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Food Insecurity in Tribal Regions of Maharashtra: Explaining Differentials between the Tribal and Non-Tribal Communities

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FOOD INSECURITY IN TRIBAL REGIONS OF MAHARASHTRA: EXPLAINING DIFFERENTIALS BETWEEN THE TRIBAL AND NON-TRIBAL COMMUNITIES

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Abstract

This paper examines the levels of food insecurity at the micro level as against to the macro level in the tribal dominated areas of Maharashtra. A comparison of food insecurity between the two communities reveals a higher incidence of food insecurity among the tribal as compared to that of non-tribal. The micro level indicators of food insecurity differ from the macro level indicators in several ways. The nutritional status of tribal children is much lower than that of their non-tribal counterparts. This finding, however, is not universally true. It has been found that natural forest resources play a significant role in determining the nutritional status of tribal children. The tribal communities' vulnerability to food insecurity would be further aggravated if they were denied access to forest resources. Government policies should, therefore, ensure not only provisions of direct benefits in terms of subsidised food but also help build the capabilities of the tribal communities to overcome food insecurity, particularly in distress situations.

Introduction

When one looks at the history of the evaluation of the Indian food policy, it becomes clear that it is mainly characterised by supply side programmes which are targeted to achieve through higher production and distribution of subsidised foodgrains. On the food production front, the emphasis of the policy has largely been on achieving self-sufficiency (Gregory Committee 1943, Thakurdas Committee 1947, and Mehta 1957). In fact, a substantial increase in foodgrain production was achieved through the adoption of the Green Revolution technology in the late 1960s, accounting for 106 per cent during 1970-2000 as compared to 87 per cent during 1951-1970 (Swaminathan 2002; p. 36). The success of the policy in terms of achieving self-sufficiency in production of foodgrains stands vindicated when one looks at the data, which largely holds true in the case of both wheat and rice. Cereals, as a group, registered a record production with wheat and rice being in the forefront. Self-sufficiency in production of foodgrains has been achieved but it is not the root cause for the presence of a substantially higher buffer stock of foodgrains in the country since 2000-01 (Rakshit 2003). Besides, recent figures also point to the availability of a substantially high buffer stock relative to buffer norms in that the proportion of actual buffer stock of both rice and wheat has increased substantially from 156 per cent in 2008 to 218 per cent in 2010.

Despite such a positive development in foodgrain production, the incidence of poverty, and child undernutrition remains relatively high in India and across States. Further, the sustainable food security index developed by the M S Swaminathan Research Foundation (MSSRF) based on 21 indicators brings out the wide variation across States. It also indicates that a few States like Orissa, Jharkhand, Tamil Nadu and Bihar do not exhibit sustainable self-sufficiency with regard to food security

whereas Madhya Pradesh and Arunachal Pradesh demonstrate sustainability. On the other hand, a few economically developed States like Maharashtra, Punjab, Haryana and West Bengal remain moderately unsustainable (MSSRF and WFP 2004). Similarly, large differences exist across social groups. For instance, both poverty and child-related undernutrition is remarkably high among tribal communities in India (Thorat 2010 and Singh 2001). The economic deterioration of tribal communities began in the British era. The influx of the non-tribal population and their consequent encroachment of forest areas further aggravated the situation (Guha 1996 and Singh 1982).

Three major factors can be attributed for underdevelopment in tribal areas and perpetuated poverty and undernutrition among tribal communities. First, the development policy adopted for achieving economic development is not compatible with the tribal development policy. The so called 'Nehruvian Model' of economic development through mega development projects in order to hasten agricultural and industrial growth, sadly proved to be a major hurdle in the path of tribal development. The immediate impact of these development projects is the massive displacement of the tribal communities from their original habitats. By 1990, nearly 85.39 lakh tribals had been displaced by some mega projects or the other and the preservation of forests as 'National Parks' etc. (GoI 2005). The resident tribal communities are deprived of their main source of livelihood, as an immediate impact of the displacement. However, the special development programmes implemented by the Government with the main objective of mitigating the hardships of the displaced communities met with varying degrees of success. Besides, the investment made on tribal development was grossly inadequate in terms of compensating for the massive disruptions occasioned by the earlier policyy aimed at diverting lands under tribal covered areas towards developmental activities. Thus, developmental efforts at the national level clashed with efforts for tribal development. Second, the encroachment of forestlands by the non-tribal population for livelihood is one of the reasons for accelerated forest degradation. This influx into forestlands resulted in the weakening of forest rights, loss of agricultural lands and depletion of forest resources, and hampered the conservation of timber plants. And lastly, the emergence and spread of the Naxalite movement in the country, particularly in the underdeveloped and tribal areas, turned out to be another major hurdle in the development process. On the whole, the development process in the tribal areas seems to have suffered due to the over-emphasis on projects of national interest, encroachment of tribal areas by non-tribal communities and the Naxalite uprising. Together these factors led to a higher incidence of poverty and child malnutrition[1] in the tribal dominated areas.

It is in this larger context that we shall explore how the inferences drawn from the macro level scenario of food insecurity are represented at the micro-level. The Tribal communities in the tribal-dominated areas face various constraints. Similar constraints are faced by the non-tribal communities living in the same natural habitats. This in a way might prompt one to explore the different issues of food insecurity. Keeping this in view, the present paper seeks to examine the state of food insecurity across regions of Maharashtra in order to understand the factors affecting the nutritional status of children less than six years old. It is based on a primary survey conducted in tribal-dominated areas of Maharashtra during 2007-08. This paper has been organised into six sections including the introduction. The sample households are selected based on the macro level information provided in section two. A brief profile of the study area for exploring similarities and dissimilarities of the four selected regions

follows in section three. In section four, the issue of food insecurity is discussed drawing on empirical evidence observed in the study area on the basis of different indicators. Section five focuses on the factors influencing nutritional status in the study region. A summary of major findings comprises the last section.

