Ethnic Disparities in Food Consumption and Household Nutrition Outcomes in India

INTRODUCTION

The persisting challenge of undernutrition remains a major hindrance in achieving MDGs, both directly related to nutrition and hunger as well as other population health outcomes. In India, the burden of undernutrition is found to be disproportionately high in pockets of vulnerability; sharp inequalities across regions/districts, social groups and income classes characterise the undernutrition phenomenon. This paper is concerned with explaining social group-based disparities in household-level nutrition outcomes in India, by considering inequality in the nutrition outcomes between tribal and non-tribal households. We develop indicators of nutritional outcomes at the household-level and estimate undernutrition 'headcount' rates among tribal communities across Indian states having a sizeable population of these groups; we also calculate indicators of the 'severity' of aggregate undernutrition, or nutritional failure, and compare group-based decompositions between tribals and non-tribal households to identify the sources of such social group-based inequality in nutritional outcomes. Our results indicate significant disadvantage among tribal households in terms of nutritional outcomes. As we find, such inequality is stark even after accounting for possible influence of poverty, occupations and education.

A number of studies in India provide a preview on the significant extent of nutritional shortfalls in tribal children and adults, mostly explained to be caused by insufficient diet, improper knowledge, and seasonal episodes of food scarcity (Rao et al 1994, 2005, 2006; Rao and Rao 1994; Mukhopadhyay et al 2010; Chakma et al 2009; Laxmaiah et al 2007; Basu et al 2006; Bhattacharjee et al 2011). Most of these studies have found that food intake of tribal children and adults alike, fall much below the recommended dietary allowances (RDA) as laid down by the Indian Council of Medical Research, particularly involving deficiencies in proteins and other micronutrients (NNMB 2000, 2009). The NNMB investigation, for example, found that only about 30% of the preschool and school age children had adequate intakes of both protein and calories; nearly half the adult male and women to suffer from chronic energy deficiency, and significantly higher levels of undernutrition among pre-school children in terms of all three standard anthropometric outcomes. Without providing a detailed review on the possible causes and determinants of adverse nutritional outcomes, for which a rich literature abounds for the general, and to a lesser extent for tribal populations, it may be noted that most of the established frameworks acknowledge the complex interplay of factors – ranging from inadequate food intake, lack of awareness and education particularly regarding feeding practices on young children, access to safe drinking water and sanitation, health care etc. to utilization of nutrition intervention programs – responsible for poor nutritional outcomes. However, most often inability of farming households to produce enough food– both in quantity as well as the required diversity – or lack of income allowing purchase of food through markets, is the most direct determinant of food security, and subsequently nutritional status of household members. As for tribal communities, such poverty-induced risks to food security, linked to reliance on un-remunerative and primitive, subsistence agriculture with low productivity are most likely to be directly responsible for worse-off FNS outcomes vis-à-vis non-tribal populations.

However, systematic comparisons of tribal and non-tribal populations in terms of FNS outcomes are relatively rare in the Indian context. In a brief but informative piece, Das and Mehta (undated) highlights that adivasi children show worse levels of malnutrition compared to non-tribals, largely attributable to chronic food insecurity and deeper poverty-levels among tribal households. In another earlier study across all districts of undivided Bihar state, the authors Yadav and colleagues (1999) find that although proportion of malnourished children is largely similar between tribal and non-tribal districts, but chronic energy deficiency levels among adults is substantially high in the former areas. Also, non-tribal districts tend to have better intake levels of proteins and other micronutrients. In tribal-dominated regions of Maharashtra, Tagade (2009) also finds a higher incidence of food insecurity among the tribals as compared to that of non-tribals, and accordingly, a much lower

nutritional status of tribal children than that of their non-tribal counterparts. Again, tribal households are also more likely to be excluded, or have less-than-adequate levels of access to public programmes and interventions that can influence nutrition outcomes in low-income settings; these includes the Targeted Public Distribution System (TPDS), the Integrated Child Development Services (ICDS) and the Mid-Day Meal (MDM) Program in primary schools.

Most analaysis of the determinants of nutrition outcomes in India have used the National Family Health Survey (NFHS) data (the counterpart of Demographic and Health Surveys in India). However, the NFHS datasets have a fundamental limitation: it provides little coverage to aspects of food intake – consumption levels both in quantity and value terms – that constitutes an important dimension of FNS *inputs*. Fortunately, the regular consumption expenditure surveys carried out by the National Sample Survey Organization (NSSO) provides such information, and although has some limitations, provides some opportunity to understand the broad patterns of food intake levels, and proportion of households' budgets devoted to food in a comparative manner across tribal and non-tribal households. This remains the main focus of this section, where we intend to answer the following major questions:

I. How does expenditure on food vary between tribal and non-tribal households, across different states of India (with particular focus on states with high population of tribal groups) and within states, across agro-climatic regions?

II. Do tribal and non-tribal households belonging to similar economic status, and other related attributes such as education levels of household members, land-holding and occupational patterns, differ in the amount spent on food?

The results, we hope, will help understanding the extent to which tribal households across different states in India differ in their food intake – mostly in monetary terms of household budgetary outlays – from their non-tribal counterparts, how they differ in terms of their dietary diversities, and most importantly, to what extent such differentials persist after controlling for effect of other background determinants such as education and economic status. While most of the analyses described below and the results that we infer are descriptive in nature, with some econometric exercises through multivariate analyses, the results are important and, when taken together with the main results following from the *outcome*-oriented analyses of NFHS data, helps a near-complete understanding of the broad dimensions and determinants of food and nutrition insecurity among tribal households in India.

DATA AND VARIABLES

The dataset we use is the most recent of the NSSO consumption expenditure surveys in India, the 66th Round conducted between July, 2009 – June, 2010. Most of the results reported here are based on the data collected using Schedule type 1 (schedule 1.0)[1]. As we will explain below, Type 2 data was used to examine patterns on self-assessed food availability questions (Block 1, question 13).

Our data of interest pertains to the detailed information on quantity of consumption and (market) value for a very detailed list of more than 200 consumption items. Following the NSSO classifications, we have mostly used aggregate food-groups primarily to overcome erroneous reporting and/or risk of outlier observations. The food-groups which was considered include cereals (or foodgrains), pulses, vegetables, fruits (both fresh and dry varieties), milk and milk products, edible oil, and other animal

[1] Schedule Type 1, as far as reference periods were concerned, was a repeat of the schedule used in most quinquennial rounds. For certain categories of relatively infrequently purchased items, including clothing and consumer durables, it collected information on consumption during the last 30 days and the last 365 days. For other categories, including all food and fuel and consumer services, it used a 30-days reference period. Schedule Type 2 used 'last 365 days' (only) for the infrequently purchased categories, 'last 7 days' for some categories of food items, as well as pan, tobacco and intoxicants, and 'last 30 days' for other food items, fuel, and the rest (NSSO Report No. 538(66/1.0/1)).

products (eggs, fish, chicken, mutton etc.). Although detailed appendix tables provide information on other food-groups such as sugar, salt and spices these were not included in the main analysis. In the analysis reported in the results section below, we have considered total consumption and value (inclusive of home produce). For aggregate monthly per capita expenditure the variable provided by the NSSO in the unit-record data based on a uniform recall period (URP) was used. While reporting frequencies and summary descriptive statistics, population weights provided by NSSO in the data were used.

Apart from the core food-consumption or *input* variables, few background socioeconomic variables were included for examining differentials across key variables such as SES, education, landholding, occupational levels etc. This is explained in greater detail while discussing the results of the multivariate models, where these variables are primarily used. The social group variable in NSSO data allows to identify social group of the household between scheduled tribes, scheduled castes, other backward castes, and general castes. For easier comparison SCs and OBCs were clubbed for our analyses, and wherever needed differentials and patterns were observed across tribal households and non-tribal households as the two mutually exclusive groups. Further methodological approaches are explained below wherever applicable, while presenting and discussing the main results.

RESULTS

Inter-state differentials between tribal and non-tribal households in food consumption

A useful starting point of the analysis following the main research questions is to examine the differentials in quantity of food consumed as well as amount spent on food, in a comparative manner between tribal and non-tribal households.

The analysis was limited among states with a reasonable proportion of scheduled tribes (5% and above) with the exclusion of north-eastern states. While in the analysis reported earlier based on the NFHS data, Census 2001 figures were used to classify states on the basis of proportion of ST population, for the present exercise we use the proportions from the NSSO 66th round household data. This is due to two reasons: firstly, NSSO data of 2009-10 is somewhat dated to use 2001 estimates, and more importantly, in subsequent analysis for regions within the state, a similarity can be maintained. Accordingly, 11 states were selected – Chhattisgarh (28%), Jharkhand (27%), Orissa (20%), Gujarat (16%), Madhya Pradesh (15%), Rajasthan (12%), Himachal Pradesh (9%), Maharashtra (8%), Karnataka (6%), Andhra Pradesh (6%) and West Bengal (5%) – and the analysis is limited within 48590 households (and 5670 tribal households) from these states.

Table 3.1 reports average monthly per capita food expenditure (all food-groups combined) across ST, SC/OBC and general caste households in the 11 selected states. In terms of absolute levels for food expenditure, quite an extent of variance is noted across the states, which, has some bearing with the overall poverty levels in the state. To illustrate, the average food expenditure of a tribal household in Gujarat or Rajasthan is almost equal to that of an upper-caste household in Chhattisgarh. For easier interpretation the expenditure-gap is presented in last two columns on the right. It is straightforward that tribal households spend substantially less on food corresponding to their non-tribal (both SC/OBC and the general, upper-caste households) counterparts. The social-group based inequality in food expenditure is highest in Gujarat among the states considered, and lowest in West Bengal (with the possible exception of Himachal Pradesh, where tribal groups are disproportionately concentrated in two districts, Kinnaur and Lahaul and Spiti). In the two states where tribal households account for more than a quarter of the state population sampled in NSSO – Chhattisgarh and Jharkhand – the gap between food-expenditure among a tribal and a upper-caste family varies from about Rs 288 (Chhattisgarh) to Rs 198 (Jharkhand); the same between a tribal and a SC/OBC household is around Rs 40. Such a finding highlighting significant inequality in food-expenditure is not surprising – tribal families are more likely to be at the lower end of the income (and consumption expenditure) distribution and thus, afford to

spend lower amounts in absolute monetary terms on food. The other possible reason could be consumption of lower quantity of food on an average by tribal households as compared to non-tribals. Both these issues are elaborated subsequently.

