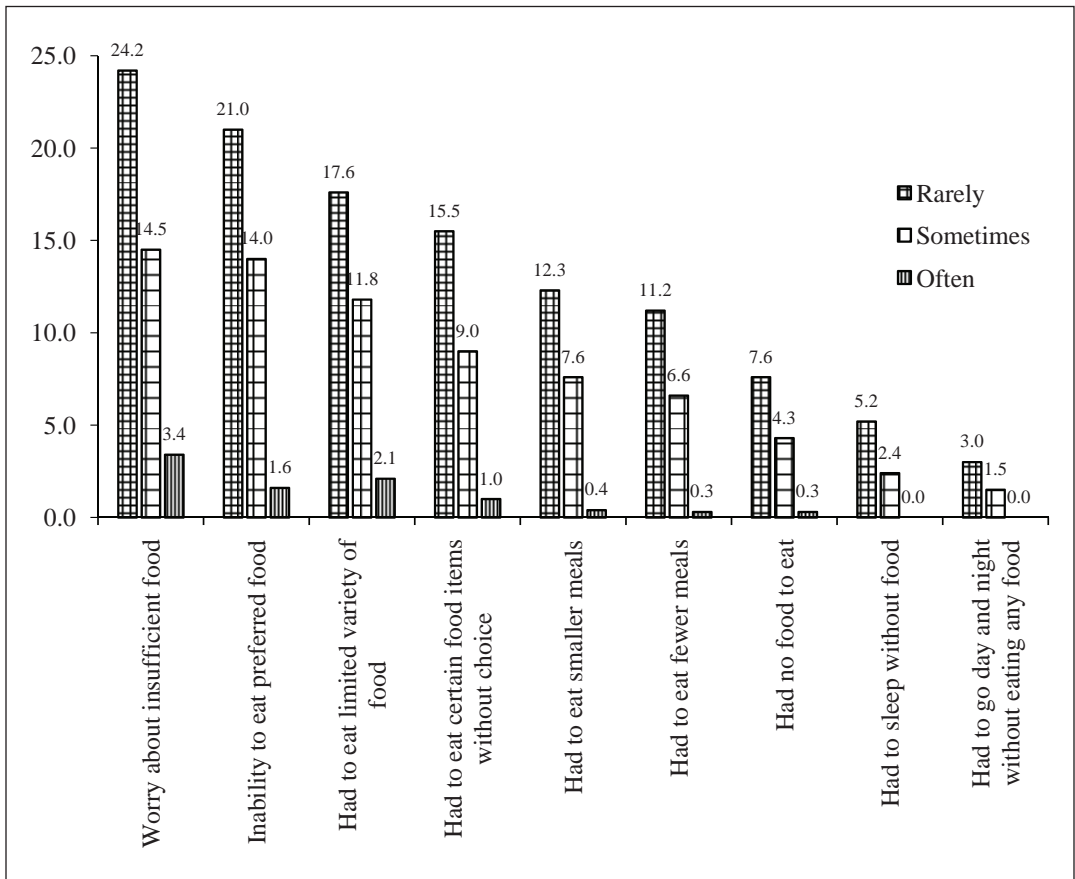
## Results

The results of the paper are categorized into two sections: firstly, it discusses food security aspects and its determinants; Secondly, it throws light on the nutrition status of children and its association with household food security.

### a) Food security in Maharashtra:

Approximately 18% households in Maharashtra were worried about insufficient food sometimes, or often in the previous month, whereas 58% never worried about insufficient food Figure 1. Three questions on household's inability to eat preferred food, i.e. a variety of food, and the food of choice capture the domain of insufficient quality of food. About 15 percent of households reported that they were unable to eat preferred food or had to eat a limited variety of food, and 10% had to eat certain food items without choice in the previous month. However, about 2% of the households reported experiencing the insufficiency of food or inability of eating preferred food often in the last month. Approximately 8 percent of the households had to eat smaller and fewer meals in the last month. Three questions on whether the respondents had no food to eat, had to sleep without food and had to go day and night without food capture the domain of reduction in food intake. About 5% of the households reported having had no food to eat in the last month either sometimes or often. Around 3% of the households reported having had to sleep without food sometimes in the last month. About 2% of the households in Maharashtra reported having had to go day and night without eating any food sometimes in the past one month.

