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Rudra Narayan Mishra

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ABSTRACT

Nutritional deprivation among Indian children is one of the parameters of underdevelopment mentioned in development discourse in recent times. And such deprivation is more often associated with well known socio-economic indicators of deprivation; prominent among them is caste, which ranks the society into a hierarchy in terms of benefit and welfare. Though caste dimension has been frequently considered as a category of understanding deprivation, it is rare to find explicit disadvantage of caste in what is said as transforming capabilities into functioning. While caste disadvantage in any outcome shows a systematic pattern, it is never made clear as to what is the dynamics of this disadvantage in terms of characteristics bearing an association with a given outcome. This paper makes an attempt in illustrating the dynamics of caste-based deprivation considering the case of child under-nutrition. It essentially demonstrates the patterns of differentials in nutrition according to other potential correlates of under-nutrition within SC/ST and others and comments on the limits of translating a given set of capabilities in to functioning/outcome (child nutrition here). It finds that while deprivation gap according to potential correlates is higher in general compared with SC/STs, there is clear demonstration of differential translation of capabilities like education, residential status, work status into outcome like nutrition among the SC/STs vis-à-vis the others. The results are also confirmed with application of a logit model. The study uses the data from National Family Health Survey report (NFHS-2, 1998-99) for the purpose of this illustration.

Key Words: Health, Under-nutrition, Child Under-nutrition, Caste, Scheduled Caste, Scheduled Tribe, Inequality, Deprivation, India

JEL Classification:- I 12, I 32

I. Introduction

The phenomenon of child under-nutrition in India is of concern given the fact that India has a disproportionate share of nutritionally deprived children of the world. This nutritional deprivation in Indian children is often associated with other indicators of socio-economic deprivation. And caste and class form the core of socio-economic indicators of deprivation in the Indian context. This is mostly due to the observed disadvantages in relation to any socio-economic indicator, which is low among those lower in the caste-class hierarchy. The most recent statistics indicate that almost half of the Indian children below the age of three years are stunted. (NFHS-2, 1998-99) and one out of every three stunted children across the world lives in India. (WHO, 2000). These alarming levels of nutritionally deprived children in aggregate have its own socio-economic dimension reflected in caste/class differential which are reasonably wider and variant across different states of India.

Child under-nutrition in particular is diagnosed with a variety of focus by development researchers. In circumstances of resource constraint at the household level, women and children are said to be vulnerable in every regard. On this count, it is observed that resource constrained poor households of India too have women and children being victims of nutritional disadvantage among other disadvantages [Dreze and Sen, 1989; Deolalikar, 1988]. Such disadvantage in children originates from poorly fed mothers themselves being under nourished, who lack potential of required quality and intensity of breastfeeding

[Choe and Anandiaha, 2000]. As a result, early food supplementation in poor hygiene and sanitary conditions make children vulnerable to diarrhea and other childhood ailments frequently, which in turn reflect undernourishment in children [Brown et al, 1998; Black and Krishna Kumar, 1999]. This complex mechanism of poverty-disease and under-nutrition is referred to as the vicious cycle of under nutrition. And therefore no single most explanatory factor responsible for child under nutrition can be figured out in the Indian circumstance. In fact, the complex interplay of socio-economic indicators that has a bearing on under-nutrition provides clues as regard the differential level of response of these indicators to under- nutrition across class/caste groups.

Based on this understanding, this paper makes an attempt towards verifying such differential response of well known correlates like the place of residence, maternal education, household economic status, parent's occupation to under nutrition according to caste categories.

The low castes in India are referred to as scheduled castes. The concept of scheduled caste is basically a statutory concept to refer backwardness in terms of overall economic, social and educational achievement compared to other castes [for details see the various reports based on recently conducted census in 2001, especially reports on household amenities for SC/ST households and socio-cultural tables for information on educational achievement in terms of male/female literacy ratio, school enrollment ratio among 0-6 year age group among the SC/ ST population and also the reports on employment[1]]. They include the erstwhile untouchables also, who are discriminated on the basis of their birth and their occupation. [Deaton and Dreze, 2002] Along with them come the tribal populations who are left out of the mainstream society, as they are concentrated in their forest and remote areas of the country. Due to their inaccessibility, they also get left out of the mainstream

1 Details of these reports and figures are presented in the discussion section

development process and are deprived of basic education, livelihood and sanitation. [Sundaram K. 2003] Though during the last fifty years India's economic growth has brought development to many of these communities they lag behind other communities with respect to the attainment of income, education, health and other requisites of a dignified life [Srinivasan and Mohanty, 2004].

One of the potential characteristics to measure human development is child nutritional status. [Dreze and Sen; 1989]. However one finds disparities in child well-being between urban and rural residents which is equally reflected in nutritional status of children [NFHS-2 1998-99; Smith et al, 2004] There is also evidence that children from households associated with agriculture as an occupation are more likely to be under-nourished. [Saito et al, 1997; Foster et al, 1996] As agriculture is concentrated more in rural areas, the seasonality, low wage rate and larger dependence on it for livelihood (which is itself governed by Monsoon) fluctuate the availability of food in the household, which in turn might reduce the child's intake [Beherman and Deolalikar, 1989; Bidinger et al, 1986]. The children from poor households as already stated above, are also likely to be vulnerable to under nutrition [Svedberg, 2001; Hadad and Smith, 2002; and Beherman, 1988].

But what lacks in these literatures relates to how caste makes a difference to the nutritional outcome given the place of residence, occupation status of the household head and maternal education. The Table-1 demonstrates such difference. We can observe that the children from SC/ST households are reporting higher incidence of stunting when compared with children from non SC/ST household, in all states except Kerala, Haryana, Himachal Pradesh and opposite in case of Jammu and Kashmir. In an attempt towards addressing this question, we make an exposition of the differential levels of vulnerabilities to under-nutrition according to its potential correlates, namely rural-urban divide, household economic status, and occupational status of parents as well as maternal

education in different caste groups. The issues that is explored here relates to whether the extent of inequity/disparity as regard to child under nutrition widens or narrows within caste groups when read along the characteristics such as rural urban divide, maternal education, occupational status of the household head and economic status of the household etc. In other words, we intend to exhibit the differential translation of certain capabilities to outcome (i.e. absence of nutritional deprivation) across caste groups based on the inequity gaps that emerge in relation to stated capability categories. The data and methodology of the study is explained in the next section.

II. Data and Methodology

We have considered National Family Health Survey (NFHS-2: 1998-99) for our analysis. The nutritional status for children is reported in terms of height-for-age (stunting), weight-for-age (under weight), weight-for-height (waiting) and child anemia. The nutritional status information is available for children below three years of age only. Here we have considered only one indictor i.e. stunting,[2] because it represents long-term nutritional achievement and is free from short-term fluctuations. Unlike weight-for-age, stunting is not affected by short-term illness, change in quantity of dietary intake and seasonal variations. Thus it reflects a long-term growth faltering if any [Osmani; 1992]. As an indicator, it is also considered robust even against waisting because the latter only reflects acute nutritional deficiency, the incidence of which is due to severe inadequacy of food (in a famine like situation). The report shows a very low percentage among all the children who suffer from waisting. Anaemia as an indicator, which reflects the iron short fall among the children, is basically a clinical indicator. But weather it affects normal growth of the child, is still questionable.

2. To keep the arguement simple we have only focused on "stunting". However the results on "underweight" can be obtained from the author. In the logit models we have presented both the indicators.

Thus ‘stunting’ which records short fall in normal growth, given the age of the children, from ideal median height for that age group, is taken as the only indicator to describe child nutritional status in our study. We have considered 17 major states in our analysis, which represents approximately 90 percent of the total population of India.

Here we have taken only simple bi-variate and multivariate cross tabulations to know the prevalence of stunting among different categories. First, we have attempted simple cross tabulation to gauge the differential prevalence of stunting among children on the basis of broad characteristics like place of residence, maternal education, household occupation and economic status. Then we have calculated the relative risk for each group within a particular characteristic by placing its prevalence rate against group average. Thus we have calculated the difference between minimum and maximum values for each category across the states. Here minimum values refer to better off situation and maximum values indicate worse off situation. In other words when prevalence of stunting among a particular category is less than the over all prevalence of that category, the standardized figure (it is also referred to as relative risk in the following text) will be less than one and if the prevalence among the particular category is higher than the over all prevalence, then the standardized figure will be greater than one.