While Table 3.1 highlights food-expenditure inequalities, it is pertinent to examine the possible *sources* of the evident differentials. As a first step, total food expenditure is disaggregated according to the major NSSO food-groups and results are provided in table 3.2. As in the case of aggregate food expenditures, tribal households in all the states (except Himachal Pradesh) can be seen spending less on cereals, pulses, milk and milk products, edible oils, vegetables and fruits as compared to both the SC/OBCs and the upper castes. For animal products, the main source of animal-based proteins in the diet, while the gap between upper castes and tribals persists, the picture is irregular when comparing between tribals and SC/OBCs. The magnitude of inequality in absolute terms could be identified in the case of milk and milk products, where non-tribal households spends roughly double the amount spent by tribal households. However, this could be partially true due to culturally dominant food-habits among tribals where milk is less consumed.

If we try to correlate expenditure inequality observed for individual food-groups with the aggregate differentials noted in Table 3.1, a few facts emerge which helps to deduce the possible sources or food-groups which accounts for the aggregate differentials. Firstly, the two major food-groups that apparently account for the largest part of the observed differentials in food expenditure between tribals and non-tribals are milk and other animal products such as eggs, fish and meat; a look at the last two columns of Table 3.2 confirms that inequality in expenditure is starkest among STs and SC/OBCs or upper castes for these two food-groups. Secondly, for more common (and 'essential') food items such as cereals and pulses the differentials are much less intense. Although for states like Jharkhand and Orissa, a tribal household spends about Rs 40 per capita less (which roughly accounts for about 15-20% of the aggregate food expenditure inequality) on cereals than general castes, and about Rs 20, in the case of pulses, consumption expenditure on these foods are less unequal. Lastly, within tribal groups across the states, average expenditure on the food-groups varies considerably, more so for high-quality and/or costly foods such as fruits, vegetables, and animal products; as for the overall food-expenditure levels here too such pattern is related to general poverty levels in the state concerned.

In order to infer on what factors are responsible for the observed disparity in consumption expenditure on food (and individual food-groups) between tribal and non-tribal households across the state, it is useful to consider the *quantity* of consumption. Unfortunately, due to comparability issues of quantity units, such comparisons are only possible for certain food-groups such as cereals, pulses and edible oils (Table 3.2b). As seen in the table, per-capita consumption of cereal staples does not vary significantly across the social groups, and in fact, tribal households are seen to consume marginally higher amount of cereals per capita, on an average in all the states except for the southern states of Andhra Pradesh and Karnataka. This could be due a latent *substitution-effect* manifest in tribal households compensating for lower consumption of other (more costly, and of a diverse nutrient content) food items through higher intake of cereals. To an extent, such assertion seems pertinent: tribal households in all the states are found to consume lesser quantity of pulses and edible oils which constitute common sources for non-animal proteins and fats in diets.

The table 3.2b is primarily concerned with staples or basic diet – cereals, pulses and edible oils comprise the core diet of any average household, but in terms of the nutritional requirement, hardly comprise a balanced diet. In order to examine whether tribal households in addition to lower food-expenditures, and lower average consumption levels of pulses and edible-oils, also have a much less diverse dietary patterns requires to compare food-intake patterns for other food-items between tribals and non-tribals. We carry out such exercise in Table B2c with interesting patterns emerging.

From the diverse list of food-items for which consumption levels are available in the NSSO data, we select a few that broadly represents the different nutrients considered to be essential components of a

typically balanced Indian diet, covering ripe fruits, green leafy vegetables, yellow, Vitamin-A rich vegetables, milk, eggs and chicken. Since monthly quantity of such items consumed are prone to suffer from reporting errors, we rely on an alternative measure – the proportion of households reporting consumption (or intake) of these food-items by any member in the household at least once a month[2] and compare the proportions between tribal and non-tribal (SC, OBC and upper, general castes combined). The results are presented in Table 3.2c.

A point is to be noted while interpreting and commenting on the results. A household reporting no-intake for any of the food-items can do so due either (or combinations) of the following four reasons: (a) not being able to afford purchase/consumption, (b) not preferring to eat the particular item due to tastes etc., (c) cultural restrictions or conventions in (non)-consumption of particular items, and (d) local non-availability of the food-item concerned. Unfortunately, the NSS data does not provide any information on why a particular food-item was not consumed, and hence, we can at best make some indirect conjectures.

As seen from the results, only for two of the food-items considered – tubers and chicken – average proportion of 'consuming' households is higher among tribals than the non-tribals. In fact, both tubers and chicken are more likely to be consumed out of self-produce, collection from wildly-grown varieties, or reared at home, all of which have been established as natural modes and sources of foods in rural tribal societies. To an extent, this can also be applied equally well to explain additionally higher levels of foodgrains consumption among tribals, which again is predominantly sourced as products of subsistence agriculture. Taken together this may lead a cautious inference: both the levels and diversity of food consumption in tribal households are likely to have a strong nexus with poverty – higher average levels and predominance of locally-grown, domesticated or wildly collected food-items along with lower levels of average expenses on food most possible lend support to such hypothesis. However, the picture complicates when one examines the figures across the states, which for certain states, suggest the contrary. In the three high tribal-population states (Chhattisgarh, Jharkhand and Orissa), while the overall pattern holds true for consumption of chicken, it reverses for tubers. The available data however, does not permits to test for more probing on possible reasons sparing the standard socioeconomic analysis which is addressed in the section that follows.

Looking across other food-items, while the overall pattern reinforces a nutritional disadvantage or a worse-off scenario in terms of dietary diversity among tribals, the differentials as observed across the states is not equally straightforward. While for vegetables rich in vitamin A, a higher proportion of non-tribal households are found to consume varying amounts than tribals in almost all the states considered (with the largest differential in Orissa), for leafy vegetables tribals in Jharkhand reports a higher degree of consumption than non-tribals. For fruits, a pattern similar to the vitamin A rich vegetables is observed across the states. As for milk and eggs, the findings are less obvious, most likely due to strong cultural preferences or food habits discouraging consumption. Nevertheless, the strong pattern emerging from the figures for milk consumption suggests that less than a third of the tribal households in Chhattisgarh, Orissa and Jharkhand consume milk, even once in a while.

We end our analysis of comparing food expenditure and consumption patterns between tribal and non-tribal households across the selected states by looking at household budgetary outlays on food and certain major food-groups. In this section we report basic univariate summary statistics, and take up comparisons based on other socioeconomic variables in the sections to follow.

In Table 3.3a, average proportion of a household's monthly per capita consumption expenditure (MPCE) spent on food is shown. For the combined sample, tribal households spend a statistically significant higher proportion (59%) on food as compared to non-tribal (55%) households. A similar pattern is also observed for all the individual states except West Bengal but the difference is non-

[2] Based on simple indicator (dichotomous, 0-1) variables denoting any intake vis-à-vis no intake

significant statistically. While this appears consistent with the prescriptions of Engel's law assuming that average income (or consumption expenditure) levels of tribals are lower than that of non-tribals, we reserve detailed comments when the pattern is decomposed further across the consumption expenditure distribution comparatively for tribals and non-tribals. Table B3b is a corollary to the results: it breaks down food expenditure to observe proportional contributions of expenditure on different food-items in the aggregate household budgetary outlay on food and compare the values between the two contending groups.
Overall, tribal households spend more on cereals and to an extent, on vegetables across the states with a varying extent of the magnitude of the difference. Note that we have found earlier that STs spend as well as consume more of cereals than non-tribals; the absolute levels of these as well as the relative budgetary outlay is also correlated with the average poverty levels in the state. For e.g., compared to tribals and non-tribals in better-off states like Gujarat, Maharashtra and Himachal Pradesh, their counterparts in poorer states of Jharkhand, Chhattisgarh and Orissa spend a higher proportion of their food-budgets on cereals. While this indicates a possible *income-effect* explaining higher allocation to staple foods such as cereals, a matching *substitution effect* – whereby the tribals (and non-tribals) in poorer states can be expected to allocate relatively lesser proportion of food budgets to other items such as fruits and vegetables – is not equally evident.

Further, there exists considerable variation in budgetary outlays among different food-items even *across* tribal households. Considering the three tribal-dominated states used earlier, tribal households in Jharkhand (38%) spend a higher proportion of their food budgets on cereals than those in Chhattisgarh (35%), but less than those in Orissa (41%)[3]. For vegetables, tribals in Chhattisgarh allocate a higher proportion (20%) than those in Orissa (18%) or Jharkhand (16%).

Regional analysis of food consumption patterns

While the ongoing analysis discussed above reports the findings based on state-level differentials in observed food consumption and expenditure levels and patterns, there could be possible benefit in trying to improve upon the intuitive appeal of the results by adopting distinct agro-climatic regions as a stratifying basis. In other words, this is based on narrowing down at the sub-state level following the agro-climatic regions followed by NSSO (better known as NSS regions), and grouping such regions across the states based on the average proportion of tribal population of the districts comprising the regions. The classification variable thus derived can be thought of as regional groups with similar tribal concentrations; this removes the 'synthetic' state boundaries where states with disparate levels of tribal population are compared across. Standard state-level analysis may also mask certain underlying patterns where tribal and non-tribal groups of different regions (with different agro-climatic and other unobserved spatial endowments) are compared for a particular state, while in terms of actual spatial distribution, tribal groups in a state are generally concentrated in specific regions and except for high-tribal populated states, rarely distributed uniformly across a state.