**Figure 1:**  
**Percentage household in Maharashtra experiencing**  
**different components of Food security rarely, sometimes**  
**and often in the last month**



Food insecurity in the rural area is higher than the urban area in all nine components considered under food security (Table 1). About half of the rural households reported to be worried about insufficient food followed by 45% households with the inability to eat preferred food. Seventeen percent rural households had no food to eat because of lack of resources to get food compared to 8 percent in urban areas. About one-tenth of rural households reported to go a whole day and night without eating in the last month because of lack of food- an intense case of food insecurity. The regions that attract attention for immediate action related to food insecurity are Amravati, Aurangabad and Nashik divisions.

**Table 1: Percentage of households by nine components of food security, according to place of residence and administrative divisions, Maharashtra, 2012**

Background characteristics		Worry about insufficient food	Inability to eat preferred food	Had to eat limited variety of food	Had to eat food without choice	Had to eat smaller meals	Had to eat fewer meals	Had no food to eat	Had to sleep without food	Had to go day-night without food
Locality Type	Rural	48.3	44.4	39.6	32.2	27.2	24.3	16.8	10.4	6.5
	Urban	37.2	29.3	24.3	19.4	14.2	12.4	8.0	5.3	2.8
	Amravati	48.8	44.6	40.0	34.2	26.0	22.4	15.4	13.0	6.2
Region	Auranghabad	60.3	56.2	52.8	42.0	41.7	36.6	26.6	14.2	7.9
	Konkan	30.7	23.3	18.1	14.6	10.5	8.7	4.2	3.2	2.4
	Nagpur	37.7	29.9	15.0	9.2	10.0	8.8	7.0	4.4	3.2
	Nashik	50.6	48.7	43.2	33.0	31.4	28.4	20.2	14.3	8.7
	Pune	41.8	35.4	34.5	30.5	16.1	15.3	9.8	4.5	3.2

Note: Percentage shows the combined percentage of those who reported rarely, sometimes and often in each question.

In Maharashtra, 57% of the households were classified as food secure, 17% as having mildly food insecure, 13% having moderately food insecure, and 14% having severely food insecurity. More households in the urban than rural areas (66% vs. 49%) were classified as food secure. The proportion of food secure and insecure households varied considerably by the administrative divisions. It may be noted that three-quarters (73%) of households in Konkan being classified as food secure, and only 40% of the households in Aurangabad are classified as food secure. Except Konkan and Nagpur division, the rest of the divisions demonstrate moderate to severe insecurity with more than 25% households were classified under food insecurity (Table 2).

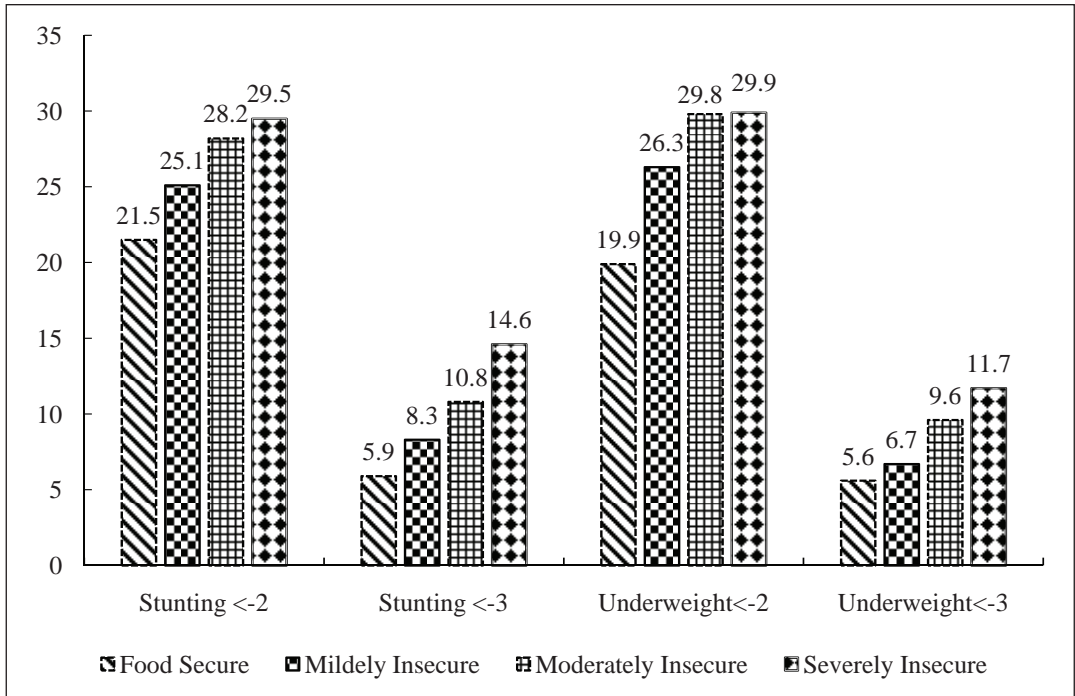
**Table 2:**  
**Percentage of households by Household Food Insecurity Access Prevalence (HFIAP) according to place of residence and administrative divisions, Maharashtra, 2012**