Then we have calculated a gap for each state on the basis of the broad categories. Suppose for example maternal education is one of the characteristics and state under consideration is Madhya Pradesh. It has four categories, namely no education, primary education, secondary education and higher education for the mother. First we have calculated the prevalence of stunting among the children across each of the four categories. Then we have divided the number representing prevalence of stunting across each category against the over all prevalence of under nutrition for that particular category as a whole (in this case maternal education) for Madhya Pradesh. Thus we got some standardised figures

for each category, which could be explained as relative risk for that particular category. Taking the minimum and maximum value we have calculated the gap in relative risk for maternal education.

Given the understanding of these gaps according to the set of characteristics, we attempt to examine the same in SC/ST group and non-SC/ST group to gauge the difference if any, in relation to this gap while compared with the population as a whole as well as the non-SC/ST category. Such a comparison not only intimates the kind of prevailing gaps according to these well-known correlates/characteristics but also informs us on the extremities of disadvantages against the prevailing averages of different groups. We have divided the households into two broad categories, one consisting of all scheduled caste and scheduled tribe households (SC/ST households) and the other consisting of all non-SC/ST households, including 'Other back ward caste' as well as other non scheduled categories. The reason behind this broad categorisation is subject to possible disaggregation in NFHS-2, one can find out that the prevalence of child under nutrition is higher among SC/STs vis-a-vis others (generally above 60% compared with below 50%) for all the states taken into account. Then following the earlier methodology we have calculated prevalence of under nutrition among the children from SC/ST households and non-SC/ST households across categories for a given characteristic. For example considering maternal education as the characteristic, we compute the entire gap of most advantaged with better education and the most disadvantaged with worse level of education for these three groups of households SC/ST, non-SC/ST as well as the entire population. A similar computation of gap is made for each of the characteristics. This gap essentially is normalized and facilitates comparison as they are around unity where unity represents the overall prevalence of under-nutrition in the corresponding group. Further, the relative positioning of advantage/disadvantage for a given characteristic category like maternal education, standard of living could also be compared between SC/ST and non-SC/ST households.

Such a comparison essentially illustrates two aspects: one whether these potential characteristics/correlates of under-nutrition make a similar difference in nutritional status among SC/STs and others and secondly weather the most disadvantaged ordering according to under-nutrition is compared across groups. This adds to the understanding of characteristic bearing on nutritional advantage across groups, which in other words inform us on the translation of these capabilities (characteristics) to functioning (here in terms of nutritional outcome)[3]. We have also applied logistic models as a confirmatory exercise to know the robustness of caste disadvantage on nutritional achievement of children. For this purpose we have taken other correlates such as age of the mother at marriage, mother's nutrition status in terms of body mass index of the mother, birth size of the child, family size along with other socio-economic indicators like occupation of the households, household economic status, place of residence and maternal education. There exists ample literature and evidence to justify the inclusion of these variables. [Hadad and Smith, 1999; Hotchkiss et al, 2002; Smith et al, 2004; Mishra, 2003][4] .

III. Observation / Results

Our analysis shows that for characteristics like place of residence, in almost all the states the urban children have low risk compared to their rural counter parts. The rural-urban gap is the largest for West Bengal, about (0.33) and least for Assam (0.01). This otherwise informs us that the rural disadvantage in West Bengal is most severe while the same in Rajasthan is minimal with regard to child nutritional outcome.

The urban advantage in child under nutrition is universal across all the states excepting states like Jammu and Kashmir, Andhra Pradesh and Tamilnadu. The absolute difference which measures the gap between

3 Please look to the Appendix-1 for empirical illustration of the methodology.

4 For details on logit model specification please see the note given below the Table-10.

the difference among SC/STs on the basis of their location to the over all rural-urban difference shows that for states like Kerala, Assam, Bihar, Gujarat, Jammu and Kashmir, Maharastra, Orissa, Punjab, Rajasthan, Tamilnadu and Uttar Pradesh, it is very low, less than (0.1), which indicates the difference in prevalence of stunting among SC/ST households on the basis of their place of residence are more or less closer to the over all rural-urban difference in prevalence of stunting. For West Bengal the absolute difference is 0.33, which indicates that the gap between SC/ST is small, compared to rural-urban difference. While reaching such conclusion we are aware that, each of these states is at different stage of urbanisation. Where Maharashtra, Gujarat and Tamilnadu are highly urbanised states; Bihar, Orissa, Madhya Pradesh and Rajasthan are having lesser degree of urbanisation. At the same time the population composition shows that in these backward states, SC/ST constitute a very high share of the population, who are concentrated in villages. [see Table 2].

In the case of maternal education we found that the prevalence of stunting is higher among children of uneducated mothers across the states. Among the SC/ST households, too, uneducated mothers have higher prevalence of stunting compared to mothers with higher education, for all the states in the analysis. The gap in prevalence of stunting is very wide across the states among children of higher educated mothers and children with uneducated mothers (no education category). The gap or difference between no education category and higher educated category is also very high in the absence of any caste factor. It is true for all the states considered in the analysis. Since in both cases, gaps are very high, the absolute difference is below (0.1) for all states except Gujarat, Himachal Pradesh and Kerala where it is above (0.1). One can easily conclude that the maternal literacy rates in respective states have more to explain. This indicates that maternal education is a crucial determinant of nutritional outcome of the children irrespective of their caste affiliation. This is supported by a small absolute difference. [see Table 3].

The economic status of the household demonstrates an expected pattern of the children from low economic status households having higher prevalence of stunting (in terms of relative risk) against their counterparts from high economic status households. The pattern is clear for all the states.

A similar pattern is noticed among SC/ST households, where children from poor households have higher risk compared to their counterparts from rich households. But the gap in prevalence of stunting among children from SC/ST households on the basis of economic status is higher in states like Bihar, Gujarat, Kerala, Madhya Pradesh, Orissa, Tamilnadu, and West Bengal, which is above 0.50. This implies that in these states household economic status displays a larger influence on nutritional outcome of the children in SC/ST households. But in other states the role of household economic status is relatively less significant. [See Table 4].

With regard to mother's occupation, except for states like Uttar Pradesh, Rajasthan and Himachal Pradesh, in all other states children of mothers working in agriculture have a higher relative risk of being undernourished. The reason might be in those states the women from less privileged class or caste are engaged in agriculture as casual labourers. So the economic gain is very minimal. It might affect the care of children as well, which will have a bearing on their health outcome. Though Uttar Pradesh and Rajasthan are no different from other northern states like Madhya Pradesh, Bihar or Orissa; as far as women status is concerned, especially in agriculture, we found children of women working in the non-agriculture have higher risk of stunting. One has to carefully look at the employment pattern of the women in these states before making any further conclusion. Whereas mothers not engaged in any occupation have reported lowest prevalence of stunting among children compared to the mothers engaged either in agriculture or non-agriculture sector. Even among SC/ST households, we found evidence

that women not working have less prevalence of stunting among their children compared to those who work in either agriculture or non-agriculture sector. The gap among SC/ST households is the highest in Tamilnadu. The absolute difference in states like Assam, Haryana, Himachal Pradesh, Karnataka and Punjab indicates the gap in prevalence of stunting among the SC/ST household is relatively low compared to the over all difference in prevalence of stunting among different occupational categories irrespective of caste. In all other states the absolute difference is very low (not exceeding 0.1) this indicates that the occupational difference in prevalence of stunting among SC/ST households is closer to the gap in over all prevalence of stunting among different occupational categories irrespective of caste. [See Table 5].