With the rationale being clear enough, the next step involves in clubbing NSS regions across states into groups. This was carried out in two steps. First proportion of ST population was tabulated for all the NSS regions among the 11 states selected earlier. Regions with 5% or more tribal population were retained. This led to a short-listing of 33 distinct regions. In the next step, these regions were clubbed into five groups based on the proportion of ST population: 5-10% (12 regions, 13388 households), 11-20% (10 regions, 10607 households), 21-33% (5 regions, 4883 households), 34-50% (4 regions, 3785 households) and more than 50% (2 regions, 1531 households). The details of the

[3] These figures are different from those reported in Table B3b as while the later reports proportions based on total food expenditure, these figures are based on a total that considers only the following: cereals, pulses, oils, fruits, vegetables, milk and animal products. Both results though are similar in spirit and the differences reported are only in scale.

regions under each category (respective state and constituent districts) are included as an appendix. This categorical variable was used as the main classifying variable[4].

We start with a similar analytical approach as followed in the preceding section. Accordingly Table 3.4 reports average per capita household expenditure on food for tribal and non-tribal households[5]. As it can be seen, despite a minor irregularity, average food expenditure of tribal families tend to be higher in regions where they account for a relative minority of the total population: In the two regions where tribal are a majority (Southern Chhattisgarh comprising of Bastar, Dantewada and Kanker districts, and the Ranchi Plateau in Jharkhand comprising most of the districts in southern Jharkhand) average expenditure is only about Rs 417[6]. In terms of inequality in food-expenditure based on social-group affiliations, the pattern is almost similar suggesting a higher extent of inequality in low-tribal populated regions and lower in regions predominated by tribals.

To test whether such spatial patterns in expenditure inequality for all food-groups combined between tribal and non-tribal households, we compute average expenses for certain major food-groups and the results are summarized in Table 3.5a. However, as the figures indicate there are no clear discernible patterns evident across the different region-clusters except for some indication of higher expenditure levels reported for non-staples (animal products, fresh fruits) and pulses in low-tribal concentration areas by tribals and non-tribals alike; for vegetables on the other hand, the pattern suggests a possibly stronger effect of tastes and preferences, overriding spatial effects. For cereals also the results are somewhat confusing, as high tribal concentrated regions do not necessarily report progressively higher expenditures.

We do not undertake a detailed analysis of quantity of consumption for different food-items as in the preceding section, and compare the average proportions of households reporting incidence of intake of certain food-items considered to be rich in different essential nutrients across the region clusters. Figure 3.1 below shows the proportion of tribal households in each of the region-groups reporting consumption of the following items – eggs, chicken, yellow vegetables, leafy vegetables, fruits and tubers – represented by the vertical bars. The horizontal line plots the difference in consumption percentages between tribals and non-tribals. Consumption of vegetables and fruits among tribals across the five region-clusters is seen to be almost similar with a modest increase noted for cheaper (and mostly locally-sourced) tubers on moving from low to high tribal populated regions. Consumption of eggs and chicken is the highest in region-group 1, but thereafter it remains almost at similar levels. In terms of difference between consumption levels of tribals and non-tribals, the gap tends to be narrow, and almost similar for eggs, yellow vegetables and fruits. The disparity in average consumption percentages is significant in the case of tubers, eggs and chickens, but instead of a

[4] For easier read, we denote the region-groups as region-group 1 – region group 5, where region-group 1 denotes the first group (5-10% ST population) and region-group 5 stands for the fifth group (more than 50% tribal population) in a progressive manner.

[5] Our initial results were based on the three standard groups – ST, SC/OBC and General castes. However, on closer evaluation of results it was felt appropriate to retain only two groups – tribals and non-tribals – for easier interpretation, an also because using the three groups were found not to add much in terms of the inferences. Detailed results are however, available from the author.

[6] There is an interesting pattern that emerges from the results. The average food expenditure for region-group 5 (Rs 417) comprising the two regions from Chhattisgarh and Jharkhand mentioned above have opposite associations with the average food expenditure of all tribal households from these two states. While for Chhattisgarh, the average is much higher than the state average for tribal households (Rs 363), it is lower from the similar state aggregate average for Jharkhand (Rs 433). Following such pattern, it appears that tribals in high tribal-concentration areas of Chhatisgarh are relatively better-off with respect to their counterparts from other areas ij the state, while in Jharkhand, tribals residing in the Hazaribagh plateau or the northern part of the state are relatively better-off, vis-à-vis the tribal families in high tribal-concentrated districts of southern Jharkhand. Such differentials *within a state* across tribal households, which remains masked in the earlier state-level analysis highlights the significant spatial effects in explaining variations in food consumption (and expenditure) among tribals.

progressive pattern as noted in earlier instances, the gaps are highest in the 'middle' regions where tribal populations range widely, from 10-50%.

The last part of the regional analysis is concerned with comparing the relative contribution of different food-items in the household food budget, and also to examine how does the food expenses vary, as a proportion of a household's total consumption expenditure, between tribal and non-tribal households across the region. Table 3.6 is much similar in spirit as well as the main results to that of Table 3.3b earlier. Across the region-groups, tribals consistently spend a higher proportion of their total income on food than non-tribals, with a higher share noted in regions where tribals account for about a quarter to less than half of the total population – a sizeable population group. For the budgetary outlay (of total food expenses) for other individual food items, both across-region variations as well as that between tribals and non-tribals are not substantial, and mostly indicate irregular variations. A few findings are however, imminent. In the region-group III[7], tribals have the highest relative outlays on pulses and vegetables; for eggs/fish/meat the tribals in region-group I (with the lowest tribal concentrations) have highest consumption, as reflected by higher proportional outlay of household food budgets on these items. Consumption of fruits remains virtually unchanged among tribals spread across the region-clusters.

With the above results emerging from both the state-level analysis and further clubbing tribal-concentrated regions into separate clusters, we proceed to test for the possible interaction effects due to other socioeconomic variables, mainly income level, education and landholding, to disaggregate the results further, and more importantly, examine the extent of variations within tribal households spread across different regions[8].

Role of socioeconomic factors in explaining observed variance in food consumption and expenditure levels between tribal and non-tribal households

The previous section reports univariate descriptive statistics primarily concerned with examining the inequality in consumption, and expenditure levels on food between tribal and non-tribal households across major tribal concentrated states and geographic regions in India. Though the findings broadly support the premise that tribal households are at a distinct disadvantage in such FSN input dimensions, we have noticed that the magnitude of such disparities vary significantly in their intensity and effect across particular food-items, as well as across geographic regions. This is most likely indicative of secondary effects of other socioeconomic parameters – income, land-holding, education and occupational patterns for e.g. – on the reported levels of food intake and expenditure a household incurs on them; standardizing the reported levels and values for different socioeconomic categories can help in gaining important insights into variance within tribal households, when segregated according to the SES groups.

A standard starting point of such SES-based analyses is to observe the indicators considered earlier – average food expenditure, expenditure on certain important food-groups, and a household's (proportional) budgetary outlays on food consumption overall – across the income (or consumption

---

[7] This groups includes the following NSS regions and districts: Rest of Chhattisgarh (except southern districts included in region-group V), Dhule, Nandurbar, Jalgaon and Nashik districts (Inland Northern) districts of Maharashtra, Kargaon, Khandwa, Barwani, Betul, Harda, Hosangabad, and Burhampur (south-western region) of Madhya Pradesh, and southern Orissa.

[8] We had also tried out a potentially interesting exercise to derive a proxy measure for dietary diversity for households, based on whether a household reports consumption for certain food-items (includes pulses, both yellow and leafy vegetables, fruits, milk, eggs, chicken and tubers). A score ranging from 1 to 8 was thus assigned to each household based on counts of positive observations, which was then divided into three equal-sized classes. Average scores for each class were observed for tribal and non-tribal households, separately for the five region clusters. Unfortunately, there was very little, and statistically non-significant differences between tribal and non-tribal in all region-groups. Accordingly, we decided not to report and discuss further the results of this exercise.

expenditure) distribution. To maintain continuity of the results, the analysis is limited to the sub-sample of NSS regions with tribal concentrations used in the previous section.

Figure 3.2 shows the average expenditure on food incurred by tribal households ranked across the MPCE deciles, separately for rural and urban areas. As a comparing basis, we have also plotted similar levels for non-tribal households. It may be noted that in urban areas, tribal households in the sample are in certain cases inadequate for a strong quantitative inference, and may be considered in an indicative sense. Urban tribal households appear to be better-off and spend a higher absolute amount on food across the consumption expenditure deciles than their rural counterparts, but more interestingly, there is virtually no difference at all in food expenditures between tribal and non-tribal households belonging to similar economic status, or consumption classes. While this could led to believe that tribal and non-tribal households are on a similar standing in terms of their consumption levels, a closer inspection reveals that much of the observed pattern is actually due to the in some distribution pattern across the tribal and non-tribal households, and more significantly, relative concentration or population shares of the consumption classes by the tribal and non-tribal households, a pattern brought out clearly by Figure 3.2. To keep the comparisons simple but intuitive, the figure plots the population share of tribals and non-tribals in the five MPCE classes; in a perfect distribution each of these classes should account for about 20% of the population. Note that the MPCE quintiles divide the total sample households into five equal-sized classes, or in other words apply the similar distributional classification to the tribal and non-tribal households. As seen from the figure, tribal households – both in rural as well as in urban areas – are disproportionately concentrated in the poorer expenditure groups. While about 30% of the non-tribal households are in the two lowest MPCE classes (with about 29% and 44% in rural and urban areas respectively), 53% of the tribal households account for these two groups (with about 48% and 58% in rural and urban areas separately). This pattern of grossly unequal population shares in the expenditure distribution explains the somewhat misleading observation from Figure 3.1 which shows a near identical pattern of food expenditure between tribal and non-tribal households; being simple averages (and not standardized for differential population share in the expenditure distribution) for tribal and non-tribal households, the estimates mask the underlying influence of significantly different distribution in consumption expenditure between tribal and non-tribal households.