Methodology

Internationally, the widely quoted definition of food security lays emphasis on food security at the household level rather than at the national level because macro level indicators often fail to reflect the ground reality at the household level as variations exist in purchasing power. In order to capture the variations in purchasing power, the recent definition of food security emphasises on the household rather than the aggregate analysis.[2] Therefore, the emphasis in this paper is on household food security. It is to be noted that there is no single indicator to measure food security. Various dimensions of it can be explored through diverse indicators[3] like poverty ratios, anthropometric indicators and calorie intake. These three indicators are inter-linked. The poverty ratio represents the level of material well-being of households and is defined as the proportion of population living below a certain level of consumption expenditure or income.[4] Invariably it determines the level of food intake and thereby calorie intake. The second indicator of food security, i.e., calorie intake has been computed on the basis of the food consumption patterns of households for the last three preceding days by converting it into calories on the basis of ICMR calorie chart (ICMR, 1996). The information on the quantity of food intake for the three preceding days was collected from each household. Generally, calorie intake is estimated based on the information collected on consumption patterns either for 7 days or 30 days recall period. However, in this study we have restricted it to three days mainly for two reasons. First, food habits in the rural areas are largely monotonous in nature and limited to locally available food items, which generally do not vary much on a daily basis. Whatever differences exist in the consumption patterns are largely found in terms of quantity consumed rather than diversity and quality of food across households. Secondly, it is to reduce the recall lapse that might occur over a longer duration. Generally, it is difficult to obtain information on food intake even for seven days due to the absence of leisure time and widespread illiteracy in the study area. Therefore, we have restricted information collection to three days. All the same, calorie intake depends on the quantity and quality of food consumed. Further, the provision of public assistance in the form of subsidised food supply and healthcare facilities may result in a better nutritional status even if the household consumption expenditure is low. As nutritional status is the outcome indicator of individual food security, we have estimated the same for children below six years of age on the basis of weight, height, age and sex in relation to the international reference category proposed by the World Health Organisation (WHO) (See, IIPS 2007), i.e., anthropometric indicators, namely, underweight, stunting and wasting. Stunting is an indicator of chronic undernutrition caused by inadequate food intake for longer periods. Wasting indicates acute undernutrition mainly due to frequent diseases and inadequate healthcare facilities. Underweight is an indicator of chronic and acute undernutrition (Mortorell and Ho 1984).

Households (239) having at least one child below six years of age form the basis of our analysis. The nutritional status has been estimated for 342 children below six years of age born to 248 mothers in 239 households of both tribal and non-tribal communities. In order to access these households, a four-stage selection procedure was adopted. In the first stage, districts with a higher tribal population compared to the State average were divided into four categories based on the level of poverty and child malnutrition. These four categories include High Poverty and Low Malnutrition (HPLM), Low Poverty and High Malnutrition (LPHM), High Poverty and High Malnutrition (HPHM) and Low Poverty and Low Malnutrition (LPLM).[5] Four districts, namely, Nagpur, Gadchiroli, Nandurbar and Raigarh, were selected for the survey. In the second stage, a tehsil (i.e. sub-district) was selected from each district based on a higher proportion of tribal population. Further, two villages were selected in the third stage based on two criteria: one, the tribal population should account for a major share in the village, and two, one village should be closer to the market place while the other far away. Proximity to the market place is indicative of the relative level of development in the village.[6] In the last stage, 30 households having at least one child below six years of age were selected randomly from a list provided by the primary school in each selected village.

A Profile of the Study Are

A glimpse of the general characteristics of villages selected from the four regions is presented in Table 1. Eight villages were selected from these four regions. As per the selection criterion, the tribal population is dominant in all the villages with the highest proportion coming under the category of Low Poverty and High Malnutrition (LPHM) region and the lowest under the category of High Poverty and Low Malnutrition (HPLM) region. Villages far-removed from the market place are categorised as HPLM1, LPHM1, HPHM1 and LPLM1 while villages closer to the market place are categorised as HPLM2, LPHM2, HPHM2 and LPLM2. Similarities and dissimilarities among the regions provide a clear scenario of the study area because the choice of the regions was based on heterogeneous characteristics despite the presence of larger homogeneous groups at the aggregate level. All the villages, irrespective of their proximity to the market place, have access to most of the basic amenities such as primary schools, Fair Price Shops (FPS) and Healthcare Sub-Centers (HSC). Further, access to water is available through different sources such as wells, bore-wells and piped water. In all the villages, access to water through wells or bore-well is universal. However, piped water is available only in villages closer to the market place, excepting the LPLM region. This is because LPLM villages are situated in the hilly regions. In LPLM region, villages are found disintegrated in nature. The disintegrated villages here implies that a group of people belonging to the same caste lives separately at a distance from the dwellings of other castes. In other words, the settlements of the two caste groups do not have a common boundary. The nature of caste-based disintegration of the settlements could be divided into three groups, viz., villages with no common boundary, those with common boundary without assimilation and those with assimilation to some extent. Caste-based assimilation here indicates households from different caste groups living together in a given settlement without any barrier. The first category indicates that there is a lack of caste-based assimilation and that settlements of different social groups do not share the same boundary. The second group indicates different caste-based settlements sharing a common

boundary, but not living together. The last group is somewhat better than the other two groups because the barriers for living together are lower to some extent. This indicates social stratification of village at two levels, i.e., based on caste at one level and habitats of caste groups that do not share common boundary at the other level. It is also important to note that healthcare facilities are not available in LPLM villages, even though people in these villages report regular visits by the government health personnel for malaria detection, vaccinations and ante-natal care. In the HPLM and LPHM regions, traditional healers play a major role mainly in providing healthcare but this phenomenon has not been noticed in the other two regions where villagers generally visit only medical practitioners for healthcare.