In Tables 6, 7 and 8 we have presented the worst-off categories among SC/ST households and also among non-SC/ST households. We found for both social categories that the rural habitants have a higher relative risk of having stunting among their children. Only exceptions are Tamilnadu and Andhra Pradesh where SC/ST households from urban areas have higher relative risk of having stunted children. But for non-SC/ST households rural disadvantage is clear for all the states. Across all the states the SC/ST households have lower relative risk for stunting among their children compared to non-SC/ST households, which indicates that the impact of urban advantage is low for children of SC/ST households. [See Table 6].

In Table 7 we found that the prevalence of stunting is higher among children from households where mothers have no education. This is true for both SC/ST households and non-SC/ST households. We found the relative risk of stunting is higher among SC/ST households compared to non-SC/ST households, indicating the impact of illiteracy on nutritional outcome, which is higher for children from SC/ST households than for children from non-SC/ST households. [See Table 7]

As far as economic status is concerned the children from low economic status households have higher relative risk of being stunted between both SC/ST and non-SC/ST households. The only exception is Kerala where among SC/ST households, the middle-income category has the highest relative risk of being stunted compared to other categories. But one interesting observation is that the economic status makes a higher difference to relative risk of being under nourished in the case of non-SC/ST households than SC/ST households. This implies that living standard component is relatively less responsive to child stunting among SC/ST households. In other words, the difference in prevalence of stunting among children from SC/ST households across different economic status is lower compared to the children from non-SC/ST households. [See Table 8]. Table 9 summarizes finding from Tables 1 to 5, which indicates how the absolute difference across the states varies in a certain defined range. Results of this absolute difference for some of the states, from Table 9, are also presented in a graphic form [see Graph1] for the convenience of the reader.

Table 10 presents odds value for caste. It helps us to quantify the odds of experiencing under-nourishment in terms of stunting and under-weight among SC/ST children vis-à-vis others. We have applied two logit (binomial) models each for stunting and under weight. We justified the use of bivariate logit models, since our dependent variable is dichotomous and categorical. [Hosmer and Lemeshow; 2000]. The model-1 tells us the odds of the caste (risk of being under nourished because the child is from SC/ST household) in general, while controlling for the socio-economic indicators like economic status, occupational status, place of residence of the household along with other demographic indicators like, family size, maternal education, age at marriage of the mother, maternal nutrition measured in terms of body mass index (BMI), religion and child's own health characteristic measured in terms of birth size. In model-2 we have considered only agricultural households and controlling for above-mentioned factors, we try to quantify the risk of

under nourishment for the child if he or she belongs to a scheduled caste. The basis of running the model-2 separately rests with the evidence that most of the households from scheduled caste category are engaged in agriculture. [Mutatkar 2005]. We choose to present only estimated odds ratios and associated standard errors for the covariate, caste (since it is the focus of our study).[5]

At All India level, in both the models for the twin indicators of under nutrition, caste is found to be statistically significant. In model-1 we found Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharastra, Orissa, Punjab, Rajasthan, Tamilnadu, West Bengal and Uttar Pradesh have the odds of 'greater than one' for children from SC/ST households to become stunted. The statistical significance is ensured in the case of Bihar, Kerala, Maharastra, Tamilnadu and Uttar Pradesh. In case of model-2, Tamilnadu and West Bengal are the states having statistically significant odds for children, being stunted, from SC/ST households engaged in agriculture. For other states except Gujarat, Jammu and Kashmir and Karnataka the odds are greater than one for children from SC/ST households, engaged in agriculture in reference to children from other social backgrounds.

With regard to under weight, we found that almost states except Gujarat, the odds for SC/ST children being stunted are greater than one in model-1. The statistical significance is confirmed in states like Assam, Kerala, Maharastra, Rajasthan, Tamil Nadu, West Bengal and Uttar Pradesh. In case of model-2 Bihar, Tamil Nadu, Rajasthan and West Bengal are the states showing statistically significant odds for children (being under weight) from SC/ST households engaged in agriculture. Except for Assam, Gujarat, Haryana, Jammu and Kashmir, Kerala and Orissa, all other states have odds of greater than one for children (being under weight) from SC/ST households, engaged in agriculture.

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5 The results of other covariates are not presented to keep the argument simple. However interested person can contact the author.

IV. Discussion

These empirical results and regional comparison of caste dynamic of child undernutrition portray a clear caste-inhibiting component in the response of correlates of child under-nutrition. The advantage of place of residence in terms of urban habitat, maternal education, standard of living and occupational status are minimum for the SC/ST households compared to non SC/ST households which is reflected in smaller disparity (difference) for the SC/ST households. This observation is evidenced by the extent of relative disadvantage due to the categories of different characteristics being smaller in the SC/ST group vis-à-vis the aggregate situation as well as the non-SC/ST group. The fact is also reiterated in results presented in the Tables 6 to 8 where we found that the relative risk of stunting or (disadvantage) is low among SC/ST households if they live in rural areas, are from low economic households and depend upon agriculture for living compared to non-SC/ST households. Which in turn shows the advantage of a SC/ST household in terms of urban setting, better economic status and occupational status with regard to better nutritional status of their children is comparatively low when compared with the non-SC/ST households. In other words, the gains in nutritional status accrued due to positive characteristic/correlates are relatively lower for the SC/ST households for almost all the characteristics. There are striking exceptions in the pattern of these gains especially with maternal education. The relative advantage/disadvantage against a prevailing aggregate for different categories of maternal education sometimes reiterates the role of maternal education in determining nutritional status among children of SC/ST households. Thus our finding is on line with the findings of the earlier studies, which show advantage of maternal education in determining child health. [Engle, 1999; Hotchkiss et al; 2004]. This relative difference is also very close to the difference (gap) in relative risk for over all maternal education characteristics itself. [See Table 9].

Thus one can argue that locational, economic and occupational advantage help little to change the plight of children from SC/ST households in terms of under-nourishment and this pattern is universal across all the states under examination. In other words the achievement in terms of better urban habitation, economic status has brought little benefit to the children from these households. The reasons might be that the SC/ST households even if they live in urban areas and have better economic status may not be able to translate the fullest advantage of their opportunity due to their social identity constraints, which needs to be explored. For instance, maternal education makes the least of difference to child nutritional outcome in SC/ST households when contrasted with non-SC/ST households across the rural/urban spectrum in almost all the states. Thus it might affect the caring practice of these women towards their children, which is reflected in the stunting. Thus one has to go further to see what are the constraints that hamper the realisation of full benefit of these advantages for SC/ST households. Whereas in the case of non-SC/ST households we found the difference in relative risk for stunting in terms of rural-urban, maternal education, economic status and occupation to be very clear.

Another interesting observation is from maternal occupation category. This shows that across the states women not working have low relative risks of stunting of their children in both the social categories. This implies that the availability of the mother to take proper care of the children during childhood is significant. The earlier studies thus show the advantage and disadvantage of maternal work on nutritional outcome of their children. [Engel et al, 1999]. One of the indirect implications might be, in these households where women do not engage in any occupation, might be financially sound which do have an impact on the outcome of stunting.

However, the nutritional deprivation of scheduled caste and scheduled tribe children cannot be seen in exclusion from other related

indicators of deprivation. These two social groups share an identity of deprivation given the major share of the deprived belonging to these groups in the country. Different survey reports published by the Census of India, National Sample Survey Organisation and Human Development Report of India have also reiterated that these groups fair poorly in other crucial social and economic indicators.

For instance, extent of poverty among these group is reasonably higher when compared with the average prevailing levels of poverty (India Human Development Report (1999), with 51 percent of the tribal households and 50 percent of the scheduled caste households are poor by 'Head Count Ratio[6] ' against 39 percent at all India level. Other studies also report identical poverty level among these groups. [Thorat 2000; Despande et al 2004]. One of the most recent studies puts 45.83 percent of tribal population and 35.89% of the scheduled caste population below poverty line as against national average of 26.98 percent in Rural India. [Mutakar; 2005].

