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**Analysis of Changes in Food Consumption and Their
Implications for Food Security and Undernourishment:
The Indian Experience in the 1990s**

Ranjan Ray
(University of Tasmania)

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by

Ranjan Ray*
School of Economics
University of Tasmania
Private Bag 85
Hobart Tasmania 7001
Australia

Ranjan.Ray@utas.edu.au

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Abstract

This paper examines the changes in the nature and quantity of Food consumption in India during the reforms decade of the 1990s, and analyses their implications for calorie intake and undernourishment. The study documents the decline in cereal consumption, especially in the urban areas, and provides evidence that suggests a sharp increase in the prevalence of undernourishment over the 2 year period, 1999/2000 – 2001/2002. The results also point to a significant number of households, even in the top expenditure decile, suffering from undernourishment. This calls for a reassessment of the current strategy of directing the Public Distribution System (PDS) exclusively at households “below the poverty line” (BPL). Another important result is that, notwithstanding the sharp decline in their expenditure share during the 1990s, Rice and Wheat continue to provide the dominant share of calories, especially for the rural poor. The overall message is that, especially in a period of significant economic change, one needs to go beyond the standard expenditure based money metric measures to assess the changes in the living standards of households.

Keywords: Calorie Intake, Prevalence of Undernourishment, Unit Value Inflation, Public Distribution System, Backward Classes, Female headed Households.

JEL Classification: D12, I12, O18, O53.

1. Introduction

The 1990s witnessed widespread economic reforms and liberalisation in India. Much of the discussion on the effects of economic reforms in India has centred around the temporal movement in the poverty and inequality magnitudes [see, for example, Dubey and Gangopadhyay (1998), Meenakshi and Ray (2002), Bhalla (2003), Sen and Himanshu (2004), Ray and Lancaster (2005)]. Relatively little attention has been paid, until recently, to changes in the magnitude and pattern of Food consumption over the reforms period, even though such changes ought to be linked to poverty movements via the calorie basis of the original definition of the poverty line in India [see Dandekar and Rath (1971)]. However, as Ray and Lancaster (2005) have shown, the link has weakened to the extent that the official poverty line in India today is quite out of step with that based on the household's minimum calorie requirements.¹ This is reflected in a dissonance, even contradiction, between the expenditure based poverty magnitudes and the calorie based measures of hunger or under nourishment.²

This points to the need to analyse the magnitude and trend in Food, especially Cereals, consumption over the reforms period in India in view of their strong implications for Food and nutrition security. Such an analysis, which is the main motivation for this study, is necessitated by the failure of expenditure and income based poverty magnitudes to depict the true picture on Food and nutrition security in a period of significant changes in the nature of Food consumption with strong implications for the household's calorie intake. This study provides evidence, at both state and All India levels, on the magnitude and trends in Food consumption. It, then, uses calorie conversion factors to calculate calorie intake and, from them, estimates of under nourishment in both urban areas and the rural countryside. The prevalence of under nourishment (POU) is measured by the percentage of households who are unable to meet their daily calorie requirement.

¹ See, also, Subramanian (2005) for an analytical critique of the methodology generally adopted in India for calculating poverty.

² See Coondoo, Lancaster, Majumder and Ray (2005).

This paper is a contribution to the recent literature on Food security and calorie intake in India during the reforms period [for example, Suryanarayan (1997), Meenakshi and Vishwanathan (2003), Radhakrishna (2005), Rao, N. (2005), Rao, C.H.H. (2005), Chand (2005), Ray and Lancaster (2005)].³ Apart from extending the recent evidence to the new millennium by considering the 57th round (2001/2) of the National Sample Survey, this study has the following features. It presents the magnitude and trend in the quantities and expenditure shares of the principal items of Food consumption, works out the corresponding calorie intake and calorie shares of the Food items, and then calculates the magnitude of under nourishment during the reforms period. The study pays special attention to the calorie intake of two minority groups, namely, female headed households and the backward classes. Evidence is presented on the role of the public distribution system (PDS) in providing cheap calories to the household, especially those belonging to these minority groups. This is a topic of some policy importance in the Indian context in view of recent discussions on the effectiveness of the PDS as an anti hunger strategy, and the efforts to target the PDS exclusively at households “below the poverty line” (BPL). The results of this study suggest that such a strategy may be counter productive since a lot of households that are “above the poverty line” (APL), especially in the rural areas, suffer from under nourishment. Such APL households are missing out on the provision of subsidised Rice and Wheat, via the PDS, because they are now outside the purview of this system.