The livelihood in most of the villages is dependent on agricultural and non-agricultural sources. However, a clear demarcation between villages that are closer to and those far-removed from the market place could be made with respect to forest-based livelihood sources. The major livelihood sources in interior villages largely consist of forest-based resources apart from agricultural and non-agricultural sources. The extent of dependence varies across villages depending on the forest cover. For example, people in HPLM and LPHM regions depend on forest-based products for their livelihood. However, dependence on forest-based products is higher in the LPHM region compared to others. As against this, people living in the LPLM region do not depend on forest-based resources for their livelihood besides collection of firewood even though these villages are surrounded by fairly thick forests. Their livelihood options mainly include migration, agricultural and non-agricultural activities, i.e., tribal people migrate to other places as manual labourers making bricks or working in road construction projects. Overall, access to village amenities indicates commonalities on the one hand, while the demographic composition of tribal and non-tribal communities and the degree of their dependence on forest-based resources on the other hand are the features that distinguish groups from one another.

Table 1: Profile of the Study Area

Regions	Village	% of STs	Proximity to Tehsil (kms.)	Basic Amenities	Major Livelihood Sources	HH Mean Income (Rs)	Others
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HPLM	HPLM1	55	Interior (25)*	PHC[a], Primary School, FPS[b], Bore-well,	Agri. Non-agriculture and Forest based	46618	1. Surrounded by forests 2. Presence of Traditional Healers
	HPLM2	55	Closer (4)	Primary School, Bore-well, Piped water	Agri. Non-agriculture and Forest based	28573	1. Partially surrounded by forests 2. Presence of Traditional Healers
LPHM	LPHM1	85	Interior (18)	HSC[c], Primary School, FPS, Bore-well,	Agri. Non-agriculture and Forest based	24853	1. Surrounded by forests 2. Presence of Traditional Healers
	LPHM2	83	Closer (3)	Primary School, FPS, Bore-well, Piped water	Agri. Non-agriculture and Forest based	37836	1. Partially surrounded by forests 2. Presence of Traditional Healers
HPHM	HPHM1	70	Interior (15)	HSC, Primary school, Ashram school, FPS, Bore-well	Agri. Non-agriculture, self-employment, Govt. services	44817	1. No forests 2. Absence of traditional healers 3.Presence of Money lenders
	HPHM2	58	Closer (4)	HSC, Primary school, Ashram school, FPS, Bore-well, Bank, Piped water	Agri. Non-agriculture, self-employment,	43926	1. No forests 2. Absence of traditional healers
LPLM	LPLM1	56	Interior (12)	Primary school, FPS, Bore-well	Agri. Non-agriculture, and migration	36985	1. Surrounded by forests 2. Absence of traditional healers 3. Disintegrated villages[d]
	LPLM2	56	Closer (4)	Primary school, FPS, Bore-well	Agri. Non-agriculture, and migration	47079	1. Partially surrounded by forests 2. Absence of traditional healers 3. Disintegrated villages

Source: Based on the Primary Survey
Note: 1. * The figures in parentheses indicate proximity to the market place in kms.
2. [a] Primary Heath Centre, [b] Fair Price Shop, [c] Health Sub-Centre, and [d] The villages in LPHM region are geographically disintegrated in nature.
3. In Column 2, the first village in each region indicates closer proximity to the market place; whereas, second village is far-flung from the same.
4. Column 3 indicates the share of ST population in the respective village.
5. HPLM, LPHM, HPLM and LPLM refer to High Poverty and Low Malnutrition, Low Poverty and High Malnutrition, High Poverty and High Malnutrition, and Low Poverty and Low Malnutrition regions, respectively.

In Maharashtra, 47 tribal communities are notified as Scheduled Tribes.[7] In the select sample, eight tribal communities and 21 non-tribal communities are covered from four tribal dominated areas (Table 2 and 3). The major tribal communities include Gond, Madia Gond, Katkari, Thakar, Bhil and

Tadvi Bhil. The first two tribal communities are largely found in the LPHM and HPLM regions. The Katkari and Thakar belong to the LPLM region while Bhil and Tadvi Bhil are from the HPHM region. The major livelihood sources of the tribal communities are farming, collection of forest-based produce such as fire wood, tendu leaves, forest food products and manual labour. On the other hand, the livelihood sources of non-tribal groups comprise traditional occupations such as farming, drumming, hair-cutting, carpentry and self-employment sources such as petty grocery shops, bicycle repair shops, etc.

Table 2: Tribal and Non-tribal Communities across Regions in the Study Area

Regions	Social Groups	Tribes/ Caste	Current Occupations
LPHM	SC	Katiya, Mahar, Holya	Self-employment, farming, salaried job, collection of forest resources
	ST	Gond, Nagarchi	Collection of forest resources, farming, Drummer
	NT	Dhivar,	Fishing, labour
	OBC	Kalar, Nhavi, Powar, Teli	Farming, self-employment like grocery shop, hair saloon etc.
HPLM	SC	Mahar, Lohar, Madgi	Self-employment like tailoring, bicycle repairing store, drumming, farming and collection of forest resources
	ST	Gond, Govari, Madia	Collection of forest resources such as mahua, tendu leaves, vegetables etc., livestock rearing and labour
	NT	Gavali	Labour, dairy producer
	OBC	Marar	Farming and vegetable cultivation
HPHM	SC	Bhangi, Mahar	Self-employment, labour and basket weavers
	ST	Bhil, Tadvi bhil,	Farming, self-employment and labour
	NT	Bhoi,	Farming and labour, salaried job
	OBC	Gosavi, Nhavi, Sutar	Traditional occupations such as carpenter and hair cutting and labour
	Others	Jain Marwadi, Maratha, Muslim	Farming, business, money lending
LPLM	ST	Katkari, Thakar	Farming, labour, brick making and construction work
	NT	Gavali, Dhangar	Livestock rearing, farming, brick making and construction and labour
	OBC	Agri, Nhavi	Farming, self-employment, hair cutting
	Others	Maratha	Farming and self-employment