An alternative approach to bring out the *true* differential in food expenditure patterns between tribal and non-tribal households for varying economic status is to use a *relative* consumption expenditure distribution, instead of an *absolute* approach. In other words, this implies, using the consumption expenditure distributions of tribal and non-tribal households separately to derive the MPCE classes, and then repeat the analysis reported in Figure 3.1. The adjusted estimates depicted in Figure 3.1a which simple adjusts levels reported in Figure 3.1 with the relative inequality in the expenditure distribution shown in Figure 3.2, clearly brings out the difference in food expenditure patterns between tribal and non-tribal households. A poor tribal household – in rural and urban areas alike – consistently and significantly spends lesser amount on food than a poor-non-tribal household, when one considers separate expenditure distributions for these groups.

A conventional approach in microeconomics in discussions of food expenditure and consumption patterns and its connotations with poverty is comparing the Engel curves for the comparing groups. Simple stated, the Engel curve implies that share of food expenses in a household's budgetary outlay declines as one moves up the income (or expenditure) distribution. This rests on the premise that the poor spend a higher proportion of their consumption expenditure on food than the better-off; a corollary that follows also implies that even within the aggregate food expenses, share of cereals or staples (comprising the bare necessities or basic foods) falls on moving upwards the expenditure distribution, while for foods of higher quality or price (or both) the pattern reverses. In our case, this can be approached in tow different ways as followed for the average food expenditure levels above – employing both absolute and relative notions of the consumption expenditure.

Considered together figures 3.3a and 3.3b have some important insights. While considering the unstandardized or absolute MPCE distribution, the Engel curves for tribal and non-tribal households in both rural and urban areas are almost mirror-images of each other (Figure 3.3a); the relative MPCE distribution used for deriving the standardized estimates (Figure 3.3b) indicate some variations, particularly in urban areas. It may be noted that the differentials – following the standardization for unequal population shares of tribals and non-tribals in the aggregate expenditure distribution – between tribals and non-tribals in the Engel curve derivations are less intense than for the aggregate food expenditure levels. This is a clear support for the fact that although differing in their absolute food expenditure levels with respect to their position in the MPCE distribution, tribal and non-tribal households do not necessarily differ in their *propensity to spend on food*, or their income-elasticity for food.

But does the evident pattern of near-similar income or expenditure elasticity for food between tribals and non-tribals persist equally, when one considers food-items of different price-quality-nutrient value combinations? As noted earlier, tribal households spend higher proportion as well as consume more of cereals and staples, but not equally marked for higher quality and other diverse food items. To highlight the differentials more clearly, we use the relative MPCE deciles for the comparisons. Results are depicted through the figures 3.4 and 3.5 representing consumption of cereals (staples) and non-vegetarian food (eggs, fish and meat).

For cereals, Figure 3.4 shows clearly that proportional allocation of household's food budgets for cereal consumption steadily declines as economic status improves, both for tribals as well as non-tribals and in rural and urban areas. Interestingly, the consumption patterns for tribals and non-tribals follow a similar path with a common kink, and a similar gradient thereafter, from about the median point of the expenditure distribution. This implies that while poorer tribal households tend to allocate a higher proportion of their food budgets on cereals vis-à-vis their non-tribal counterparts of similar economic standing, the gap narrows down on moving upwards the economic status levels. For food-items of higher cost/quality and offering a more varied nutrient intake (captured here through eggs, fish and meat) and as depicted in Figure 3.5, the evident pattern is less straightforward. For a major part of the relative expenditure distribution in rural areas, tribal households devote lesser proportion of food budgets (and correspondingly consume lesser proportionate amounts) of these food-items than non-tribals. In urban areas, the pattern and differential between tribal and non-tribal households across economic status is less regular, but broadly indicates that economically better-off non-tribal, urban households consume higher levels of these food items than tribal households of comparable economic status. Similar computations were also carried out for other food-items used in the regional analysis earlier (fruits, vegetables, milk, oils etc.), but the relationships were highly irregular and without a systematic pattern.

Multivariate Analysis

While the ongoing analysis have presented and compared food consumption levels and expenditures between tribal and non-tribal households, and examined variance in observed levels across the consumption expenditure distribution, for more precise understanding and accounting for effects of other possible explanatory predictors a multivariate framework is suitable. Accordingly, we regress both reported levels of a household's expenditure on food (in logs) and the proportional allocation of its budgetary outlay on food, against a vector of explanatory variables. The set of regressors considered include economic status (in terms of *absolute* MPCE quintiles), whether household possess any agricultural land, whether any HH member has a regular or salaried income, educational level of the household head, household size-groups and place of residence (urban-rural). We estimate ordinary least square (OLS) coefficients, with fixed-effects considered for the five regional groups explained in section 3.2. For each of the two outcome variables considered, separate *between-effects* (comparing the effect of a household being from tribal groups as against being non-tribal) and *within-effect* (those assessing variance in outcome for tribal and non-tribal households separately) models are estimated. The coefficients are reported in Tables R1 and R2.

For the aggregate food expenditure models (Table R1), tribal households spend a significantly lesser proportion of their consumption expenditure on food, controlling for the effects of economic status, education, landholding and place of residence. However, a similar preposition is not found true for the proportion of total expenses spent on food. For most of the other explanatory variables, both the level and direction of association are on expected lines. For example, indicating a strong and positive *income-effect,* food expenditure of households steadily increases with better economic status, with an almost similar magnitude for tribal and non-tribal households. Justifying further the Engel relationship explained earlier, economically better-off households, both tribal and non-tribal, behave much similar in allocating lesser proportions of their total monthly expenses on food.

Education too, plays a significant influence, possibly through its correlation with progressively better economic status. On the other hand, households with more number of residing members (and more mouths to feed), can afford to spend lesser amounts in aggregate on food-items, due to other parallel, and increased demand on household's financial capacities. Possessing land, particularly among tribal households, also helps in keeping food expenses lower among the cultivating families through a subsistence support. Lastly, the urban-rural divide in food-expenditure levels and its association in explaining consumption differences between tribal and non-tribal households is also brought out well: urban households both among tribals and non-tribals are economically much better-off, and (due to the income-effect most likely) enjoys higher food consumption.

Summary and Conclusion

In the preceding sections we have presented the detailed results following analysis of most recent consumption expenditure survey data in India, with the aim to identify the levels, patterns and differentials in expenditure as well as quantities consumed for different food items, in a comparative manner between tribal and non-tribal households in India. The main results can be summarized as follows:

- Food-expenditure varies significantly between tribal and other non-tribal groups across the major tribal-concentration states in India with an extent of correlation with overall poverty levels in the respective states. Inequality in food-expenditure is most prominent for consumption of milk and other animal-products (eggs, meat and fish), with less intense differentials for cereals and other staple foods. Even within tribal households in a state, average expenditure on more costly or higher quality food-items varies considerably.

- For individual food-items, a higher proportion of tribal households reports consumption of two food-items, chicken and tubers, than non-tribals; the results suggest that both the levels and diversity of food consumption in tribal households are likely to have a strong nexus with poverty – higher average levels and predominance of locally-grown, domesticated or wildly collected food-items co-exists along with lower levels of average expenses on food.

- Across the spectrum of the major food-items, while the overall pattern reinforces a nutritional disadvantage or a worse-off scenario in terms of dietary diversity among tribals, the differentials as observed across the states is not equally straightforward.

- Overall, tribal households spend more on cereals and to an extent, on vegetables across the states with a varying extent of the magnitude of the difference. While this indicates a possible *income-effect* explaining higher allocation to staple foods such as cereals, a matching *substitution effect* – whereby the tribals (and non-tribals) in poorer states can be expected to allocate relatively lesser proportion of food budgets to other items such as fruits and vegetables – is not equally evident.

- The findings of a more granulated region-level analysis arrived at by clustering agro-cliamtic regions with similar tribal concentrations, it appears that despite a minor irregularity, average food expenditure of tribal families tend to be higher in regions where they account for a relative minority of the total population. For food-groups, however, any clear spatial pattern following such clustering could not be identified. Across the region-groups, tribals consistently spend a higher proportion of their total income on food than non-tribals, with a higher share noted in regions where tribals account for about a quarter to less than half of the total population.

- When the results are refined further allowing for more basic expenditure distribution-based inequalities, several important findings emerge. A poor tribal household – in rural and urban areas alike – consistently and significantly spends lesser amount on food than a poor-non-tribal household, when one considers separate expenditure distributions for these groups. Interestingly, This is a clear support for the fact that although differing in their absolute food expenditure levels with respect to their position in the MPCE distribution, tribal and non-tribal households do not necessarily differ in their *propensity to spend on food*, or their income-elasticity for food. For cereals, proportional allocation of household's food budgets for cereal consumption steadily declines as economic status improves, both for tribals as well as non-tribals and in rural and urban areas. The emerging pattern further suggests that while poorer tribal households tend to allocate a higher proportion of their food budgets on cereals vis-à-vis their non-tribal counterparts of similar economic standing, the gap narrows down on moving upwards the economic status levels.

- Results from multivariate regression models, that account for effect of other socioeconomic variables suggest that actually tribal households spend a significantly lesser proportion of their consumption expenditure on food, controlling for the effects of economic status, education, landholding and place of residence. However, a similar preposition is not found true for the proportion of total expenses spent on food. Indicating a strong and positive *income-effect,* food expenditure of households steadily increases with better economic status, with an almost similar magnitude for tribal and non-tribal households.