Background characteristics	Household food Insecurity Access Prevalence (HFIAP)1 (%)				Total
	Food secure	Mildly food insecure access	Moderately food insecure access	Severely food insecure access	
Total	57.0	16.7	12.7	13.6	2,630
<b>Place of Residence</b>					
Rural	49.4	16.6	16.0	18.0	1,440
Urban	66.2	16.9	8.7	8.3	1,190
<b>Administrative Divisions</b>					
Amravati	45.8	23.3	13.5	17.5	275
Aurangabad	39.5	14.7	18.3	27.5	461
Konkan	72.9	16.1	6.4	4.7	835
Nagpur	62.3	23.6	8.0	6.1	221
Nashik	47.2	12.8	17.7	22.3	339
Pune	58.3	16.3	15.3	10.1	499

Note :The HFIAP indicator categorizes households into four levels of household food insecurity (access):

Food secure, and mild, moderately and severely food insecure. Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently. Based on Food and Nutrition Technical Assistance Project (FANTA), (Coates et al., 2007)

**Figure 2:**  
**Percent children under 2 years experiencing stunted growth and underweight by food security status**



Based on WHO (2006) standard. Stunting means the child has low height for age; Underweight means low weight-for-age

Household living in rural and urban areas must be facing a different level of food security and the factor influencing it may also differ. Hence, in this paper an attempt has been made to examine food security for rural and urban areas separately by different background characteristics of the surveyed households. It has been observed that in rural households of Maharashtra, severe food-insecurity is experienced by 56.7 % Muslims, followed by Scheduled Castes and Tribes (28.7 and 22.3 % respectively). Landholding size and type of crop production have a direct relationship with food security. Households with less than five acres of land and those who produce mainly cotton have a higher incidence of food insecurity in comparison to households with large land holding and cash crop farming. Twenty-three percent households without ration card in rural areas face severe food insecurity (Table 3a). While in urban Maharashtra, the similar situation of severe food insecurity is observed among the poor households, those staying in kaccha house (Table 3b). However, religion-wise differentials in the severe food insecurity have a lower margin in urban areas.

**Table 3a:**  
**Household Food Insecurity Access Index by different background characteristics in rural Maharashtra**

Background characteristics		Household Food Insecurity Access Index (%)				Total
		Food secure	Mildly food insecure access	Moderately food insecure access	Severely food insecure access	
<b>Religion</b>	Hindu	50.4	16.2	15.8	17.7	100.0
	Muslim	12.6	10.8	19.8	56.7	100.0
	Buddhist/Neo-Buddhist	29.6	25.0	19.5	25.9	100.0
	Others	0.0	0.0	86.6	13.4	100.0
<b>Caste</b>	SC	35.0	18.3	17.9	28.7	100.0
	ST	43.1	15.0	19.7	22.3	100.0
	OBC	60.3	15.9	11.7	12.1	100.0
	VJ/NT	39.6	19.1	19.5	21.8	100.0
	Others	53.4	16.4	15.3	15.0	100.0
<b>Wealth Index</b>	Poorest	41.0	17.0	15.6	26.3	100.0
	Second	50.9	14.2	19.1	15.8	100.0
	Middle	46.6	19.8	16.3	17.3	100.0
	Fourth	67.0	17.2	11.8	3.9	100.0
	Richest	90.8	6.1	3.1	0.0	100.0
<b>Agricultural land own/lease</b>	No	34.5	16.7	24.4	24.3	100.0
	Yes	54.5	16.6	12.9	16.1	100.0
<b>Amount of landholdings</b>	<5 acres	50.0	17.5	14.1	18.4	100.0
	>=5 acres	67.3	13.9	8.9	9.9	100.0
<b>Type of crop produced</b>	Food crops	54.0	14.9	17.3	13.9	100.0
	Cotton	52.3	12.6	14.2	20.9	100.0
	Cash crops/fruits	58.9	20.1	13.4	7.5	100.0
<b>Type of house</b>	Kachha	37.7	18.6	18.8	25.0	100.0
	Pucca/semi pucca	53.0	15.8	15.3	15.9	100.0
<b>Household has ration card</b>	Yes	53.1	15.1	14.9	16.8	100.0
	No	35.4	20.8	20.3	23.5	100.0
<b>Region</b>	Amravati	42.3	24.4	14.4	18.9	100.0
	Auranghabad	36.3	13.7	20.1	29.9	100.0
	Konkan	68.5	12.0	10.4	9.1	100.0
	Nagpur	57.6	29.9	5.4	7.1	100.0
	Nashik	46.5	10.9	19.4	23.2	100.0
	Pune	52.2	16.2	19.0	12.6	100.0