Source: Primary Survey

The disparities in the economic condition of tribal versus non-tribal communities occur not only due to differences in economic activities, but also because of discrepancy in the income generation from the same economic activity. Tribal communities are largely engaged in traditional occupations that attract a very low market value. The forest products sold by the tribals in the market fetches very low price despite having higher market value due to their low bargaining power. For example, tendu leaves are collected by tribals and sold to the contractor in the HPLM and LPHM regions. The official rates for tendu leaves are fixed by the respective forest departments in order to protect the sellers from

exploitation. However, the prices are almost twice the official rates in the LPHM region, because the Naxalites demand higher rates from the contractor.[8]

Table 3: Livelihood Sources and other details in the Study Area

Indicators	Tribe	Non-tribe	N
Number of Caste or tribe	8	21	239
Mean Household Yearly Income (`	34,654.33	47,534.24	239
Mean Household Yearly Income from Forest (`)	11,881.67	6,178.47	158
Mean Household Yearly Income from Livestock (`)	3,037.50	6,078.40	97
Mean Household Yearly Income from Self-employment (`)	23,652.00	54,541.14	53
Mean Household Yearly Income from Labour (`)	16,448.73	14,241.44	169
Mean Household Yearly Income from Salaried Job (`)	19,989.47	28,475.00	35
Mean Household Yearly Income from Government Service (`)	1,18,920.00	1,23,000.00	7
Mean Household Yearly Income from Migration (`)	4,764.44	8,135.83	57
Mean Household Yearly Income from Agriculture (`)	10,311.76	14,310.98	176
Mean Years of Schooling	2.44	5.19	239
Mean Per Consumption Unit Calorie Intake (Kcal)	2,047.88	2,100.95	239
Mean Land Owned (acre)	2.71	1.85	239
Mean Operational Land (acre)	4.10	3.96	143
Mean Share of Food Expenditure (%)	86.42	82.26	239

Source: Primary Survey
Note: Mean household yearly income is the average of the respective households.

The mean incomes from various livelihood sources in the study area differ substantially across the tribal and non-tribal communities (Table 3). In the study area, the mean total income of the households and the mean income across various sources are lower among tribal communities than the non-tribal groups with the exception of the mean income from forest resources. Even the mean income from agriculture is substantially lower among tribal communities with higher land holdings compared to that of the non-tribal communities. The reason could be attributed not only to the lack of capital investment but also to the lack of awareness and low educational attainments of tribal communities. This also holds true at the macro level. It was observed that the tribal households possess relatively low quality land holdings and use less modern inputs such as fertilisers, hybrid seeds etc. In addition to this, the mean years of schooling of heads of tribal households is substantially lower at 2.44 years as compared to 5.19 years for heads of non-tribal households.

Patterns of Food Insecurity

This section presents a discussion on understanding the state of food insecurity at the aggregate and disaggregate levels, and across tribal and non-tribal communities. The focus is also to draw attention to the inter-linkages between various indicators of food insecurity. In the study region, high level of poverty and severe child undernutrition indicated the operation of a vicious circle. Among poor households, a large proportion of income goes to food expenditure and relatively higher non-food needs are not met due to their insufficient purchasing power (Table 3). Also, in spite of spending a high

proportion of income on food, the required calorie intake is seldom attained due to the low quality of food. These together negatively influence the nutritional status, particularly of children below six years of age because of their inherent inability to augment their calorie intake in accordance with growth requirements. The proportion of the poor in the study area was remarkably high, at over 69 per cent, with the mean calorie intake being far less than the prescribed ICMR norms (Table 4). Therefore, it can be inferred that apart from a high proportion of chronically undernourished children, the study area also accounts for a relatively high proportion of acutely undernourished children.[9]

The share of chronic undernutrition (stunting) in this region constitute more than 54 per cent, while acute undernutrition (wasting) is more than 44 per cent, indicating that 50 per cent of the children are under-nourished in some way or the other. The underlying cause for a substantially higher level of chronic undernutrition compared to acute state of undernutrition in the study region is attributed to insufficient food intake followed by the inadequate health care facilities. As pointed out earlier, chronic undernutrition is largely occasioned by inadequate food intake for a long time, while acute undernutrition is the result of frequent onset of diseases and inadequate healthcare facilities (Mortorell, and Ho 1984). The empirical evidence also validates the above argument, in that the calorie intake of a large proportion of households is inadequate, i.e., more than 94 per cent of the people consume less than 2,400 kcal in a day. The prevalence of underweight is substantially higher among children, i.e., 61 per cent. Thus, food insecurity in the study area is high in terms of income poverty as well as outcome indicators such as child undernutrition. On the whole, undernutrition, chronic and acute, is remarkably high. As revealed by the study, acute undernutrition is higher than chronic undernutrition, which is indicative of the inadequacy of health care facilities available rather than a just high level of undernutrition.