Table 3.1: Average monthly per capita expenditure (Rs) on food* for selected States according to Social Groups

State	Avg. Food Expenditures			Inequality in Food Expenditures	
	Tribal	Other (SC/OBC)	General	SC/OBC vs. STs	Gen vs STs
Himachal Pradesh	701.93	666.55	850.85	-35.37	148.92
Rajasthan	553.92	605.94	774.15	52.02	220.24
West Bengal	487.91	538.74	645.01	50.83	157.10
Jharkhand	432.62	474.90	720.96	42.27	288.34
Orissa	365.81	455.43	609.90	89.62	244.09
Chhattisgarh	362.88	410.64	561.63	47.76	198.74
Madhya Pradesh	370.58	459.06	710.92	88.48	340.34
Gujarat	531.59	638.23	883.20	106.64	351.61
Maharashtra	576.63	620.80	876.50	44.17	299.87
Andhra Pradesh	552.25	649.70	943.30	97.45	391.05
Karnataka	516.62	600.02	776.60	83.39	259.98
India	***499.14***	***572.77***	***791.06***	***73.64***	***291.93***

*includes cereals, pulses, vegetables, fruits (fresh and dry), edible oil, sugar/salt/spices, beverages, milk & milk products, eggs/fish/meat.

Table B2a: Average monthly per capita expenditure (Rs) on major food-groups for selected States according to Social Groups

States	Avg. Cereal Expenditures			Inequality in Cereal Expenditures	
	Tribal	Other (SC/OBC)	General	SC/OBC vs. STs	Gen vs STs
Himachal Pradesh	159.63	138.67	158.98	-20.96	-0.65
Rajasthan	142.05	144.58	152.41	2.53	10.36
West Bengal	171.28	175.48	180.78	4.21	9.50
Jharkhand	153.05	172.91	197.36	19.87	44.32
Orissa	127.63	159.65	175.23	32.02	47.60
Chhattisgarh	118.86	125.04	154.28	6.18	35.41
Madhya Pradesh	118.02	124.42	143.96	6.39	25.94
Gujarat	118.20	129.89	158.34	11.70	40.15
Maharashtra	124.65	143.51	163.34	18.86	38.68
Andhra Pradesh	156.81	183.57	225.07	26.76	68.27
Karnataka	132.84	142.67	184.21	9.83	51.38
Combined Sample	***143.23***	***148.77***	***172.37***	***5.54***	***29.14***
	Avg. Expenditure on Pulses			**Inequality in Expenditure on Pulses**	
Himachal Pradesh	53.36	55.61	63.36	2.25	10.00
Rajasthan	22.58	23.93	29.09	1.35	6.51
West Bengal	25.98	26.01	28.60	0.03	2.62
Jharkhand	26.21	35.01	48.03	8.80	21.82
Orissa	26.50	33.84	46.33	7.34	19.83
Chhattisgarh	36.55	43.28	62.03	6.73	25.47
Madhya Pradesh	40.98	43.34	53.11	2.37	12.13
Gujarat	46.91	47.43	62.04	0.52	15.13
Maharashtra	53.54	57.05	65.38	3.51	11.84
Andhra Pradesh	38.79	48.83	62.59	10.04	23.80
Karnataka	42.23	47.85	56.40	5.62	14.17
Combined Sample	***36.45***	***42.32***	***49.94***	***5.87***	***13.49***
	Avg. Expenditure on Milk/Milk products			**Inequality in Expenditure on Milk/Milk products**	
Himachal Pradesh	165.68	163.13	234.28	-2.55	68.61
Rajasthan	173.29	204.19	269.43	30.90	96.14
West Bengal	42.48	47.43	62.32	4.95	19.84
Jharkhand	60.46	68.73	145.50	8.27	85.04
Orissa	34.00	42.96	66.68	8.96	32.68
Chhattisgarh	41.87	46.93	97.63	5.07	55.76
Madhya Pradesh	57.03	105.94	165.49	48.91	108.45
Gujarat	117.31	157.42	226.20	40.10	108.88
Maharashtra	63.79	83.68	148.75	19.89	84.96
Andhra Pradesh	63.86	83.61	131.55	19.75	67.69

Karnataka	60.71	73.34	106.74	12.63	46.03
Combined Sample	***85.06***	***105.66***	***161.32***	***20.60***	***76.25***
	Avg. Expenditure on Edible Oils			**Inequality in Expenditure on Edible Oils**	
Himachal Pradesh	43.77	48.39	51.28	4.62	7.51
Rajasthan	37.14	38.79	46.64	1.66	9.50
West Bengal	36.10	39.03	44.96	2.93	8.86
Jharkhand	34.07	37.27	50.45	3.20	16.38
Orissa	21.84	28.02	34.70	6.18	12.86
Chhattisgarh	31.40	37.11	50.28	5.71	18.88
Madhya Pradesh	27.74	31.65	43.74	3.90	15.99
Gujarat	48.61	63.67	79.81	15.06	31.19
Maharashtra	44.18	52.27	58.84	8.09	14.67
Andhra Pradesh	33.34	37.46	45.02	4.11	11.68
Karnataka	33.12	35.78	42.32	2.65	9.20
Combined Sample	***34.31***	***37.92***	***48.35***	***3.61***	***14.04***
	Avg. Expenditure on Egg/Fish/Meat			**Inequality in Expenditure on Egg/Fish/Meat**	
Himachal Pradesh	60.54	46.35	56.12	-14.18	-4.42
Rajasthan	33.04	52.04	58.58	19.00	25.54
West Bengal	62.28	77.11	105.57	14.83	43.29
Jharkhand	42.79	43.86	61.74	1.06	18.94
Orissa	30.65	38.73	49.88	8.08	19.23
Chhattisgarh	31.53	29.51	48.39	-2.03	16.85
Madhya Pradesh	33.28	30.91	101.84	-2.37	68.56
Gujarat	44.10	35.67	62.87	-8.43	18.77
Maharashtra	50.69	57.94	84.29	7.25	33.60
Andhra Pradesh	49.36	58.04	71.21	8.68	21.85
Karnataka	55.08	59.83	103.82	4.75	48.74
Combined Sample	***54.75***	***58.64***	***87.78***	***3.89***	***33.04***
	Avg. Expenditure on Vegetables			**Inequality in Expenditure on Vegetables**	
Himachal Pradesh	72.69	76.64	91.04	3.94	18.34
Rajasthan	46.13	51.95	66.90	5.81	20.77
West Bengal	71.97	75.05	86.44	3.07	14.46
Jharkhand	64.57	64.83	90.60	0.26	26.03
Orissa	55.39	74.62	88.93	19.24	33.54
Chhattisgarh	67.58	75.08	95.62	7.50	28.04
Madhya Pradesh	43.01	49.57	61.08	6.56	18.07
Gujarat	80.34	80.52	107.13	0.18	26.79
Maharashtra	60.21	67.89	82.33	7.68	22.11
Andhra Pradesh	62.08	72.50	86.10	10.42	24.02

Karnataka	43.87	50.12	62.25	6.25	18.39
Combined Sample	***62.60***	***65.42***	***83.00***	***2.82***	***20.40***
	Avg. Expenditure on Fruits			**Inequality in Expenditure on Fruits**	
Himachal Pradesh	27.90	24.88	38.31	-3.02	10.41
Rajasthan	12.35	15.15	33.30	2.80	20.95
West Bengal	12.97	16.39	24.22	3.42	11.25
Jharkhand	14.27	16.27	39.25	1.99	24.98
Orissa	10.30	12.65	23.55	2.35	13.25
Chhattisgarh	10.32	13.87	26.17	3.54	15.84
Madhya Pradesh	10.08	13.24	25.25	3.16	15.17
Gujarat	15.12	20.28	37.92	5.16	22.80
Maharashtra	16.20	23.46	47.18	7.26	30.98
Andhra Pradesh	15.42	21.96	35.52	6.54	20.10
Karnataka	19.36	26.87	42.84	7.51	23.48
Combined Sample	***15.66***	***21.55***	***35.79***	***5.89***	***20.13***

Table 3.2b: Average monthly per capita consumption (quantity) for certain food-groups for selected States according to Social Groups

State	Quantity consumed – cereals			Inequality in consumption-cereals		Quantity consumed - Pulses			Inequality in consumption-Pulses		Quantity consumed - Edible Oils			Inequality in consumption-Edible oils	
	ST	SC/OBC	Gen	SC/OBC vs. STs	Gen vs STs	ST	SC/OBC	Gen	SC/OBC vs. STs	Gen vs STs	ST	SC/OBC	Gen	SC/OBC vs. STs	Gen vs STs
Himachal Pradesh	12.06	11.79	11.63	-0.27	-0.43	1.28	1.39	1.50	0.11	0.22	0.72	0.84	0.88	0.13	0.17
Rajasthan	12.48	11.57	11.05	-0.91	-1.43	0.43	0.46	0.52	0.03	0.09	0.57	0.59	0.71	0.02	0.13
West Bengal	12.25	11.26	10.85	-0.99	-1.40	0.44	0.44	0.47	0.00	0.02	0.53	0.58	0.66	0.05	0.13
Jharkhand	11.90	11.81	11.58	-0.09	-0.32	0.55	0.63	0.85	0.08	0.30	0.51	0.55	0.75	0.04	0.24
Orissa	13.67	14.24	13.83	0.57	0.16	0.51	0.61	0.76	0.10	0.25	0.35	0.45	0.54	0.10	0.19
Chhattisgarh	13.43	13.02	11.49	-0.42	-1.95	0.68	0.79	1.01	0.11	0.33	0.53	0.63	0.82	0.10	0.29
Madhya Pradesh	11.72	11.23	10.47	-0.49	-1.24	0.81	0.78	0.89	-0.03	0.08	0.51	0.59	0.78	0.08	0.27
Gujarat	9.65	9.30	9.23	-0.35	-0.42	0.75	0.77	0.97	0.02	0.22	0.82	1.03	1.21	0.22	0.40
Maharashtra	10.39	10.12	9.32	-0.27	-1.06	0.87	0.94	1.01	0.06	0.13	0.81	0.89	0.91	0.09	0.11
Andhra Pradesh	11.51	11.80	11.31	0.28	-0.20	0.60	0.72	0.91	0.12	0.31	0.63	0.69	0.77	0.05	0.13
Karnataka	10.04	10.39	10.17	0.35	0.13	0.70	0.82	0.89	0.12	0.19	0.60	0.61	0.70	0.01	0.10
India	11.81	11.28	10.70	-0.53	-1.11	0.65	0.76	0.82	0.11	0.17	0.57	0.63	0.75	0.06	0.19

All quantities in Kgs.