The recent census data shows the literacy level among these groups (especially among women) to be very low in almost all the Indian states excepting in a few states like Kerala, Goa and other Northeastern states For females among scheduled caste, the adult literacy rate is approximately 42 percent while for women from tribal communities it is below 35 percent. (Census 2001). As regard land holding, a substantial majority of these people are either land less and (or) agricultural labourers or marginal farmers (NSSO, 1999-2000). A study by Dubey et al (2004)

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6 This is a measure of income - poverty and measures the proportion of the population below a level of income defined as a "poverty line". The poverty line in India is measured by taking the income (separately for rural and urban areas) necessary to buy a rudimentary food-basket, a basket that, when consumed, yields a minimum level of calories. The head-count ratio is computed on the basis of National Sample Survey (NSS) data on consumption expenditure; people with an income below the poverty line are "poor" and the proportion of the poor to the aggregate population is the head-count ratio. Frontline, Vol. 14, No. 16, Aug. 9-22, 1997

found that 33 percent of tribal and 56 percent of scheduled caste households are land less in rural India as per employment survey done by 'Central Statistical Organisation' in the year 1999-2000, against a rural average landlessness of 37 per cent at the national level. In rural India, more than 60 percent households from scheduled caste community and more than 50 percent households from scheduled tribe earn their livelihood from agricultural labour. Since the rural labour markets are largely unorganized the scope for exploitation of this vulnerable group is pretty high. (Dubey et al; 2004). Findings from recent census shows that 76.30 percent of scheduled caste households do not have latrine and 57.1% do not have any drainage facility in their homes. Among tribal households the corresponding figure stands at 82.4 percent and 78.1% respectively. Their access to health care is also limited given the inadequate health infrastructure in the country, especially in villages. Since most of these groups live in the remote forest areas (not having proper road, transport and modern communication), the benefit of health care and other welfare schemes remains beyond their reach. The infant mortality rate and maternal mortality rate are still very high among these social groups compared to any other social groups. National Family Health Survey-2; 1998-99, page 182-187, Mari bhat; 2002].

And since they have been socially excluded for a long period of time, not only do they lack proper organisation (social as well as political) in most of the states excepting a few, but also their capability to bargain or confront the government and other agencies for getting benefit from different welfare schemes is limited. Further, their incapability restricts their access to labour market, credit market and other income (asset) generating institutions (like co-operatives and banks). [Fourth Report; National Commission for scheduled castes and scheduled Tribes: 1996-97 and 1997-98]

So the existing welfare schemes in general or for the marginalised groups in particular has to be restructured in such a way that the maximum

benefit will reach to these communities. Therefore, reformulation of government strategy (both at administrative as well as political level) is necessary for implementation of 'affirmative action' carried out in form of several intervention programmes for these marginalised groups.

Thus the phenomenon of mal-nourishment among children from the scheduled caste and scheduled tribe households need to be viewed in the broader context of socio-economic exclusion of this community.

V. Policy Implication

This study brings to light the fact that caste serves as an agent of disadvantage not only in the aggregate outcome (i.e. child-under-nutrition) but also this disadvantage is intense when compared along different categories of correlates of under-nutrition. And such evidence exemplifies the limitation in the translation potential of capabilities to outcomes across caste categories. In other words the characteristic based inequities are minimal among the SC/STs compared with the general population or the non-SC/STs. The potential gain due to improved capabilities like maternal education or standard of living not showing up in outcomes, point at differential intervention strategy towards addressing the problem of child under-nutrition among the disadvantaged caste groups. And perhaps such intervention strategies relate to mainstreaming them in all spheres as well as work against social-exclusion of any kind that inhibits their mainstreaming with the rest of the society.

Table 1: Prevalence of stunting among children by ethnicity of their household across Indian states

States	Prevalence of stunting among Scheduled caste (SC) (1)	Prevalence of stunting among Scheduled Tribe (ST) (2)	Prevalence of stunting among SC/ST children (3)=(1+2)	Prevalence of stunting among children from Other backward caste (OBC) (4)	Prevalence of stunting among children from Others (5)	Prevalence of stunting among Non SC/ST children 6 = (4+5)	Overall prevalence of stunting (7)	Gap between SC/ST and non SC/STs (8)	Total sample size (9)
Andhra Pradesh	42.7	44.2	43.45	39.8	32.3	36.05	38.6	7.4	933
Assam	45.1	42.6	43.85	31.7	55.6	43.65	50.2	0.2	644
Bihar	57.6	56.4	57.0	54.7	45.1	49.90	53.7	7.1	2,086
Gujarat	48.9	46.9	47.9	46.5	37.8	42.15	43.6	5.75	1,011
Haryana	56.3	-	56.3	55.3	44.6	56.30	50.0	0	877
Himachal Pradesh	54.9	-	54.9	42.4	35.7	54.90	41.3	0	808
Jammu and Kashmir	38.9	39.7	39.3	50.6	36.6	43.60	38.8	-4.3	815
Karnataka	43.7	41.2	42.45	34.4	35.0	34.70	36.6	7.75	1,047
Kerala	38.2	-	38.2	23.4	17.7	38.20	21.9	0	576
Madhya Pradesh	52.7	59.9	56.3	51.5	37.2	44.35	51.0	11.95	2,127
Maharastra	43.7	57.1	50.4	40.3	35.0	37.65	39.9	12.75	1,562

cont'd....

Orissa	50.7	49.4	50.05	44.2	32.4	38.30	44.0	11.75	1,282
Punjab	49.6	-	49.6	43.1	28.7	49.60	39.2	0	757
Rajasthan	55.0	60.0	57.5	51.4	48.3	49.85	52.0	7.65	2,353
Tamilnadu	41.2	-	41.2	25.1	-	25.10	29.4	16.1	1,196
West Bengal	45.6	46.6	46.1	27.0	40.1	33.55	41.5	12.55	1,111
Uttar Pradesh	63.1	69.3	66.2	55.7	50.3	53.00	55.5	13.2	2,387
All India	51.7	52.8	52.25	44.8	40.7	42.75	45.5	9.5	24,600

- Source: NFHS-2 (1998-99), extracted from various state-wise reports
- Figures in bracket refers to column numbers
- In column 4 the figures refers to average prevalence of stunting among children from SC and ST households together.
- In column 6 the figures refers to average prevalence of stunting among children from OBC and Other households together.
- Column 9 refers to the difference in prevalence of stunting among children between SC/ST house holds and their non-SC/ST counterparts.
- For some states the total number of cases reported may not add up to the reported number. Also the total number of cases considered here for stunting might not be same to the reported total number of cases in the column 9 of the Table-1. The reason might be non availability of information in some cases or the package drops the cases if weight equals to zero, etc.

Table 2: Description of relative risk of stunting during childhood by Rural-Urban Residence, caste group and general Population, NFHS-2, 1998-99.

Characteristics / States	Rural-Urban Gap						Absolute difference in risk of stunting between SC/ST and overall (a-b)
	Risk for SC/ST children in urban[7] (1)	Risk for SC/ST children in rural[8] (2)	Absolute difference within SC/ST (a)[9] (1-2)	Risk of stunting among children in urban (3)[10]	Risk of stunting among children in rural (4)[11]	Absolute difference in risk of stunting between rural and urban (b)[12] (3-4)	
Andhra Pradesh	0.99	1.00	0.01	0.77	1.08	0.31	0.30
Assam	0.76	1.01	0.25	0.74	1.02	0.26	0.01
Bihar	0.81	1.01	0.20	0.78	1.02	0.24	0.04
Gujarat	0.90	1.04	0.14	0.88	1.07	0.19	0.05
Haryana	0.93	1.02	0.09	0.81	1.06	0.25	0.16
Himachal Pradesh	0.91	1.01	0.10	0.72	1.02	0.30	0.20
Jammu and Kashmir	0.96	1.29	0.33	0.68	1.06	0.38	0.05
Karnataka	1.00	1.00	0.00	0.84	1.07	0.23	0.23
Kerala	0.87	1.02	0.15	0.86	1.03	0.17	0.02
Madhya Pradesh	0.94	1.01	0.07	0.78	1.07	0.29	0.21
Maharastra	0.84	1.10	0.26	0.83	1.11	0.28	0.02

cont'd....