Table 4: Food Insecurity in the Study Area

Indicator of Food Insecurity		Tribal	Non-tribal	All	N
Poverty (%)	BPL	88.27	70.13	69.3	197
	APL	11.73	29.87	30.7	42
Calorie Intake (kcal)	Mean	2,048	2,101	2,065	239
Stunting (%)	Severe	22.94	15.32	20.5	70
	Moderate	60.45	40.54	54.09	185
Wasting (%)	Severe	16.45	6.31	13.16	45
	Moderate	48.92	35.14	44.44	152
Underweight (%)	Severe	26.84	14.41	22.81	78
	Moderate	68.83	44.14	60.82	208

Source: Primary Survey

The need to explore the disparities between tribal and non-tribal communities is crucial from the policy point of view because it is generally assumed that people living in the tribal dominated areas feel equally food insecure. In order to investigate this argument, food insecurity across regions as well as tribal and non-tribal communities in the study region will be discussed at the disaggregate level. By juxtaposing food insecurity indicators, relatively higher levels of poverty and malnourished children and

lower mean calorie intake are evident among tribal communities than non-tribal. Among tribal communities, poverty is as high as 88 per cent, underweight about 69 per cent, wasting over 48 per cent and stunting over 61 per cent (Table 4). On the other hand, poverty among non-tribal communities is over 69 per cent, child undernutrition in terms of underweight is over 40 per cent, while both wasting and stunting are about 37 per cent. Thus, food insecurity is high among both groups while the magnitude of food insecurity among tribal groups is relatively higher.

Based on the extent of undernutrition, different regions can be grouped into three broader categories (Table 5). These three categories include high, medium and low levels of child undernutrition. The regions with the highest degree of severe and moderate undernutrition are included in the category of 'higher extent of undernutrition' and regions with a medium proportion of severe undernutrition but with the highest degree of moderate undernutrition are included in the second category, i.e., 'medium extent of undernutrition' whereas the third group, i.e., 'low extent of undernutrition', includes regions with a lower levels of both severe and moderate child undernutrition. The HPHM region falls under the first category while the LPHM region comes under the second category. The two regions, i.e., LPLM and HPLM, fall under the third category of lower extent of undernutrition.

Table 5: Prevalence of Undernutrition across Study Regions (%)

Regions	Wasting				Stunting				Underweight			
	Tribal	Non-tribal	All	Differ ence	Tribal	Non-tribal	All	Differ ence	Tribal	Non-tribal	All	Differ ence
Severe												
HPLM	19.05	9.09	13.95	9.96	23.81	9.09	16.28	14.72	21.43	11.36	16.28	10.06
LPHM	17.39	0.00	14.29	17.39	17.39	20.00	17.86	-2.61	24.64	40.00	27.38	-15.36
HPHM	24.53	6.06	17.44	18.47	32.08	24.24	29.07	7.83	39.62	15.15	30.23	24.47
LPLM	7.69	4.76	6.98	2.93	21.54	9.52	18.6	12.01	21.54	4.76	17.44	16.78
Moderate												
HPLM	45.24	54.55	50.00	-9.31	59.52	29.55	44.19	29.98	69.05	47.73	58.14	21.32
LPHM	52.17	53.33	52.38	-1.16	57.97	40.00	54.76	17.97	72.46	46.67	67.86	25.8
HPHM	56.6	15.15	40.70	41.45	67.92	72.73	69.77	-4.80	64.15	48.48	58.14	15.67
LPLM	40.00	19.05	34.88	20.95	56.92	19.05	47.67	37.88	69.23	28.57	59.30	40.66

N=342
Source: Primary Survey
Note: HPLM, LPHM, HPLM and LPLM refer to High Poverty and Low Malnutrition, Low Poverty and High Malnutrition, High Poverty and High Malnutrition, and Low Poverty and Low Malnutrition regions, rsespectively.

The HPHM region falls under the first category of higher degree of undernutrition because, on the one hand, it shares the highest proportion of severely stunted, wasted and underweight children accounting for 29 per cent, 17 per cent and 30 per cent, respectively. On the other hand, it has the highest proportion of moderately wasted children accounting for more than 52 per cent, along with about 55 per cent of moderately stunted children and over 58 per cent of underweight children. However, it must be noted that poverty is high with lower calorie intake in the LPHM region under the second group in which the proportion of moderately wasted and underweight children is highest across all regions, along with a relatively lower levels of severely undernourished children compared to the

HPHM region. The percentage of moderately wasted and underweight children in this region constitute about 52 and 68 per cent, respectively, while 55 per cent are moderately stunted. The third group includes the HPLM and LPLM regions. In the HPLM region, the proportion of severely stunted and underweight children is lowest, whereas, the proportion of severely wasted children is lowest in the LPLM region. On the other hand, the level of moderately stunted children is lowest in the HPLM while the proportion of moderately wasted is lowest in the LPLM region. It is interesting to note that LPLM region has the lowest poverty ratio while the second highest poverty ratio is in the HPLM region (Figure 1).

Figure 1: Levels of Poverty across Regions
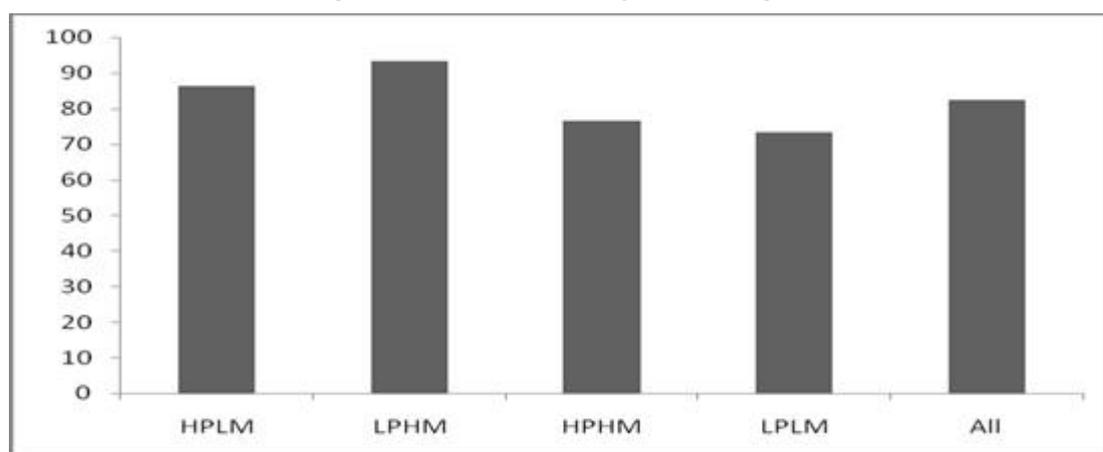
N=239
Source: Field Survey