The rest of this paper is organised as follows. Section 2 describes the data sets and reports the State wise changes in the per capita consumption of the principal Food items and of the composition of Food expenditure between 1987/88 and 2001/2. This section also presents evidence on how the unit values paid for the principal Food items have increased over this period. Section 3 analyses the nutritional implications of the changes in the Food

³ See Shah (1983) for earlier evidence (1967/68) on food consumption and undernourishment in the State of Kerala in South India.

expenditure pattern, presents the calorie share of each Food item in the household's total intake of calories and reports the movement in these calorie shares in India over the sample period. This section also reports on the inflation in the unit value of calorie intake from the various Food items during the '90s. The importance of the PDS in providing subsidised calories in India is examined in Section 4 with special reference to the female headed households and the backward classes. Section 5 presents and discusses the State wise changes in the magnitude of under nourishment between 1987/88 and 2001/2. Section 6 concludes the paper.

2. Changes in Indian Food Consumption

The data sets used in our analysis are from the 43rd (July, 1987 – June 1988), 55th (July, 1999 – June, 2000) and 57th (July, 2001 – June, 2002) rounds of the National Sample Survey (NSS) in India. The 55th round data provides information, at the household level, on calorie intake. These, in conjunction with the conversion factors of Indian foods provided in Gopalan, et.al. (1999), were used to calculate calorie consumption figures in the other rounds. In the present study, we have overlooked the distinction between the “availability” and the actual “intake” of calories, in the absence of necessary information. Another potential complication that we have overlooked is the possible non comparability between the 30 day food expenditure figures in NSS round 55 with those in the other rounds because of the inclusion of questions on the seven-day recall figures on food expenditure in the same questionnaire [Sen (2000)].

Tables 1, 2 report the State wise changes in the per capita consumption (kgs.) of the principal Food items between 1987/88 (Round 43) and 2001/2 (Round 57) in the rural, urban areas respectively. The following features are worth noting. First, Cereals consumption is generally much higher in the rural areas than in the urban, mainly due to the higher

consumption of Rice by the rural household. The reverse is the case for Meat/Fish/Eggs and Fruits/Vegetables. Second, there has been a marked decline in the consumption of all the Cereal items over the period, 1987/88 – 2001/2 in nearly all the States and in both rural and urban areas, with the reduction being particularly sharp in case of the smaller Cereal items, namely, barley, maize and cereal substitutes such as tapioca. Third, there has been a switch in preferences towards non Cereal items such as Meat/Fish and Fruits/Vegetables and, once again, this picture holds generally.

These features are confirmed in Table 3 which presents the All India average values of both the (monthly) Food consumption quantities and the Food expenditure shares at the beginning (1987/88) and end (2001/2) of our sample period. The Engel Food share in total expenditure, also, registered a sharp decline over this period, especially in the urban areas. It is interesting to note that the rural Food share in total expenditure in 2002 fell below that prevailing in the urban areas in 1988. While some, such as Rao, C.H. (2005), have interpreted these movements as evidence of urbanisation and increased household affluence, others such as Mehta and Venkatraman (2000), have argued that such changes have been involuntary reflecting the loss in access to common property resources by the rural poor. Whatever the underlying factors causing these changes, these have led to significant declines in calorie consumption, as we report later, due to the switch from calorie intensive cereal items to non Cereals which are more expensive sources of calories.

A partial explanation for the switch in food spending from Cereals to non Cereal items, especially, Meat, Fish and Eggs, is provided by Tables 4 and 5 which show how the Food prices have moved during this period by reporting, at median purchase levels, the State wise unit value index of the Food items in 2001/2002 with 1987/88 adopted as the base year. It is clear that there has been a differential inflation in the unit values, in both rural and urban areas, with Cereals and Pulses registering large increases and oils, meat, fish and eggs

recording smaller unit value inflation. The above average increases in the unit values of the Cereal items, partly, reflect the shift in household purchases from inferior to superior quality cereals. However, they also reflect the artificially high levels at which the minimum support prices of Rice and Wheat were set, with consequent inflationary effect on Cereal prices vis-à-vis that of the non Cereal items. The latter, being outside the PDS, were not subject to similar upward pressure on their unit values. Incidentally, besides the substitution effect due to increase in the relative prices of Cereal items, the switch from Cereals to non Cereals could, also, be explained by the much larger values of the expenditure elasticities of the latter items.