Table 3.2c: Proportion of households consuming supplementary food-items for selected States according to tribal and non-tribal households

States	Tubers		Yellow vegetables		Leafy vegetables		Fruits		Milk		Eggs		Chicken	
	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals
Himachal Pradesh	90.4	94.7	6.5	2.6	50.9	55.2	4.0	2.0	92.2	84.4	16.5	27.6	13.0	8.3
Rajasthan	78.0	69.6	4.5	1.9	55.5	47.7	4.5	4.0	98.0	97.7	6.1	4.6	2.9	1.2
West Bengal	66.9	82.1	11.5	9.8	87.3	88.5	5.5	0.7	64.4	54.9	81.0	77.3	49.6	53.6
Jharkhand	80.3	77.0	8.0	6.7	66.7	72.8	2.7	3.4	60.1	38.3	26.0	24.5	34.5	40.3
Orissa	84.2	71.3	14.4	5.9	84.5	85.1	6.3	2.2	51.5	19.8	38.3	32.8	35.1	37.5
Chhattisgarh	93.6	81.5	4.3	1.4	74.2	72.0	1.2	0.8	50.1	32.0	29.4	32.0	35.2	45.8
Madhya Pradesh	89.8	91.0	2.6	1.2	64.7	58.3	4.5	1.3	92.5	70.7	16.2	18.5	12.6	26.1
Gujarat	87.3	82.4	1.1	0.2	63.0	56.0	7.9	3.5	98.9	88.7	11.1	21.2	10.2	43.4
Maharashtra	60.2	58.8	0.7	0.5	85.7	77.7	4.9	3.1	92.0	75.4	32.5	36.6	31.4	45.6
Andhra Pradesh	19.5	20.2	1.5	2.2	88.1	82.7	5.9	2.2	88.5	65.2	69.6	71.9	67.0	76.3
Karnataka	13.7	1.7	1.2	0.6	84.9	86.5	5.2	4.9	93.2	90.4	41.8	36.9	40.2	46.5
Combined Sample	*60.8*	*66.6*	*3.7*	*2.6*	*77.3*	*71.0*	*4.9*	*2.4*	*82.6*	*59.6*	*39.9*	*31.8*	*34.3*	*38.7*

All figures denote proportion of households reporting any amounts of consumption of the respective food-items (by any family-member) at least once during past 30 days.
Tubers include potato, sweet-potato, turnip & radish; Yellow vegetables include carrot & pumpkin; Leafy vegetables include spinach (*palak*) and other such vegetables (*sag*); Fruits include banana, mango & guava.

Table 3.3a: Household budgetary outlay (proportion of monthly consumption expenditure) on food in selected States, according to social groups

States	Tribals	Non-tribals	Diff
Himachal Pradesh	54.4	52.6	-1.9
Rajasthan	56.2	55.3	-0.9
West Bengal	57.5	58.3	0.8
Jharkhand	59.9	56.9	-3.0
Orissa	65.0	59.0	-6.0
Chhattisgarh	56.4	52.6	-3.8
Madhya Pradesh	53.5	51.4	-2.1
Gujarat	62.8	53.6	-9.2
Maharashtra	58.0	50.9	-7.0
Andhra Pradesh	61.2	56.2	-5.0
Karnataka	60.6	55.1	-5.5
Total	***58.8***	***54.8***	***-4.0***

Table 3.3b: Household budgetary outlay on individual food-groups (proportion of monthly food-expenditure) in selected States, across tribal and non-tribal households

States	Cereals		Pulses		Vegetables		Eggs/Fish/Meat		Milk & Milk products		Fresh fruits	
	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals	Tribals	Non-tribals
HP	25.5	21.7	7.6	8.4	10.3	11.5	8.3	6.4	23.1	25.5	3.6	3.6
Rajasthan	27.9	25.0	4.2	4.1	8.6	9.0	6.3	7.7	28.2	32.1	2.0	2.6
West Bengal	37.7	33.3	5.4	4.7	15.3	14.5	12.1	14.6	7.6	8.2	2.3	2.9
Jharkhand	38.1	37.7	6.3	7.3	15.7	14.2	9.2	8.3	12.0	13.4	2.7	3.1
Orissa	39.0	36.7	7.8	7.7	17.4	17.0	8.8	8.2	6.5	8.4	2.6	2.7
Chhattisgarh	33.2	30.0	10.0	10.6	19.5	18.9	8.8	7.6	9.7	10.2	2.7	3.0
MP	34.3	28.5	11.3	9.7	12.2	11.1	7.9	7.2	13.4	20.8	2.3	2.7
Gujarat	23.7	20.5	9.1	7.4	15.3	12.8	7.9	6.4	19.6	24.9	2.4	3.3
Maharashtra	25.4	24.2	11.0	9.6	12.2	11.1	9.7	9.3	10.3	14.8	2.5	3.7
AP	32.7	30.3	7.8	8.0	12.9	12.0	9.7	9.1	10.6	13.7	2.6	3.2
Karnataka	27.6	26.4	8.7	8.9	9.2	9.2	10.3	10.4	11.9	13.6	3.6	4.5
Total	***31.9***	***28.4***	***8.5***	***7.7***	***13.9***	***12.2***	***9.1***	***10.2***	***15.1***	***16.9***	***2.5***	***3.3***

Table 3.4: Average monthly per capita expenditure (Rs) on food* for selected region-groups according to Social Groups

Region-groups	Avg. Food Expenditures		Inequality in Food Expenditures
	Tribals	Non-Tribals	
Region-group 1	504.69	708.81	204.11
Region-group 2	489.17	556.08	66.91
Region-group 3	385.29	481.11	95.82
Region-group 4	452.35	639.08	186.73
Region-group 5	417.51	543.21	125.71

Total	***454.19***	***630.38***	176.19

Table 3.5: Average monthly per capita expenditure (Rs) on major food-groups for tribal and non-tribal households in selected region-groups

Region-groups	Cereals		Pulses		Edible Oils		Egg/Fish/Meat		Vegetables		Fresh fruits	
	Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal
Region-group 1	149.15	175.31	34.51	47.83	34.71	46.37	51.89	70.58	63.20	79.31	15.03	29.94
Region-group 2	131.69	145.49	36.63	40.88	35.69	40.86	39.88	52.95	49.80	56.68	12.42	18.56
Region-group 3	111.24	137.30	40.60	48.11	31.72	40.06	33.26	37.06	58.14	73.77	11.17	18.64
Region-group 4	131.91	166.26	36.62	49.56	34.78	46.70	39.35	45.18	61.26	86.15	11.73	22.87
Region-group 5	136.57	159.81	30.13	41.82	33.88	43.09	41.50	49.37	67.21	75.05	11.78	24.93
All selected regions	***131.30***	***161.19***	***36.44***	***45.78***	***34.30***	***44.00***	***41.26***	***61.46***	***58.65***	***72.37***	***12.52***	***24.80***

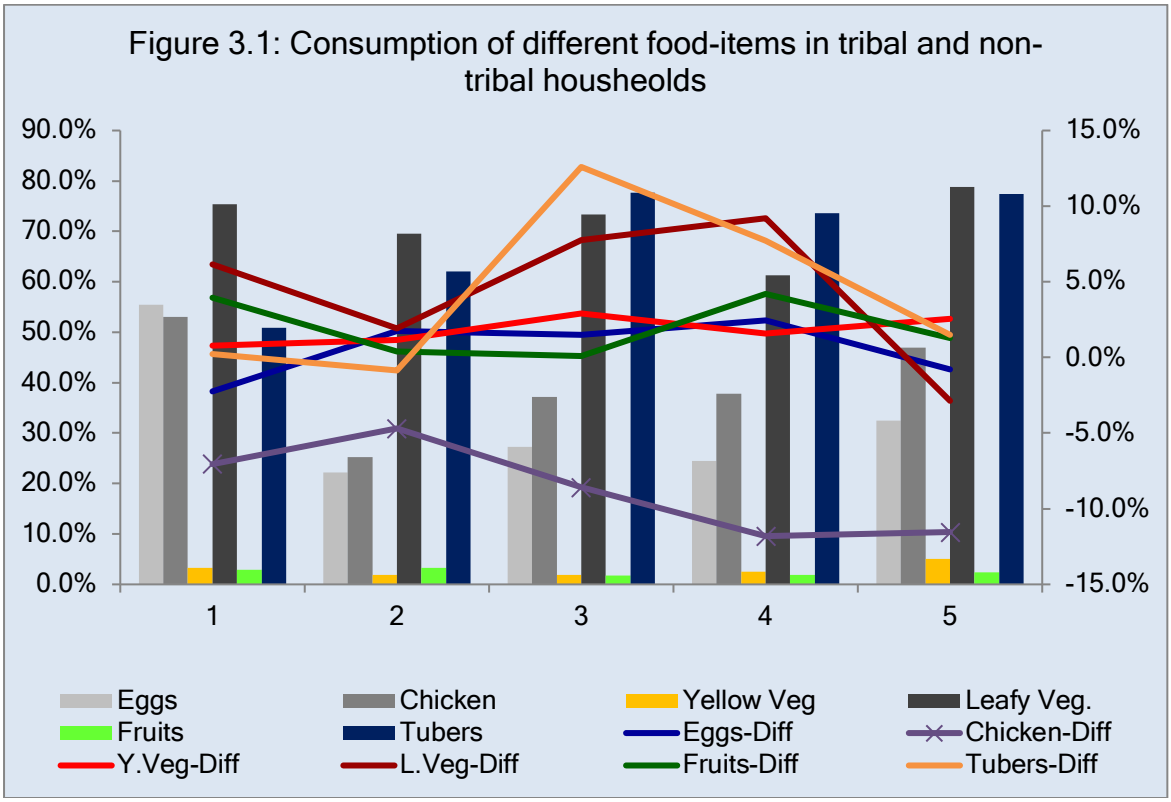

Table 3.6: Household budgetary outlay on food and individual food-groups (proportion of monthly food-expenditure) across tribal and non-tribal households, selected region clusters