The extent of food insecurity needs to be examined because the demographic composition of both tribal and non-tribal communities in the tribal dominated areas of the State differs from one district to another like the aggregate levels of poverty and child malnutrition. As discussed above, the level of food insecurity is relatively higher among the tribal population compared to the non-tribal population at the aggregate level, but it is essential to investigate how much visible it is at the disaggregate level. The results reveal that the prevalence of undernutrition is relatively high among tribal communities compared to non-tribal communities in most of the regions (See, Table 5). The indicators of undernutrition are grouped as severe or moderate.[10] The prevalence of severe wasting is high among children of tribal communities across regions with the highest difference observed in the HPHM region and the lowest in the LPLM region. However, moderate wasting is higher among tribal children only in the HPHM and LPLM regions and with remarkably higher levels in the former region. The lower levels of wasting in HPHM and LPLM regions are largely due to the lower prevalence of wasting among children of non-tribal communities.

The regional comparison indicates that the severe undernutrition is higher in most of the regions and among tribal communities. However, two regions, the LPHM and HPHM, clearly shows contrasting features in terms of the levels of severe stunting among tribal and non-tribal communities. The severe stunting and underweight in LPHM region are high among non-tribal children as compared to that of tribal, while difference between tribal and non-tribal is substantially high in HPHM region

indicating higher level of severe undernutrition among tribal children. The proportion of severe stunting among children of tribal communities in the LPHM region is found to be over 17 per cent, while it is 20 per cent among non-tribal children, indicating a relatively lower extent of food insecurity among the tribal communities. Similarly, about 25 per cent of tribal children are severely underweight while non-tribal children account for 40 per cent, which is substantially high. On the other hand, prevalence of severe stunting is higher among tribal communities accounting for more than 32 per cent in HPHM, whereas it is over 24 per cent among non-tribal communities. Similar case is evident in the case of the levels of severe wasting and underweight in HPHM region. This is due to the fact that the LPHM region is covered by dense forests with tribal communities which are largely dependent on forest-based resources for livelihood, while a market-oriented economy exists in the HPHM region where a large proportion of households is engaged in non-agricultural activities such as self-employment, skilled labour, construction work and non-agricultural labour.[11] A comparison between levels of severe underweight and access to forest resources across regions indicates that the levels of underweight among tribal children is high in the region having low level of access to forest resources, while low in the region with high access to forest resources (Table 6). On the whole, food insecurity is high in the LPHM region. However, the tribal population has been able to overcome the problem of food insecurity through higher consumption through ready access to forest resources. This also confirms the prevalence of severe to moderate underweight among children, which is an indicator of both acute and chronic undernutrition. The results show that the prevalence of severe underweight is remarkably low among tribal communities while moderate underweight is remarkably high.

Table 6: Levels of Severe Underweight across the Levels of access to Forest Resources

Level of access to Forest Resources	High Underweight	Low Underweight
High	LPHM (NT)	HPLM (T)
Low	HPHM (T)	LPLM (NT)

Source: Estimates based on Primary Survey
Notes: 1. T and NT in the parenthesis refer to Tribal and Non-tribal communities, respectively.
2. HPLM, LPHM, HPLM and LPLM regions refer to High Poverty and Low Malnutrition, Low Poverty and High Malnutrition, High Poverty and High Malnutrition; and Low Poverty and Low Malnutrition regions, respectively.

Determinants of Underweight

The discussion on food insecurity in the tribal dominated areas of Maharashtra reveals the incidence of high levels of food insecurity in the study area, particularly among the tribal communities. However, the nutritional status of tribal children in a few regions is relatively better. A few other studies also have shown a significantly lower probability of tribal children being malnourished when compared to others (Radhakrishna and Ravi 2005, p-175). This view finds support in the argument that the proportion of malnutrition is lower in tribal children in India due to the prevalence of a remarkably better nutritional status of children in the North-Eastern States/Union Territories (ibid.). Contrary to this, undernutrition among tribal communities in this study is found relatively higher when compared to non-tribal communities at the aggregate level. However, this does not hold true equally across regions. Despite

being part of a homogeneous group, the findings at the disaggregate level clearly indicate a contradictory scenario in the LPHM and HPHM regions in terms of a relatively lower level of undernutrition among tribal children when compared to non-tribal children.

Keeping this in view, an attempt has been made to understand the factors affecting the nutritional status in the study area because it is the outcome indicator of deprivation or hardship, which would enable a broader understanding of deprivation in the society. Such an understanding of factors affecting the nutritional status would naturally hold larger implications for policymakers and hence, this attempt. Insights into the factors affecting the nutritional status of children below six years of age would facilitate a comprehensive understanding of deprivation and misery that exists in the tribal dominated areas. The earlier studies identified mainly three groups of factors that affect the nutritional status of children in the Indian context using the logit regression (Sadana Sabarwal 2011; Radhakrishna and Ravi 2004; Fred et al. 2004; Acharya 2003; Venkateswarlu *et al.* 2000). These three factors are related to the child, mother and household. Malnutrition among children is determined by various factors including the household, child and mother. Most of the studies use secondary data, particularly the NFHS data, to examine the factors that determine malnutrition among children. The household-specific factors such as ethnicity and Standard of Living Index (SLI)[12] of households have a significant impact on the nutritional status of children (Radhakrishna and Ravi 2004; Fred et al. 2004 and Venkateswarlu et al. 2000).