Orissa	0.90	1.01	0.11	0.84	1.02	0.18	0.07
Punjab	0.78	1.04	0.26	0.74	1.08	0.34	0.08
Rajasthan	0.87	1.02	0.15	0.85	1.04	0.19	0.04
Tamilnadu	0.99	1.04	0.05	0.92	1.04	0.12	0.07
West Bengal	0.88	1.02	0.14	0.62	1.09	0.47	0.33
Uttar Pradesh	0.89	1.01	0.12	0.84	1.03	0.19	0.07
All India	0.87	1.03	0.16	0.78	1.07	0.29	0.13

Source: NFHS-2; 1998-99
Note: 'r' refers to households living in rural areas
'u' refers to households living in urban areas

7 'Column 1' refers to the 'risk of stunting' among children from urban SC/ST households

8 'Column 2' refers to the 'risk of stunting' among children from rural SC/ST households

9 'Column 3' refers to the absolute difference in 'risk for stunting' between children from rural SC/ST households and urban SC/ST households.

10 'Column 4' refers to the 'risk of stunting' among children from urban households. It includes both SC/ST and non-SC/ST households in the urban area of respective states.

11 'Column 5' refers to the 'risk of stunting' among children from rural households. It includes both SC/ST and non-SC/ST households in rural area of respective states.

12 'Column 6' refers to the absolute difference in 'risk for stunting' among the SC/ST children on the basis of their location to the overall rural-urban gap.

Table 3: Description of range of relative risk of stunting during childhood by Maternal Education, caste group and general Population, NFHS-2, 1998-99.

Characteristics / States	Maternal education						Absolute difference in risk for stunting for SC/ST children vis-a-vis all children (a-b)
	Minimum Risk for SC/ST children[13] (1)	Maximum risk for SC/ST children (2)	Difference among SC/ST children (a) (1-2)	Minimum Risk of stunting for all children[14] (3)	Maximum Risk of stunting for all children (4)	Difference between minimum and maximum risk (b) (3-4)	
Andhra Pradesh	0.48 (H)	1.22 (N.E.)	0.74	0.47 (H)	1.19 (N.E.)	0.72	0.02
Assam	0.44 (H)	1.09 (N.E.)	0.65	0.43 (H)	1.12 (N.E.)	0.69	0.04
Bihar	0.31 (H)	1.11(P)	0.80	0.31 (H)	1.05 (N.E.)	0.74	0.06
Gujarat	0.4 (H)	1.38 (N.E.)	1.34	0.41 (H)	1.28 (N.E.)	0.87	0.47
Haryana	0.61 (H)	1.24 (N.E.)	0.63	0.61 (H)	1.18 (N.E.)	0.57	0.06
Himachal Pradesh	0.38 (H)	1.27 (N.E.)	0.89	0.55 (H)	1.20 (N.E.)	0.65	0.24
Jammu and Kashmir	0.34 (H)	1.26 (N.E.)	0.92	0.32 (H)	1.27 (N.E.)	0.95	0.03
Karnataka	0.57 (H)	1.37 (N.E.)	0.80	0.56 (H)	1.27 (N.E.)	0.71	0.09
Kerala	0.54 (H)	1.26 (N.E.)	0.72	0.42 (N.E.)	1.26 (S.E.)	0.84	0.12

cont'd....

Madhya Pradesh	0.52 (H)	1.18 (N.E.)	0.66	0.47 (H)	1.12 (N.E.)	0.65	0.01
Maharastra	0.75 (H)	1.25 (N.E.)	0.50	0.74 (H)	1.21 (N.E.)	0.47	0.03
Orissa	0.32 (H)	1.26 (N.E.)	0.94	0.32 (H)	1.16 (N.E.)	0.84	0.10
Punjab	0.34 (H)	1.42 (N.E.)	1.08	0.28 (H)	1.33 (N.E.)	1.05	0.03
Rajasthan	0.44 (H)	1.12 (N.E.)	0.68	0.44 (H)	1.08 (N.E.)	0.64	0.04
Tamilnadu	0.47 (H)	1.38 (N.E.)	0.91	0.46 (H)	1.37 (N.E.)	0.91	0
West Bengal	0.28 (H)	1.43 (N.E.)	1.15	0.26 (H)	1.34 (N.E.)	1.08	0.07
Uttar Pradesh	0.5 (H)	1.12 (N.E.)	0.62	0.50 (H)	1.10 (N.E.)	0.60	0.02
All India	0.58 (H)	1.10 (N.E.)	0.52	0.46 (H)	1.26 (N.E.)	0.80	0.28

Source: NFHS-2; 1998-99
Note: 'H' refers to Higher education
'N.E.' refers to no education

[13] Here it indicates the lowest risk for stunting among children whose mothers are highly educated; even from SC/ST background; where as in the next column i.e. column 2 the risk is highest among children whose mothers are uneducated.

[14] The same exercise is repeated to know the risk of stunting among the children for the education of the mother inclusive of all the social categories (See column 3 and 4).

Table 4: Description of range of relative risk of stunting during childhood by Standard of living, caste group and general Population, NFHS-2, 1998-99.

Characteristics / States	Household standard of living						Absolute difference in risk for stunting for SC/ST children vis-à-vis all children (a-b)
	Minimum Risk for SC/ST children[15] (1)	Maximum risk for SC/ST children (2)	Difference among SC/ST children (a) (1-2)	Minimum Risk of stunting for all children[16] (3)	Maximum Risk of stunting for all children (4)	Difference between minimum and maximum risk (b) (3-4)	
Andhra Pradesh	0.85 (M)	1.12 (L)	0.27	0.62 (H)	1.22 (L)	0.60	0.23
Assam	0.77 (H)	1.06 (L)	0.29	0.85 (H)	1.08 (L)	0.23	0.43
Bihar	0.4 (H)	1.06 (L)	0.66	0.66 (H)	1.07 (L)	0.41	0.25
Gujarat	0.48 (H)	1.15(L)	0.67	0.61 (H)	1.40 (L)	0.79	0.12
Haryana	0.96 (M)	1.06 (L)	0.10	0.78 (H)	1.20 (L)	0.42	0.32
Himachal Pradesh	0.85 (H)	1.02 (L)	0.17	0.72 (H)	1.40 (L)	0.68	0.51
Jammu and Kashmir	0.94 (H)	1.11 (L)	0.17	0.61 (H)	1.44 (L)	0.83	0.66
Karnataka	0.42 (H)	1.02 (L)	0.6	0.49 (H)	1.21 (L)	0.72	0.12
Kerala	0.55 (H)	1.08(M)	0.53	0.66 (H)	1.28 (L)	0.62	0.09
Madhya Pradesh	0.44 (H)	1.05 (L)	0.61	0.61 (H)	1.15 (L)	0.54	0.07

cont'd....

Maharastra	0.73 (H)	1.17 (L)	0.44	0.61 (H)	1.33 (L)	0.72	0.28
Orissa	0.50 (H)	1.08 (L)	0.58	0.47 (H)	1.16 (L)	0.69	0.11
Punjab	0.84 (H)	1.14 (L)	0.30	0.72 (H)	1.48 (L)	0.76	0.46
Rajasthan	0.97 (H)	1.11 (L)	0.14	0.71 (H)	1.13 (L)	0.42	0.28
Tamilnadu	0.56 (H)	1.14 (L)	0.42	0.41 (H)	1.31 (L)	0.90	0.48
West Bengal	0.35 (H)	1.14 (L)	0.8	0.36 (H)	1.26 (L)	0.90	0.10
Uttar Pradesh	0.98 (H)	1.05 (L)	0.07	0.70 (H)	1.13 (L)	0.43	0.34
All India	0.74 (H)	1.08 (L)	0.34	0.64 (H)	1.21 (L)	0.57	0.23

Source:NFHS-2;1998-99

Note: 'M' refers to medium economic status
'L' refers to low economic status
'H' refers to High economic status

15 Here it indicates the lowest risk for stunting among children is observed in high economic status households from SC/ST group; where as in the next column i.e. column 3 the risk is highest for the low economic status households among the same social group.

16 The same exercise is repeated to know the risk of stunting among the children for the given economic status of their household inclusive of all the social categories (See column 3 and 4).