**Table 3b:**  
**Household Food Insecurity Access Index by different background characteristics in Urban Maharashtra**

Background characteristics		Household Food Insecurity Access Index (%)				Total	
		Food secure	Mildly food insecure access	Moderately food insecure access	Severely food insecure access		
<b>Religion</b>	Hindu	68.3	15.0	8.2	8.4	100.0	
	Muslim	48.0	23.6	13.3	15.1	100.0	
	Buddhist/Neo-Buddhist	68.2	20.8	5.5	5.5	100.0	
	Others	65.3	18.1	9.9	6.6	100.0	
<b>Caste</b>	SC	58.0	19.1	11.1	11.9	100.0	
	ST	70.9	7.6	6.5	15.0	100.0	
	OBC	68.7	17.3	7.3	6.7	100.0	
	VJ/NT	62.6	16.2	10.0	11.2	100.0	
	Others	64.5	17.8	9.2	8.4	100.0	
	<b>Wealth Index</b>	Poorest	58.4	12.9	6.8	21.8	100.0
		Second	46.7	17.6	14.4	21.4	100.0
Middle		46.6	22.0	12.7	18.6	100.0	
Fourth		55.4	22.5	12.4	9.7	100.0	
Richest		85.9	9.4	2.8	2.0	100.0	
<b>Type of house</b>	Kachha	48.6	13.8	12.4	25.2	100.0	
	Pucca/semi pucca	66.5	17.4	8.5	7.6	100.0	
	<b>Household has ration card</b>	Yes	67.7	16.2	7.4	8.7	100.0
No		55.4	19.6	13.7	11.3	100.0	
<b>Region</b>	Amravati	55.9	14.1	14.9	15.1	100.0	
	Auranghabad	48.7	18.2	14.4	18.7	100.0	
	Konkan	73.3	16.8	5.8	4.1	100.0	
	Nagpur	73.3	11.5	8.5	6.7	100.0	
	Nashik	45.1	21.5	11.2	22.1	100.0	
	Pune	64.2	17.9	10.2	7.7	100.0	

We can clearly indicate from Table 4 that poverty is the strongest factor in rural Maharashtra to determine food insecurity. Compared to the households in richest wealth quintile, the poorest household is 16 times more likely to face food insecurity. The poorer and even the middle order households experience 7 to 8 times more chance of experiencing food insecurity compared to rich. Moreover, in rural areas of Maharashtra, household that has a land holding more than five acres face significantly lower food insecurity than those who does not have land or have less than five acres of land. In urban Maharashtra, though the chance of experiencing food insecurity among households other than the richest class is

not that high. However, other households compared to 20 percent richest show significantly higher level of reported food insecurity. Households with other religious groups (mainly Muslims and Buddhist- neo-Buddhist) have experienced the remarkably higher chance of food insecurity in comparison to Hindus at both rural and urban areas. A similar situation is observed among those not having a ration card. The urban part of Nashik division needs special attention in this regard as the reported food insecurity is substantially higher in this division as compared to Amravati division.