Region clusters	Food exp as of MPCE			Cereals		Pulses		Vegetables		Eggs/Fish/Meat		Milk & Milk products		Fresh fruits	
	Non-tribals	*Tribals*	*Diff.*	*Non-tribals*	*Tribals*	*Non-tribals*	*Tribals*	*Non-tribals*	*Tribals*	*Non-tribals*	*Tribals*	*Non-tribals*	*Tribals*	*Non-tribals*	*Tribals*
Region-group 1	55.3	58.6	3.3	29.1	33.6	7.3	7.6	12.7	13.7	10.4	10.6	15.3	12.6	3.4	2.7
Region-group 2	54.9	56.1	1.2	28.9	30.2	8.0	8.2	10.9	11.3	9.1	8.3	18.9	17.6	2.8	2.3
Region-group 3	55.5	60.9	5.4	30.2	31.6	10.0	10.8	16.5	16.9	7.7	8.9	12.3	10.1	3.1	2.6
Region-group 4	51.8	60.4	8.6	30.6	33.0	8.1	8.3	13.9	14.0	7.9	8.6	17.7	17.0	2.8	2.3
Region-group 5	55.6	59.1	3.6	33.4	34.5	8.1	7.9	14.9	17.0	8.9	9.1	14.3	12.1	3.2	2.6
All selected regions	***54.9***	***59.0***	***4.1***	***29.3***	***32.3***	***7.9***	***8.6***	***12.7***	***14.1***	***9.7***	***9.1***	***16.5***	***15.0***	***3.2***	***2.5***

Fig 3.2: Food expenditure according to MPCE deciles, Tribal and Non-tribal households, Rural-urban

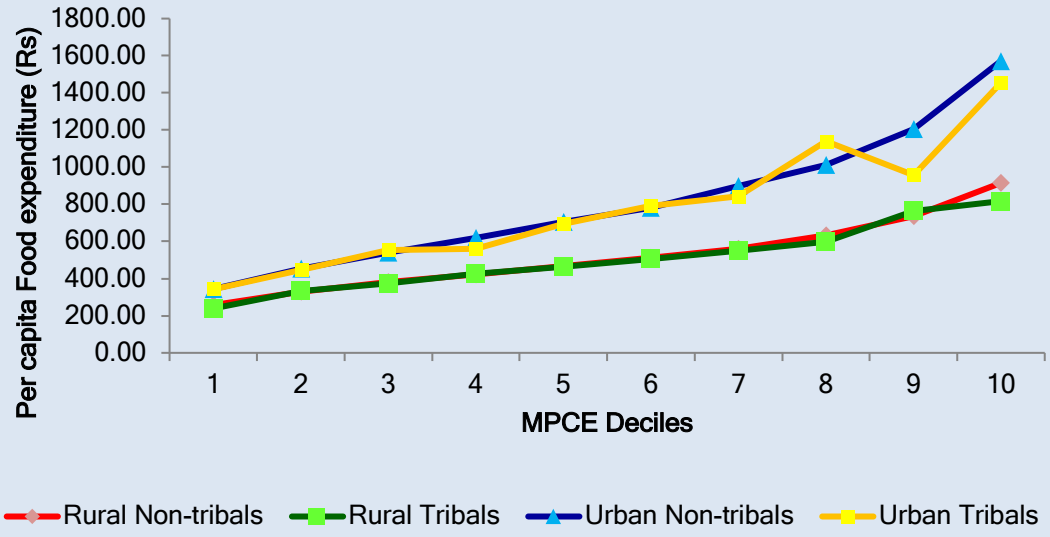

Figure 3.3: Distribution of sample households across MPCE quintiles, Tribals and Non-tribals

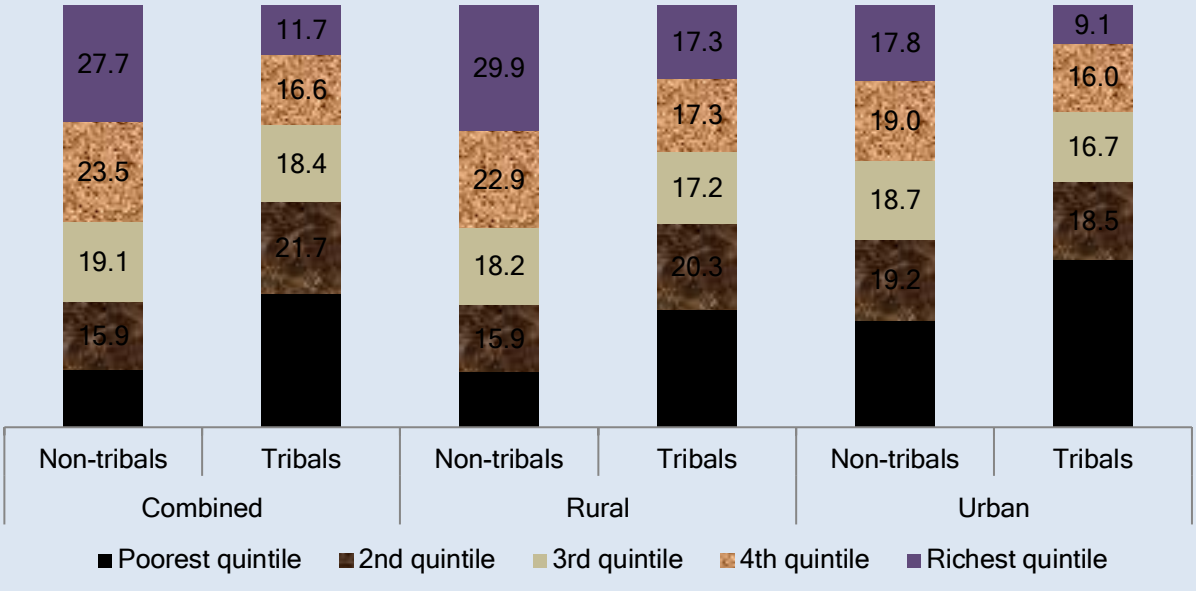

Fig 3.1a: Food expenditure according to Relative MPCE deciles, Tribal and Non-tribal households, Rural-urban

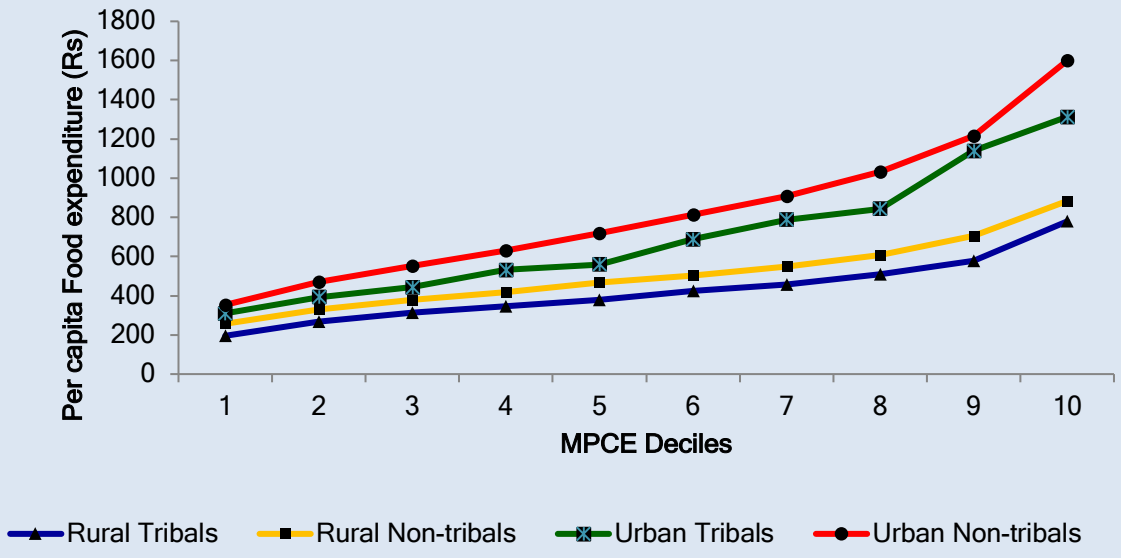

Figure 3.3b: Proportional share of food expenditure according to relative MPCE deciles, Tribal & Non-tribal households, Rural-Urban