Table 5: Description of range of relative risk of stunting during childhood by Mother's Occupation, caste group and general Population, NFHS-2, 1998-99

Characteristics / States	Mother's occupation						Absolute difference in risk for stunting for SC/ST children vis-a-vis all children (a-b)
	Minimum Risk for SC/ST children[17] (1)	Maximum risk for SC/ST children (2)	Difference among SC/ST children (a) (1-2)	Minimum Risk of stunting for all children[18] (3)	Maximum Risk of stunting for all children (4)	Difference between minimum and maximum risk (b) (3-4)	
Andhra Pradesh	0.82 (n.w.)	1.23 (n.a.)	0.41	0.79 (n.w.)	1.12 (agri)	0.33	0.08
Assam	0.95 (n.w.)	1.38 (agri)	0.43	0.99 (n.w.)	1.16 (agri)	0.17	0.26
Bihar	0.96 (n.w.)	1.09 (agri)	0.13	0.96 (n.w.)	1.18 (agri)	0.22	0.09
Gujarat	0.83 (n.w.)	1.23 (agri)	0.4	0.82 (n.w.)	1.38 (agri)	0.56	0.16
Haryana	0.99 (n.w.)	1.2 (agri)	0.21	0.84 (n.a.)	1.26 (agri)	0.44	0.23
Himachal Pradesh	0.94 (n.a.)	1.02 (n.w.)	0.08	0.60 (n.a.)	1.03 (n.w.)	0.43	0.35
Jammu and Kashmir	0.96 (n.a.)	1.03 (n.w.)	0.07	0.92 (n.a.)	1.14 (agri)	0.22	0.15
Karnataka	0.94 (n.w.)	1.06 (agri)	0.12	0.88 (n.w.)	1.31 (agri)	0.43	0.31
Kerala	0.85 (n.w.)	1.39 (agri)	0.44	0.73 (n.a.)	1.26 (agri)	0.53	0.09

cont'd....

Madhya Pradesh	0.90 (nw)	1.12 (n.a.)	0.22	0.87 (n.w.)	1.13 (agri)	0.26	0.04
Maharastra	0.88 (n.w.)	1.16 (agri)	0.28	0.86 (n.w.)	1.24 (agri)	0.38	0.10
Orissa	0.89 (n.a.)	1.1(agri)	0.21	0.96 (n.w.)	1.27 (agri)	0.31	0.10
Punjab	0.99 (n.w.)	1.34 (agri)	0.35	0.92 (n.a.)	1.91 (agri)	0.99	0.64
Rajasthan	0.96 (n.w.)	1.09 (n.a.)	0.13	0.95 (n.w.)	1.10 (n.a.)	0.15	0.02
Tamilnadu	0.78 (n.w.)	1.45 (n.a.)	0.67	0.86 (n.w.)	1.44 (agri)	0.58	0.09
West Bengal	0.91 (n.w.)	1.26 (agri)	0.35	0.92 (n.w.)	1.36 (agri)	0.44	0.09
Uttar Pradesh	0.97 (n.w.)	1.13 (n.a.)	0.16	0.97 (n.w.)	1.16 (n.a.)	0.19	0.03
All India	0.94 (n.w.)	1.09 (agri)	0.15	0.95 (n.w.)	1.24 (agri)	0.29	0.14

Source: NFHS-2; 1998-99

Note: 'n.w.' refers to not working
'agri' refers to agriculture
'n.a.' refers to non-agriculture

17 It refers to the occupation of those mothers whose children face minimum risk of stunting. This column focuses on the SC/ST households. On the contrary the column 2 refers to the occupation of the mother where risk of stunting is higher. It is applicable for the same SC/ST households as in column 1.

18 The same exercise is repeated to know the risk of stunting among the children for the given occupation status of their mothers inclusive of all the social categories (See column 3 and 4).

Table 6: Inequity Gaps in risk of Stunting by Place of Residence between SC/ST and non-SC/ST children

Characteristics	Gap among children belong to SC/STs and Others (non SC/ST) according to place of residence		
States	SC/ST	Others	Gap
Andhra Pradesh	1.00 (u[19])	1.11 (r[20])	0.11
Assam	1.01 (r)	1.03 (r)	0.02
Bihar	1.01 (r)	1.03 (r)	0.02
Gujarat	1.04 (r)	1.08 (r)	0.04
Haryana	1.02 (r)	1.08 (r)	0.06
Himachal Pradesh	1.01 (r)	1.03 (r)	0.02
Jammu and Kashmir	0.96 (r)	1.08 (r)	0.12
Karnataka	1.00 (r)	1.10 (r)	0.10
Kerala	1.02 (r)	1.03 (r)	0.01
Madhya Pradesh	1.01 (r)	1.10 (r)	0.09
Maharastra	1.10 (r)	1.11 (r)	0.01
Orissa	1.01 (r)	1.02 (r)	0.01
Punjab	1.04 (r)	1.08 (r)	0.04
Rajasthan	1.02 (r)	1.05 (r)	0.03
Tamilnadu	1.04 (u)	1.05 (r)	0.01
West Bengal	1.02 (r)	1.12 (r)	0.08
Uttar Pradesh	1.01 (r)	1.03 (r)	0.02
All India	1.03 (r)	1.08 (r)	0.05

Source: NFHS-2; 1998-99

19 'r' refers to the fact that highest risk of stunting is observed among the children from rural SC/ST household's visa-vie rural non-SC/ST households.

20 'u' refers to the fact that highest risk of stunting is observed among the children from rural non-SC/ST households visa-vie urban non-SC/ST households

Table 7: Inequity Gaps in risk of child Stunting according to Maternal education among SC/ST and others

Characteristics	Gap among children belong to SC/STs and Others according to maternal education		
States	SC/ST	Others	Gap
Andhra Pradesh	1.22 (N.E[21].)	1.19 (N.E.)	0.03
Assam	1.09 (N.E.)	1.13 (N.E.)	0.04
Bihar	1.11(P)	1.05 (N.E.)	0.06
Gujarat	1.38 (N.E.)	1.28 (N.E.)	0.10
Haryana	1.24 (N.E.)	1.18 (N.E.)	0.06
Himachal Pradesh	1.27 (N.E.)	1.28 (N.E.)	0.01
Jammu and Kashmir	1.26 (N.E.)	1.27 (N.E.)	0.01
Karnataka	1.37 (N.E.)	1.28 (N.E.)	0.09
Kerala	1.26 (N.E.)	1.26 (S.E.)	0
Madhya Pradesh	1.18 (N.E.)	1.12 (N.E.)	0.06
Maharastra	1.25 (N.E.)	1.21 (N.E.)	0.04
Orissa	1.26 (N.E.)	1.16 (N.E.)	0.1
Punjab	1.42 (N.E.)	1.34 (N.E.)	0.08
Rajasthan	1.12 (N.E.)	1.08 (N.E.)	0.04
Tamilnadu	1.38 (N.E.)	1.37 (N.E.)	0.01
West Bengal	1.43 (N.E.)	1.34 (N.E.)	0.09
Uttar Pradesh	1.12 (N.E.)	1.10 (N.E.)	0.02
All India	1.10 (N.E.)	1.26 (N.E.)	0.16

Source: NFHS-2; 1998-99
Note: 'N.E.' refers to no education.

21 Here we found the risk of stunting is always higher among the children whose mothers are uneducated, no matter what is the caste group. The statement is found valid for all the states (except Bihar where we found children of those mothers having primary education have the highest risk of stunting; but it may happen that the quality of primary education is so poor that it is not effective, even against no education to make a difference in the nutrition outcome).

Table 8: Inequity Gaps in risk of Stunting according to Standard of Living between SC/ST and non SC/ST children.