**Table 4:**  
**Odds ratios of food insecurity in rural and urban Maharashtra**

Control variables		Rural	Urban		
		Exp(B)		Exp(B)	
Religion	Hindu®				
	Others	3.563	**	1.415	**
Caste	Others®				
	SC	0.944		1.337	
	ST	1.299		0.388	**
	OBC	1.108		1.012	
	VJ/NT	0.916		1.446	
Wealth Quintile	Richest®				
	Poorest	15.723	**	4.801	**
	Second	7.813	*	6.929	***
	Middle	7.015	*	7.034	***
	Fourth	4.828		4.092	***
Type of house	Kachha®				
	Pucca/semi-pucca	0.932		1.002	
Household has ration card	Yes®				
	No	1.930	**	1.452	**
Amount of landholding	<5 acres®				
	>= 5 acres	0.371	***		
Region	Amravati®				
	Aurangabad	1.535		1.477	
	Konkan	0.830		0.712	
	Nagpur	0.444	*	0.601	
	Nashik	1.126		2.323	**
	Pune	1.046		1.212	

1: Dependent variable is '0' when household is food secure or mildly insecure, '1' when household is moderately or severely insecure. \*\*\* 1% level of significance, \*\* 5% level of significance, \*10% level of significance

## b) Child nutrition and food insecurity

Stunting, which refers to low height-for-age, is considered an irreversible outcome of chronic nutritional deprivation. On the other hand, underweight refers to low weight-for-age that reflects a combination of chronic and acute malnutrition. The nutrition survey of Maharashtra (CNSM) found that in Maharashtra 23% of children 0-23 months of age were stunted and 8% were severely stunted and approximately 23% were underweight, of which 7% were severely underweight. More children in the rural than urban areas were stunted (26% vs. 21%) and underweight (26% vs. 20%). The prevalence of under nutrition among children varied widely among administrative divisions, ranging from 16% in Nagpur to 32% in Nashik for stunting, and 18% in Pune to 29% in Amravati for underweight (Table 5).

**Table 5:**

**Percentage of children aged 0-23 months according to anthropometric indices of nutritional status by Place of residence and administrative division, Maharashtra, 2012**

	Height-for-age <sup>1</sup>		Weight-for-age <sup>3</sup>		Number of children
	Percentage below-3 SD	Percentage below-2 SD	Percentage below-3 SD	Percentage below-2 SD	
<b>Total</b>	<b>7.8</b>	<b>23.3</b>	<b>6.6</b>	<b>22.6</b>	<b>2,662</b>
<b>Place of residence</b>					
Rural	8.2	25.6	6.9	25.2	1,466
Urban	7.3	20.6	6.2	19.5	1,195
<b>Administrative Division</b>					
Amaravati	6.9	24.0	6.7	29.7	261
Aurangabad	8.4	26.0	7.1	20.9	468
Konkan	8.3	23.9	5.0	19.8	840
Nagpur	2.7	15.7	4.1	25.6	213
Nashik	14.0	31.9	11.8	29.1	359
Pune	4.2	18.1	4.5	18.5	512

Now, the question is whether there is any association between household food security with the nutritional status of children? Ample scientific and programmatic evidence suggests that marked reductions in child undernutrition can be achieved by improving women's nutritional status before and during pregnancy, optimizing breastfeeding and complementary feeding practices during the first two years of life, and preventing infectious diseases through increased access to health services. All such conditions can be attained if and only if the household is food secure, having proper knowledge and access to natal and postnatal care.

As revealed in Figure 2, there exists an adverse association between household food insecurity status with child nutrition, i.e., with the increase in food insecurity, child undernutrition also increases. For example, 22% children under two years are stunted when they belong to food secure households against 30% who belongs to severely insecure households. When 6% children faced severe stunting in food secure households, it increased to 15% children in severely insecure households. Severe underweight ranges from 6 % to 12% in secure to severely food insecure households. In underweight too, differences by the level of food security are very prominent.

Table 6 shows the effect of selected variables on nutritional status of children (underweight, stunting and low birth weight) less than two years. We have incorporated series of background characteristics (like religion, rural- urban residence), mother and child related variables (like birth order, sex of child, mother's education, mother's height,) food related variables (like household food security, food consumption diversity, minimum dietary diversity of child) and geographical region.

The analysis indicates that compared to Hindus, other religious groups are more likely to have low birth weight, while religion has no effect on underweight and stunting. Place of residence has no relevance on nutritional status of children under two years. The children from household with severe food insecurity access are more likely to be stunted than children with food secure household. Gender has significant effect on nutritional status of children; girls are more likely to be undernourished than boys. Children with higher birth order are more likely to be underweight and experiencing low birth weight than first order birth. Those children whose stools are not safely disposed of are more likely to be stunted and underweight than.