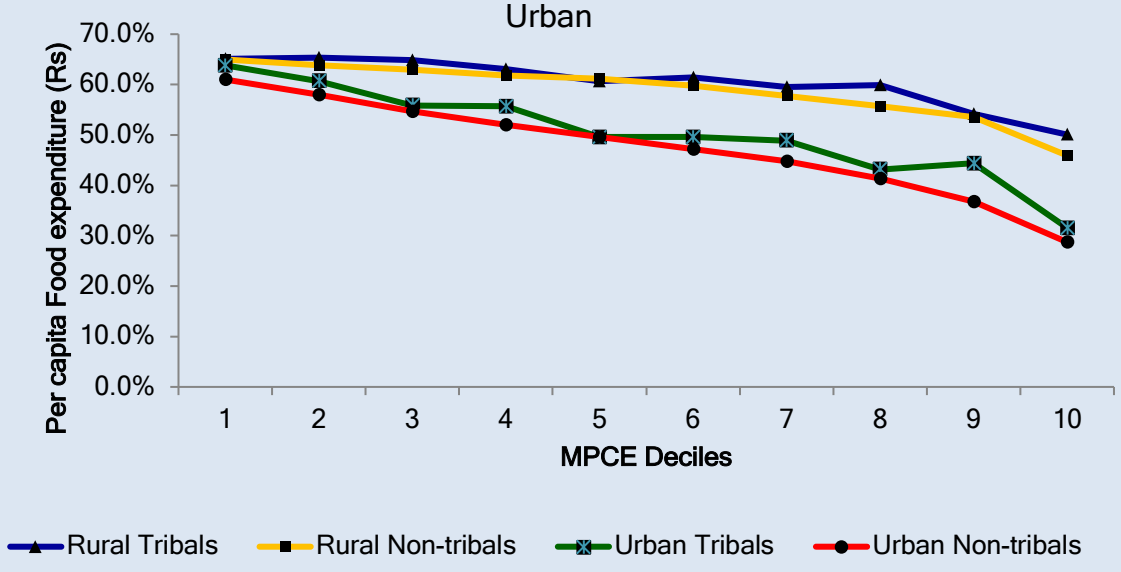

Figure 3.4: Proportional share of fcereals in food expenditure according to relative MPCE deciles, Tribal & Non-tribal households, Rural-Urban

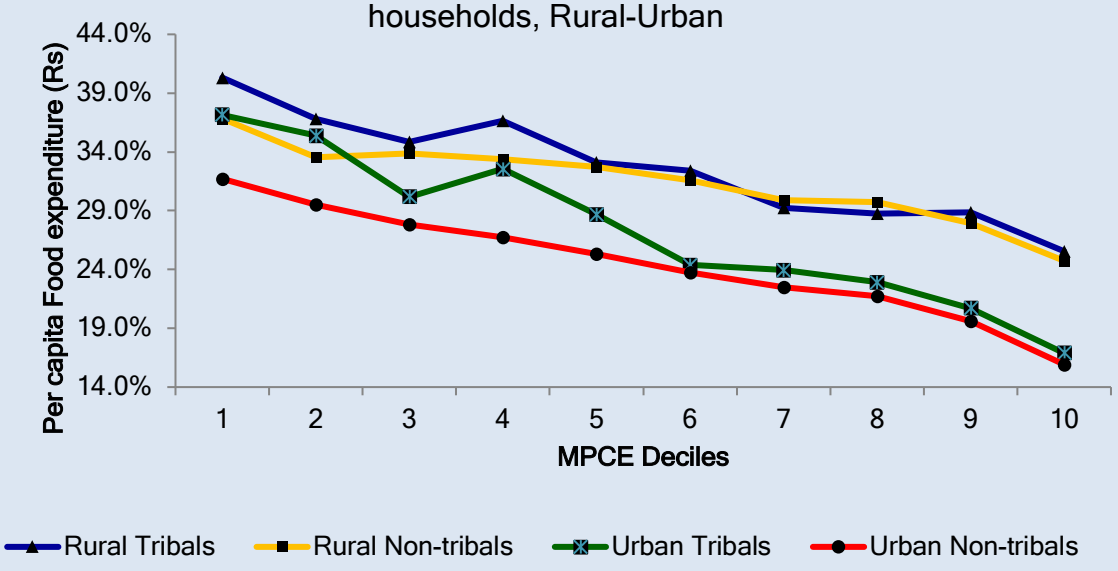

Fig 3.5: Proportional share of animal products in food expenditure according to Relative MPCE deciles, Tribal and Non-tribal households, Rural-urban

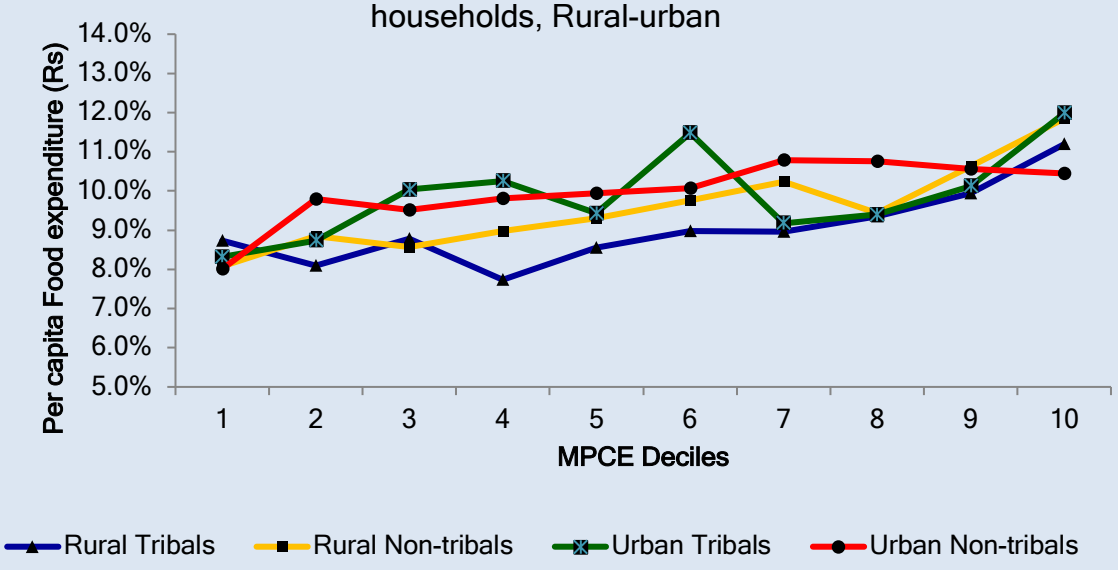

Table 3.7: OLS regression coefficients for aggregate household food expenditure

Explanatory Variables	Between-effects OLS		Within-effects OLS			
			Tribal		Non-tribal	
	β	*SE*	*β*	*SE*	*β*	*SE*
MPCE Quintiles (Ref: Poorest)						
Quintile 2	0.356***	0.004	0.403***	0.01	0.340***	0.005
Quintile 3	0.562***	0.005	0.586***	0.012	0.552***	0.005
Quintile 4	0.797***	0.005	0.870***	0.015	0.783***	0.005
Richest quintile	1.175***	0.006	1.100***	0.022	1.172***	0.006
Urban residence	0.018***	0.004	0.052**	0.016	0.017***	0.004
Possess land	-0.015**	0.005	-0.043**	0.014	-0.009	0.005
Household with regular income source	-0.007	0.004	0.003	0.015	-0.008	0.004
Education level of HH head						
Head - < primary	0.026***	0.005	0.044***	0.012	0.021***	0.005
Head - < completed primary	0.031***	0.005	0.063***	0.013	0.024***	0.005
Head - middle school	0.031***	0.005	0.094***	0.014	0.020***	0.005
Head - secondary	0.023***	0.005	0.023	0.018	0.020***	0.006
Head - higher secondary	0.043***	0.006	0.048*	0.021	0.040***	0.007
Head - grad & above	0.082***	0.007	0.086***	0.025	0.076***	0.007
HH size						
3-5 members	-0.122***	0.004	-0.114***	0.011	-0.122***	0.004
6-8 members	-0.144***	0.005	-0.109***	0.013	-0.150***	0.005
more than 9 members	-0.141***	0.008	-0.111***	0.021	-0.147***	0.009
Tribal household (ref: Non-tribal)	-0.034***	0.004				
Constant	5.887***	0.008	5.783***	0.024	5.899***	0.008
Adjusted R^2	0.733		0.635		0.736	
N	34181		5286		28895	

Table 3.8: OLS regression coefficients for food-share in total household budgetary outlay

Explanatory Variables	Between-effects OLS		Within-effects OLS			
			Tribal		Non-tribal	
	β	SE	β	SE	β	SE
MPCE Quintiles (Ref: Poorest)						
Quintile 2	-0.034***	0.002	-0.035***	0.004	-0.034***	0.002
Quintile 3	-0.075***	0.002	-0.089***	0.005	-0.072***	0.002
Quintile 4	-0.121***	0.002	-0.113***	0.006	-0.120***	0.002
Richest quintile	-0.224***	0.003	-0.242***	0.009	-0.221***	0.003
Urban residence	-0.017***	0.002	-0.003	0.007	-0.017***	0.002
Possess land	-0.018***	0.002	-0.051***	0.006	-0.010***	0.002
Household with regular income source						
Education level of HH head	0.002	0.002	0.014*	0.006	0	0.002
Head - < primary	0.008***	0.002	0.013**	0.005	0.006*	0.002
Head - < completed primary	0.004*	0.002	0.008	0.005	0.003	0.002
Head - middle school	0.007***	0.002	0.030***	0.006	0.002	0.002
Head - secondary	-0.004	0.002	-0.004	0.007	-0.006*	0.002
Head - higher secondary	-0.019***	0.003	-0.007	0.009	-0.022***	0.003
Head - grad & above	-0.042***	0.003	-0.037***	0.01	-0.046***	0.003
HH size						
3-5 members	-0.034***	0.002	-0.045***	0.005	-0.030***	0.002
6-8 members	-0.032***	0.002	-0.035***	0.005	-0.030***	0.002
more than 9 members	-0.031***	0.003	-0.020*	0.009	-0.032***	0.004
Tribal household (ref: Non-tribal)	0.003	0.002				
Constant	0.698***	0.003	0.703***	0.01	0.692***	0.003
Adjusted R^2	0.355		0.236		0.374	
N	34187		5286		28901	