Characteristics	Gap among children belong to SC/STs and Others according to economic status of the household		
States	SC/ST	Others	Gap
Andhra Pradesh	1.12 (L[22])	1.22 (L)	0.10
Assam	1.06 (L)	1.08 (L)	0.02
Bihar	1.06 (L)	1.06 (L)	0
Gujarat	1.15(L)	1.40 (L)	0.25
Haryana	1.06 (L)	1.27 (L)	0.21
Himachal Pradesh	1.02 (L)	1.53 (L)	0.51
Jammu and Kashmir	1.11 (L)	1.63 (L)	0.52
Karnataka	1.02 (L)	1.28 (L)	0.26
Kerala	1.08(M)	1.31 (L)	0.23
Madhya Pradesh	1.05 (L)	1.22 (L)	0.17
Maharastra	1.17 (L)	1.36 (L)	0.19
Orissa	1.08 (L)	1.17 (L)	0.09
Punjab	1.14 (L)	1.89 (L)	0.75
Rajasthan	1.11 (L)	1.13 (L)	0.02
Tamilnadu	1.14 (L)	1.28 (L)	0.14
West Bengal	1.14 (L)	1.32 (L)	0.18
Uttar Pradesh	1.05 (L)	1.14 (L)	0.09
All India	1.08 (L)	1.21(L)	0.13

Source: NFHS-2; 1998-99
Note: Letters in brackets are same as in Table 3.

22 Here we found the risk of stunting is always higher among the children who come from the low economic status household irrespective of the household's caste group. Only exception is found to be in Kerala where in case of SC/STs the risk of stunting is highest for the children from middle economic status households. Now the aberration might be due to the fact that in Kerala most of the SC/ST households have access to basic minimum requirement of the life; especially to health and education.(the maternal education is near total). This might reduce the role of economic status as such to the outcome of the child stunting.

Table 9. A summary Description of range of inequity gaps in relative risk of Child stunting by potential correlates across Indian States, NFHS-2, 1998-99.

Characteristics	<.10	.10-.20	.20-.30	.30-.40	.40-.50	.50-1.0	>1.0
Rural-Urban	Assam, Bihar, Gujarat, Jammu and Kashmir, Kerala, Maharastra, Orissa, Punjab, Rajasthan, Tamilnadu, Uttar Pradesh	Haryana	Himachal Pradesh, Karnataka, Madhya Pradesh	Andhra Pradesh, West Bengal	-	-	-
Maternal education	Andhra Pradesh, Bihar, Himachal Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharastra, Punjab, Rajasthan, Tamilnadu, West Bengal,	Assam, Gujarat, Jammu and Kashmir, Orissa	Himachal Pradesh	-	-	Kerala	-

cont'd....

Characteristics	<.10	.10-.20	.20-.30	.30-.40	.40-.50	.50-1.0	>1.0
Household economic	Uttar Pradesh Kerala	Karnataka, Madhya Pradesh, Maharastra, Rajasthan, Tamilnadu,	Andhra Pradesh, Bihar, Haryana, Jammu and Kashmir	Orissa, Uttar Pradesh	Assam	Gujarat, Himachal Pradesh, Punjab, West Bengal	-
Mother's occupation	Gujarat, Rajasthan, Tamilnadu, Uttar Pradesh, Kerala	Andhra Pradesh, Bihar, Orissa, Maharastra, Jammu and Kashmir, Maharastra, West Bengal	Haryana, Assam	Himachal Pradesh, Karnataka	-	Punjab	-

Source: NFHS-2; 1998-99

Figure : Inequity Gaps in Relative risk of Child Stunting by Potential Correlates: Selected Indian States, NFHS-2, 1998-99

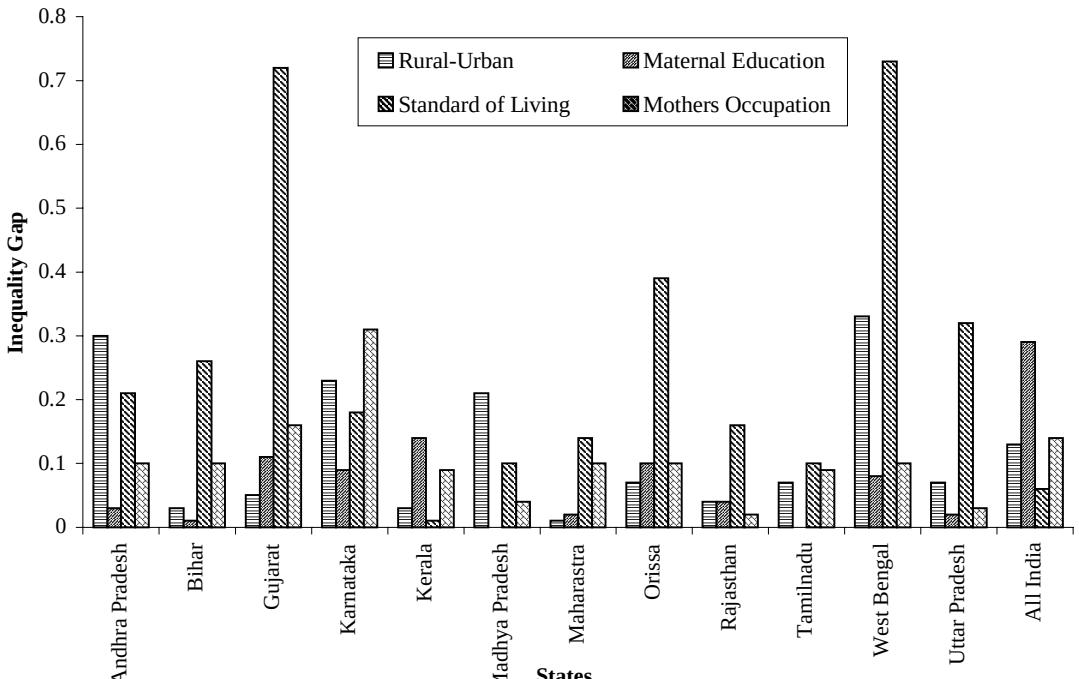

Table 10: Odds values for the children from SC/ST households for stunting and underweight

States	Height-for-age				Weight-for-age			
	Model 1		Model 2		Model 1		Model 2	
	Odds	Standard Error	Odds	Standard Error	Odds	Standard Error	Odds	Standard Error
Andhra Pradesh	1.065	0.063	1.036	0.157	1.054	0.121	1.204	0.247
Assam	0.712	0.277	1.056	0.425	1.721	0.305***	0.839	0.454
Bihar	1.3	0.077***	1.03	0.029	1.080	0.096	1.261	0.136*
Gujarat	0.833	0.145	0.780	0.207	0.901	0.148	0.823	0.212
Haryana	0.941	0.249	1.042	0.436	1.172	0.258	0.998	0.527
Himachal Pradesh	1.743	0.459	2.541	0.253	1.17	0.467	1.68	0.8
Jammu and Kashmir	0.939	0.453	0.777	0.785	1.448	0.450	0.900	0.776
Karnataka	1.030	0.165	0.953	0.220	1.086	0.160	1.359	0.222
Kerala	2.129	0.359***	2.58	0.103	1.907	0.351*	0.850	0.260
Madhya Pradesh	1.106	0.1	1.079	0.124	1.139	0.102	1.051	0.126
Maharastra	1.703	0.103***	1.406	0.159***	1.268	0.109**	1.223	0.155
Orissa	1.133	0.159	1.234	0.224	1.007	0.161	0.879	0.232
Punjab	1.348	0.238	2.651	0.614	1.449	0.252	1.915	0.609
Rajasthan	1.113	0.116	1.048	0.157	1.268	0.116**	1.311	0.158*
Tamilnadu	1.802	0.143***	2.063	0.214***	1.587	0.139**	1.489	0.204**
West Bengal	1.123	0.123	1.376	0.174***	1.553	0.123***	1.865	0.174***
Uttar Pradesh	1.3	0.076***	1.184	0.121	1.272	0.078***	1.140	0.108
All India	1.127	0.031***	1.077*	0.043	1.151	0.031***	1.129	0.042***

cont'd....

Model Specification	N= 23055 -2 log liklihood = 30510.267 Model chi-square = 1395.632	N= 10016 -2 log liklihood = 14228.527 Model chi-square = 353.765	N= 23057 -2 log liklihood = 30234.220 Model chi-square = 11778.181	N= 10022 -2 log liklihood = 14082.531 Model chi-square = 477.543

Note 1: Here we have presented the logit models for stunting (height-for-age) and under weight (weight-for-age) in this Table. For each indicator we have presented two models.