Mother's education has significant effect on nutritional status of children less than 2 years. Children of illiterate mother are more likely to be undernourished than those mothers with 10 years and above education. Nutritional status of mother has significant effect on child's nutrition. Children whose mothers are less than 145 cms are more likely to be undernourished than their counterpart children whose mothers are relatively taller. Children of mothers consuming 4 or more food groups are less likely to be undernourished than those who are not consuming 4 or more food groups.

**Table 6:**  
**Odds Ratios of stunting and underweight among children under 2 years:**  
**Maharashtra**

Control variables		Children 6-23 months		Children 0-23 months			
		Underweight	Stunting	Low Birth Weight			
		Exp(B)	Exp(B)	Exp(B)			
<b>Religion</b>	Hindu®						
	Others	0.904	1.022	0.660	**		
<b>Type of residence</b>	Rural®						
	Urban	0.918	1.164	1.093			
<b>Household food insecurity access</b>	Food secure®						
	Mildly food insecure access	1.137	1.263	1.051			
	Moderately food insecurity access	1.320	1.462	0.795			
	Severely food insecurity access	1.198	1.776	**	0.784		
<b>Gender of child</b>	Boy®						
	Girl	0.748	**	0.587	***	1.436	***
<b>Birth order</b>	1st order®						
	1+ order	1.356	**	1.045	0.786	**	
<b>Minimum dietary diversity (MDD)</b>	No®			-			
	Yes	0.666	\$	0.879	-		
<b>Safe disposal of child's stool</b>	No®			-			
	Yes	0.737	**	0.659	**	-	
<b>Mother's education</b>	No education®						
	Upto 9 years	0.903		0.605	**	0.912	
	10 years and above	0.498	***	0.362	***	0.581	***
<b>Height of mothers</b>	<145cms®						
	145 cms or above	0.516	***	0.433	***	0.577	***
<b>Mother's food diversity</b>	Did not consume 4 or more food groups®	-	-				
	Consumed 4 or more food groups	-	-	0.703	**		
<b>Region</b>	Amravati®						
	Aurangabad	0.722		1.022		1.354	
	Konkan	0.885		1.598		1.774	**
	Nagpur	1.018		0.364	\$	1.207	
	Nashik	1.273		1.662		2.694	***
	Pune	0.590	**	0.618		1.707	**
<b>Constant</b>		<b>1.018</b>		<b>0.373</b>		<b>0.349</b>	
<b>Cox &amp; Snell R Square</b>		<b>0.067</b>		<b>0.055</b>		<b>0.038</b>	

^ - variables not included in the model. ® Reference category. \*\*\*: 0.01, \*\*: 0.05, \$: 0.10

## Conclusions

Studies on the prevalence of household food security in India are sporadic. This study highlights the condition of food security in the state of Maharashtra. The research is significant in the context of the rise in the farmer suicides, when overall 53 percent (rural 81 percent) workforce consisting of cultivators and agricultural labourers (Census of India, 2011). In this study, household level food security is examined separately for rural-urban areas, as factors influencing it may be different in both the areas (Olson et al., 1997; Ruel et al., 1999; Motiur, et al., 2008; Abalo, 2009). This survey was conducted during February-April, 2012, a period is supposed to be better in the availability of food as it tallies with harvesting. Overall food insecurity is found in 43 percent households and out of every seven household, one is facing severe food security during last one-month reference period of the survey. According to Nord et al. (2009), food security in large cities and the suburban areas of big cities are more. However, in case of Maharashtra, it is more in the rural areas in comparison to urban. Households without agricultural land and farmers with less than five acres land have high food insecurity. It has been found in Maharashtra that average landholding is 1.44 hectares (3.55 acres) according to Agricultural Census, 2010-11. Moreover, it is found that those who are cultivating cotton, faced more food insecurity compared to those who grow cereals, fruit and cash crops. Similar findings were observed a survey in Amravati district (Bhagat et al., 2009). Maharashtra is having low landholding size and high dependence on agriculture. Therefore, there is an urgent need to examine the cropping pattern and productivity of the available land. Jodha (1986) suggested that intensification of land use practice and adjustment with multiple cropping with different maturation will help the problem of food security in the dry land areas.

As expected, poverty (wealth index) and food insecurity are highly correlated in rural and urban areas. Eradication of poverty is possible only with the creation of jobs in household and development of food-based industries. It will also help the farmers to have a better price for their products (Kennedy, 1994). Other features that have been noted in this study are that those with no ration card have a higher chance of food insecurity. In the rural areas, it will be feasible to identify the households without ration cards, so that the benefits of PDS system can be extended to the needy. In comparison to Hindus, other religious groups namely Muslim, Buddhist and Neo-Buddhist have a higher level of food insecurity in rural as well as in urban areas.