These studies explain the aggregate scenario at the macro level in India and without considering the heterogeneity at the regional level. Secondly, these studies largely rely on the logit regression model for explaining factors that determine malnutrition but do not explain the process of malnourishment. Therefore, an attempt has been here made to explain the process of malnourishment by employing the linear regression model. Secondly, the current study differs from earlier studies in that it tries to analyse this aspect with respect to the tribal dominated areas that naturally differ from the general population because of their unique cultural and socio-economic conditions. Thirdly, the dependent variable used in the model is z-score of weight-for-age, which is an anthropometry measure of underweight. The z-score is the standard normal random variable, which indicates how far values of weight-for-age differ from the international threshold given by the World Health Organization (WHO). The values can range from the lowest (-) 6 to the highest (+) 6. The lowest value indicates a lower nutritional status, while higher value indicates a higher nutritional status. The explanatory variables include both linear and dummy variables (Table 7).[13] The linear variables are birth order of child, body mass index of mother (BMI) and birth order of children belonging to tribal communities (interaction between tribal and birth order). On the other hand, the dummy variables represent tribal regions, i.e., HPLM, LPHM and HPHM regions, mothers engaged in collecting NTFPs, age group of children (age group 0-2, 3-4 and 5-6), literate mothers and proximity to market.

The results show that the nutritional status is the combined effect of non-economic factors that include social status, mother and child related factors and village and region-specific factors. The significance of non-economic factors in terms of determining the nutritional status, as revealed by the study, reaffirms our contention that deprivation has broader connotations than mere technical dimensions of poverty. In other words, factors such as mother being a literate, proximity to market

place, BMI of mother, mother engaged in collecting NTFPs and birth order of children have a significantly positive impact on the nutritional status of tribal children. On the other hand, being tribal, the HPHM region, birth order of children and age group of children (i.e. 3-4 years of age group) have a significantly negative impact on the nutritional status of children.

Table 7: Linear Regression Results related to Undernutrition

Dependent Variable: Underweight (z-score of Weight-for-Age)

Explanatory Variables and Variable information		Coef.	Std. Err.	t
CONS	Intercept	-3.54526	0.552866	-6.41***
PRIMARY_EDU	Dummy for Primary Education of Mother (Primary Education=1; Other=0)	-0.34054	0.183302	-1.86*
MIDDLE_EDU	Dummy for Middle Education of Mother (Middle Education=1; Other=0)	0.339295	0.134056	2.53***
HIIGHER_EDU	Dummy for Higher Education of Mother (Higher Education=1; Other=0)	-0.25152	0.261702	-0.96
INTERIOR	Dummy for Interior Villages (Interior Village=1; Close to Market Place=0)	0.359081	0.109341	3.28***
TRIBE	Dummy for Tribal (Tribal=1; Non-tribal=0)	-0.72658	0.212281	-3.42***
HPLM	Dummy for HPLM Region (HPLM=1; other=0)	-0.21964	0.151489	-1.45
LPHM	Dummy for LPHM Region (LPHM=1; other=0)	-0.11863	0.157791	-0.75
HPHM	Dummy for HPHM Region (HPHM=1; other=0)	-0.37531	0.159039	-2.36**
B_ORD	Birth Order of the Child	-0.13449	0.04911	-2.74***
BMI_MO	Body Mass Index of Mother	0.091848	0.023451	3.92***
TRIBE_BO	Interaction between Tribal and Birth Order	0.201691	0.073215	2.75***
NTFP_MO	Dummy for mothers engaged in NTFPs (Yes=1; No=0)	0.358989	0.135859	2.64***
AGEGRP1	Dummy for age-group 3-4 (Age Group 3-4=1; other=0)	-0.29642	0.141918	-2.09**
AGEGRP2	Dummy for age-group 5-6 (Age Group 5-6=1; other=0)	-0.13157	0.147266	-0.89
N= 341, F (14, 326) = 6.08*, R-squared = 0.19**				

Note:
1. ***, ** and * indicate p-value are significant at one per cent, five per cent and 10 per cent level, respectively.
2. HPLM, LPHM, HPLM and LPLM refer to High Poverty and Low Malnutrition, Low Poverty and High Malnutrition, High Poverty and High Malnutrition, and Low Poverty and Low Malnutrition regions, respectively.
3. z-score varies from -5.99 to 0.46.

The regression results partly confirms to the findings of earlier studies. The education-level of mother has a significant impact on the dependent variable, indicating that the nutritional status improves in relation to her education level. The studies have shown that the probability of mothers with primary/secondary/higher levels of education having underweight children is very low (Radhakrishna

and Ravi 2004). However, the results of the present analysis indicate a significantly negative impact for mothers with primary education and a positive impact for mothers with middle school education on the nutritional status of their children. This significant negative impact could be because a larger proportion of the sample mothers surveyed had only primary education. In the study region, it was observed that children do not attend school regularly. The other mother-related factors – BMI of mother and engagement or non-engagement of mother in the collection of NTFPs – have a positive impact on the nutritional status of children. The better the nutritional status of mothers better the nutritional status of children. Additionally, a mother's engagement in the collection of NTFPs from the forest areas has a positive impact on the nutritional status of children. This could be due to two factors: First, mothers engaged in the collection of NTFPS also collect food products from the forest areas that, in turn, might improve the nutritional status of children, and second, it may be giving additional purchasing power to mothers in terms of ensuring nutritious food for their children.