Model-1 refers to the fact that the odds for child under nutrition are calculated after controlling for following correlates i.e. place of residence (rural/urban), caste (SC/ST vs others), religion (Hindu / non-Hindu), economic status of the household (low, medium and high), occupation of the parents (agriculture/non-agriculture), maternal education (uneducated vs any education), age at fist marriage for the mother of the child (below 18 years of age/ after 18 years), family size (less than 4 or small/ 4-7 or medium/ 8 or large), body mass index of the mother (less than 18.5/ >= 18.5), birth size of the child (small/ normal size).

Model-2 is build to know the odds for undernourishment of the children from scheduled cast households engaged in agriculture. The agricultural household is defined in terms of either one of the parents of the child or both engaged in the agriculture[23]. The model is controlled for all the correlates as in case of model 1 except occupation, because occupation is set to agriculture here.

Note 2: *** Refers to statistical significance at 1% level
** Refers to statistical significance at 5% level
* Refers to statistical significance at 10% level

23 Here we have not distinguished between households engaged in agricultural labour, or doing agriculture on their own land or lease land. It does not show the relative land holding pattern among the agricultural households. This part has been taken care of while constructing the 'standard of living index or 'SLI' for a particular household.

APPENDIX

An Illustration of Methodology adopted in the paper

This is a well-known fact that there is certain gap in nutritional achievement among the children of different social backgrounds (say for example caste). But it does not tell us whether display of this caste-based difference controlled for certain other characteristics like rural-urban residence remains the same as the aggregate rural-urban difference for the phenomenon in general. Now if that gap (or dispersion or spread within the group) is less; then it indicates the advantage of place of residence is little beneficial to the groups nutritional achievement. In other words homogeneity or less disparity confirms the limited role of place of residence (controlled attribute) in better nutritional outcome of the children and vise-versa. This is the reason why we avoid a comparison of SC/ST children and non-SC/ST children within the given set up; say rural. It tells us more about the role of the caste as a decider of nutritional achievement than the usual method of looking within a given set up.

Take Madhya Pradesh for example. We have total 2052 cases out of total 2,157 cases after cleaning the data. Out of these 2,052 children, 802 belong to SC/ST households and remaining (1250) belongs to non-SC/ST households. Now these children can be split according to their place of residence also; whether they live in urban areas or rural areas.

From Illustration-1 we can see that 61 out of 114 children living in urban Madhya Pradesh suffers from stunting. So the risk or incidence level for stunting among pre-school children from rural SC/ST households will be nothing but the ratio of 61 to 114, i.e. 0.54. In similar way the risk for the children from urban non-SC/ST households, is calculated to be 0.36 (ratio of 129 to 361).

Following the above formula the risk for SC/ST children from rural households with SC/ST background is calculated at 0.58. The corresponding figure for non-SC/ST children from rural households

stands at 0.52. However we are not interested in SC/ST and non-SC/ST comparison. So we will strictly limit ourselves to the discussion of risk of stunting among SC/ST children visa-vie the children in general.

It is simple to find out the risk of stunting for the children from SC/ST households; without taking in to consideration it's place of residence. So that is the average risk for children from SC/ST households. In other words it is the ratio of children with stunting from rural as well as urban areas from SC/ST background to the over-all prevalence of stunting among children from Madhya Pradesh. So it is the sum of 61 (number of stunted children from the urban households having SC/ST background) and 396 (number of stunted children from the rural households having SC/ST background) which will add up to (457); divided by the sum of all the SC/ST children taken together irrespective of their stunting status and place of residence. (114+688=802). Now this ratio will give us a figure of 0.57, which is nothing but the risk of being stunted for a child from SC/ST background.

Now we can calculate the risk of stunting among the children from SC/ST households, given their place of residence as well. This is nothing but the ratio of risk of a particular social category in a given place of residence to the over all risk for that group. In our case it is the ratio of 0.54 to 0.57; which comes out to be 0.90 for urban set up. For rural areas it will be 1.01 for SC/ST households

Now one can easily see the intra-caste dispersion in child stunting. We find in case of SC/ST children the dispersion is 0.07 between the rural and urban set up. Whereas for non-SC/ST households same figure stands at 0.35; between the rural and urban set up. So for non-SC/ST households the dispersion is higher compared to the SC/ST households; as far as child stunting is concerned in relation to residence criterion. It means change in place of residence might influence the nutritional outcome more favourably for the children from non-SC/ST households than children from SC/ST households. [See Illustration 1]

Now come to Illustration 2, where a more common measurement of inequality is presented in terms of place of residence. We found that the over all gap in risk for stunting by location stood at 0.28. But it does not tell us whether this 0.28 is identical for each social group within or across rural/urban set up. But our analysis provides some definite answers. We can see that the gap in risk for stunting in SC/ST children given their location visa-vie the total child population given their location is 0.07-0.28 = 0.21. This demonstrates that there is not much difference in nutritional achievement of the SC/ST children because of difference in residential characteristics; even the latter could have better access (theoretically) to food and health care.

However the illustration we have done has taken in to account only two categories of a given phenomenon. It can be extended for the characteristics or phenomenon having multiple categories or outcomes. For example while considering maternal education, there could be four possible categories. They are no education at all, completed primary education or secondary education or higher education. Now here one has to take in to consideration the spread or dispersion across each outcome for a given social category. Suppose we observe the highest risk of stunting among the children from uneducated mothers from SC/ST households, where as the lowest risk is observed among women from same social background, but who are highly educated. So we will calculate the spread or gap or dispersion of risk by taking the highest and lowest risk groups in to account. Now we have a common risk of stunting for all the mothers from that social category (here SC/STs), irrespective of their education. So the relative risk of stunting for the children in a given social category (in this case children from SC/ST households), is nothing but the ratio of group specific incidence (or risk) of stunting (risk for the uneducated mother), to the common incidence (risk) of stunting for that group as a whole (common risk for all the SC/ST mothers irrespective of their education). Then we will compare both spreads to know whether the maternal education have different role to play across different caste groups.

Illustration 1: Calculation of the Gap (or distance) in child stunting across social groups within given place of residence

Type of place of residence	Caste groups	Number of stunted children	Number of NOT Stunted	Total	Over all risk for stunting among SC/ST Children	Over all risk for stunting among Non SC/ST Children	Risk of stunting among the SC/ST children given the place of residence	Risk of stunting among the non-SC/ST children given the place of residence[24]
Urban	SC/ST	61 (0.54)	53	114			0.94 (urban)	0.76 (urban)
	Non SC/ST	129 (0.36)	232	361				
	Total	190	285	475				
Rural	SC/ST	396 (0.58)	292	688			1.01 (Rural)	1.1 (rural)
	Non SC/ST	464 (0.52)	426	890				
	Total	860	718	1578	0.57	0.47		
Grand total for MP is Total no of children in urban (475) +Total no. of children in rural (1578) = 2054							Gap among SC/STs = 0.07 (a)	Gap among non SC/STs = 0.34 (b)
							Gap in risk for stunting in SC/ST children given their location visa-vie the total child population given their location is 0.07-0.28 = 0.21[25]	

24 However we not presented this column in main text, since we are looking in to the risk of stunting for SC/ST children visa-vie the risk of stunting in total child population given their location.

25 This figure is taken from Illustration 2

Illustration 2: Calculation of the Gap (or distance) in child stunting across location (place of residence) ignoring the social composition

Madhya Pradesh	Type of place of residence	No. of Stunted Children	No. of Not Stunted Children	Total	Prevalence of stunting by place of residence	Risk of stunting by place of residence	Distance between risk of stunting for children in rural and urban areas
	Urban	190	285	475	40.00	0.78	
	Rural	861	718	1579	54.53	1.06	0.28
	Total	1051	1003	2054	51.17	1.0	

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Rudra Narayan Mishra *is a Doctoral Scholar at the Centre for Development Studies, Thiruvananthapuram. His current areas of research interest are health, nutrition and poverty.*

Email: rudranarayana@cds.ac.in

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