It is often said that parents maintain normal or near normal diets and meals for their children, even when they are facing food insecurity (Bhattacharya et al., 2004; Coleman-Jensen et

al., 2013). However, in this study the significant negative relationship between the food insecurity level and nutrition level of under two children are found. These findings are similar to the studies in Nepal and Bangladesh (Saha et al., 2009; Osei et al., 2010). Moreover, under two children's nutritional status is very much dependent on the mother's food intake during pregnancy and breastfeeding. Food security is essential for the betterment of nutritional status of children.

### **Acknowledgements:**

We are thankful to the anonymous referees for their valuable comments on the paper. Also, we express our sincere appreciation to the UNICEF team of Mumbai for funding and technically supporting this project. Lastly, the merit of the paper goes to the respondents for answering a sensitive issue.

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## **Appendix-I**

It is based on the following set of generic occurrence questions, grouped by domain:

### **I. Anxiety and uncertainty about the household food supply:**

1. Did you worry that your household would not have enough food?

### **II. Insufficient quality (included variety and preferences of the type of food):**

2. Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?
3. Did you or any household member have to eat a limited variety of foods due to lack of resources?
4. Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?

### **III. Insufficient food intake and its physical consequences:**

5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?
6. Did you or any household member have to eat fewer meals in a day because there was not enough food?
7. Was there ever no food to eat of any kind in your household because of a lack of resources to get food?
8. Did you or any household members go to sleep at night hungry because there was not enough food?
9. Did you or any household member go a whole day and night without eating anything because there was not enough food?

**Categorical measure of food security is as follows:**

This can be used to report prevalence of household food insecurity, make geographic targeting decisions as well as change in the prevalence over time. Households are categorized into four levels of household food insecurity (access): 1) food secure, 2) mild, 3) moderately and 4) severely food insecure.

<p><b>Category 1 = food secure</b></p> <p>Household experiences none of the conditions, or just experiences worry, but rarely.</p>
<p><b>Category 2 = mildly food insecure</b></p> <p>Household worries about not having enough food sometimes or often, and/or is unable to eat preferred foods, and/or eats a more monotonous diet than desired and/or some foods considered undesirable, but only rarely. But it does not cut back on quantity nor experience any of three most severe conditions.</p>
<p><b>Category 3 = moderately food insecure</b></p> <p>Household sacrifices quality more frequently, by eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes.</p>
<p><b>Category 4 = severely food insecure</b></p> <p>Household is cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating), even as infrequently as rarely. In other words any household that experiences one of these three conditions even once in the last four weeks (30 days) is considered severely food insecure.</p>



# International Institute for Population Sciences

International Institute for Population Sciences was established in 1956 by the UN, Government of India and the Sir Dorabji Tata Trust as a premier institute for training and research in Population Studies for developing countries in the Asia and Pacific Region. It is the training centre for population studies for the ESCAP Region, recognised by the United Nations Fund for Population Activities (UNFPA). Now the institute is an autonomous institution under the administrative control of the Ministry of Health and Family Welfare, Government of India. It offers regular academic courses, at graduate and post graduate level; conducts research and training programmes; and provides consultancy to Government and Non-governmental organisations. The Institute was awarded deemed university status in 1985 and since then the PhD programme also initiated at the institute.

Besides teaching regular courses, the Institute has from time to time, conduct short-term courses for various organizations covering various demographic and health themes and issues. The courses have been sponsored by the WHO, Department of Family, Asian Development Bank, Nordic Centre, Johns Hopkins University and so on. The University Grants Commission (UGC) sponsored refresher courses have also been organized at IIPS.

The Institute conducts research using its own resources, and through external funding. The externally funded projects are usually initiated at the request of the concerned agencies. These are generally large-scale surveys, requiring primary data collection. It is worth mentioning the technical support given by ORC Macro International (formerly ORC Macro) at all the four rounds of the National Family Health Surveys (NFHS) and that of the East-West Centre, Honolulu, USA in the first round. Another major project undertaken by the institute is the District Level Household and Facility Survey (DLHS – RCH), conducted since 1998 at the behest of Ministry of Health and Family Welfare with World Bank funding.

**Prof. F. Ram**

Director & Senior Professor

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