On the other hand, there are other factors too that affect the nutritional status of children negatively. Studies have shown that children in the tribal communities are not significantly malnourished when compared to non-tribal children. However, our results reveal that children belonging to tribal communities exhibit a significantly low nutritional status compared to non-tribal children. This could be attributed to the tribal communities' lack of awareness about healthcare facilities, their lower educational attainments and higher number of children. It is also observed that region-specific characteristics and proximity to the market place have a significant impact on the nutritional status of children. The HPHM region has a significantly higher proportion of underweight children compared to those of the LPLM region. However, far-flung villages share a better nutritional status among children compared to villages closer to the market place. The reason could be the dependence on agriculture-based economy and access to natural forest resources in the villages far removed from the market place.

The child-specific factors such as birth order and age of children have a negative impact on the nutritional status of children - with increasing birth order the nutritional status of the children declines. It means that more the number of children in the households, higher will be the level of deprivation and underweight among children. However, it is to be noted that the interaction between tribal and birth order of children brings out a different dimension in terms of improvement in the nutritional status with increasing birth order among the tribal communities. This is because the livelihood of tribal the community is dependent on the year-round livelihood pursuits unlike non-tribal communities. Tribal communities largely depend on forest resources, which in turn necessitate the deployment of more hands for collecting forest products. In addition, children under the age group of 3-4 year experience a lower nutritional status compared to those in the 0-2 year of age group. This also confirms the negative impact of birth order. This could be due to the fact that younger children benefit from breastfeeding, while sufficient and nutritious food may not be available to higher age group of children because of household poverty.

Conclusion

This paper has tried to examine the disparities in the levels of food insecurity faced by tribal and non-tribal communities in the tribal dominated areas of Maharashtra besides identifying the determinants of the nutritional outcome taking into account underweight in children as an indicator. Empirical evidence shows a higher incidence of food insecurity in terms of poverty, deficiencies in calorie intake and undernutrition among tribal groups when compared to non-tribal groups. It is largely due to the lack of access to/ownership of productive agricultural land and the resultant lower income from agriculture, which is further compounded by the lack of education and awareness. The food insecurity in the study area varies from region to region. Largely three major groups of regions could be identified viz., (i) HPHM and LPHM are highly food insecure regions; (ii) HPLM is a moderately food insecure region, while (iii) LPLM is a low food insecurity region. Overall, undernutrition is substantially high among tribal communities across the LPLM and HPHM regions. The determinants of underweight among children are largely non-economic factors that also play a major role in determining their nutritional status. For example, the social status of households has a significant impact on the nutritional status of children. The nutritional status is significantly lower among tribal communities when compared to non-tribal communities. The nutritional status of children is subject to various other factors such educational level of mother, age of children, birth order, whether or not mothers are engaged in the collection of NTFPs from the forests etc. On the whole, food insecurity varies from region to region on the one hand and is determined by various non-economic factors on the other. The policy focus should be directed more towards building the capabilities of the target groups through increased expenditure on education and health.

Notes

[1] Malnutrition indicates either over-nutrition or undernutrition; however, malnutrition and undernutrition are used interchangeably in this paper.

[2] Food security can be defined as, "food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (WFS, 1996)".

[3] Approximately 200 definitions and 450 indicators are available in the literature for examining food security (Hoddinott, 1999).

[4] The Planning Commission of India estimated poverty line as Rs. 362.25 Monthly Per Capita Consumption Expenditure (MPCE) for rural Maharashtra for 2004-05. In the present analysis, poverty norm is deflated by the Consumer Price Index for Agricultural Labour (CPIAL) for rural Maharashtra for 2007-08. Based on this, poverty line is arrived at Rs. 440.38 MPCE.

[5] These four groups of regions, namely HPLM, LPHM, HPHM and LPLM, have been categorised on the basis poverty levels as prevailing in 1999-2000 (GoI, 2002) and child malnutrition in 2002-04 (IIPS, 2006). For identifying tribal dominated districts, we have considered districts as a criterion with more than 8.9 per cent of the Tribal population. These tribal dominated districts are Nandurbar, Dhule, Nashik, Wardha, Chandrapur, Yavatmal, Amravati, Jalgaon, Nagpur, Gadchiroli, Thane and Raigarh.

[6] We define market place as a place with a relatively developed market on which people of adjoining villages depend for various purposes such as procuring of consumption and non-consumption products, health care facilities and secondary education.

[7] See www.mahtribe.com.

[8] The demand for higher rates for tendu leaves by Naxalite groups seems to be protective of the local people, however, further investigation indicates their economic interest being achieved through this demand.

[9] The nutritional status of children can be of three types *i.e.* chronic undernutrition, acute undernutrition and underweight. These can be measured through three indicators. One, chronic under nutrition measured through stunting is an indicator of chronic deficiency which in turn indicates lower weight-for-age. Two, acute undernutrition measured through an indicator, wasting, indicates lower height for a given weight. And the last indicator is 'underweight' which is a composite measure of both chronic and acute under nutrition and indicates lower height-for-age (Arnold et. al. 2003, cited in Radhakrishna, Ravi 2004).

[10] It is to be noted that moderate undernutrition includes severe undernutrition.

[11] The forest coverage in the LPHM region constitutes about 76 per cent and is famous for quality bamboos and tendu leaves (see http://gadchiroli.gov.in).

[12] It is a composite index of various household characteristics. It includes the type of house, sanitation, electricity, sources of drinking water and cooking fuel and the type of land ownership.

[13] The specification used in this paper for linear regression model is $Y = a + bX + e$, where *Y* is dependent variable ie. weight-for-age (z-scores) for measuring underweight among children below age six years, *a* is intercept, *b* is coefficient of *X* explanatory variables and e is error term. The explanatory variables include both dummy as well as linear variables.

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