3. Calorie Share of Items and Item Wise Calorie Price Inflation

The switch in Food spending throughout the 1990s from Cereals, which are a source of cheap calories, to more expensive calorie sources such as Meat, Fish and Eggs and Fruits/Vegetables, resulted in a decline in calorie intake as documented in, for example, Ray and Lancaster (2005), Rao, C.H. (2005). While the previous section reported the decline in Cereal consumption in both absolute quantities and in terms of expenditure share over the period, 1987/88 – 2001/2, this raises the question: how did the composition of the household's total calorie intake between the various items change during this period? The answer is provided by Table 6 which reports, at the All India level, the temporal movement in the calorie shares during this period. The sharp decline in Cereals consumption, evident in the earlier discussion, did not translate into declines of similar magnitude in case of the calorie shares of Rice and Wheat. In fact, the calorie shares of Rice in the rural areas registered an increase, especially between NSS rounds 55 (1999/2000) and 57 (2001/2), when it jumped from 39.5% to 43.0%. In contrast, the calorie share of the composite item, called "Other Cereals", consisting of the smaller cereal items such as barley, maize and tapioca, recorded larger declines over this period. Another feature worth noting is that, notwithstanding the

sharp rise in the consumption of Meat, Fish & Eggs during the 1990s, the calorie share of this composite item remained virtually unchanged around an insignificant 1%. There has been a modest increase in the calorie share of Fruits and Vegetables which, from the nutritional viewpoint, strongly dominated Meat, Fish & Eggs in importance. Moreover, by 2002, Fruits and Vegetables, surpassed the smaller cereal items and pulses in terms of calorie share in both rural and urban areas. A comparison of the calorie shares in Table 6 with the expenditure shares in Table 3, also, shows that Cereals, as a whole, is far more calorie important in the Indian diet than is revealed by the expenditure share figures. The calorie importance of Cereals (as a whole) fell only marginally during the reforms period and that too due to the marked decline in the calorie share of the smaller cereal items. In both rural and urban areas, the PDS items, Rice and Wheat, together, continued to supply well over 50% of the household's total calorie intake.

Further insight into the nutritional importance of the various Food items is provided in Table 7 which reports their calorie shares by the three expenditure percentile groups, namely, the bottom 30%, middle 40% and the top 30% of households in the per capita expenditure distribution. The calorie share of Rice goes down with increasing affluence in both rural and urban areas but, in the case of Wheat, this is so only in the urban areas, not in the rural. Consistent with the expenditure shares presented earlier, Rice contributes a greater share of calories in the rural areas than in the urban, but the reverse is the case for Wheat. Note, incidentally, that the calorie content of the Indian food diet is spread more evenly between Rice and Wheat in the urban areas than in the rural, suggesting a greater diversification in the dietary pattern of the urban household, both within and beyond Cereals. Note, also, that the relative insignificance of Meat, Fish and Eggs in the calorie content, that was noted earlier, holds for all the three expenditure percentiles and that, in comparison, Fruits and Vegetables are of much greater importance in the Indian diet.

Tables 8, 9 contain evidence on the calorie price inflation over the period, 1987/88 – 2001/2, by reporting for rural and urban areas, respectively, the unit value index of calorie intake, via the various Food items, in Round 57 (2001/2), with Round 43 (1987/88) set as the base year. The calorie price inflation is a product of various factors, most notably, Food price inflation and changes in Food expenditure pattern. A comparison of the calorie price inflation figures in Tables 8, 9 with the corresponding Food inflation figures, presented in Tables 4, 5, is of interest. The All India figures show that, for several items, most notably, Rice, Wheat, Other Cereals and Meat, Fish & Eggs, the calorie price inflation has generally, though not always, been of higher order than that suggested by their unit value inflation figures. The difference is particularly marked in the case of Meat, Fish and Eggs, which witnessed one of the least inflationary movements in its unit quantity value (see Tables 4, 5) but experienced one of the highest increases in its unit calorie value (Tables 8, 9). There are some interesting regional differences in the calorie price inflation with the urban areas generally recording larger increases than the rural, consistent with the evidence on unit quantity values presented earlier.

4. Role of the Public Distribution System (PDS) in Providing Cheap Calories

The role of the PDS has figured prominently in discussions on the economic reforms undertaken in India in the 1990s. Table 10 provides some evidence on this issue by reporting the share of the household's intake of calories that is contributed by the PDS. The calculations were performed not only State wise and for all households but, also, separately for the female headed households and the backward classes. These tables show that the importance of the PDS in supplying inexpensive calories to the household varies sharply between the constituent states of the Indian Union. For example, a much larger share of the total calorie intake is supplied through the PDS in the southern States, especially Kerala and

Tamil Nadu, than in the northern States such as Punjab, Rajasthan, Haryana and Bihar.⁴ This is partly due to the caste based discrimination and exclusion prevailing in the northern states that allow the backward classes very limited access to the PDS. As Thorat and Lee (2005) have observed recently, such discrimination is much less acute in the southern States due to greater Dalit participation in the operation of the PDS in States such as Andhra Pradesh. Another feature that is apparent from these tables and, consistent with the previous observation, is that, in the calorie poor states though not everywhere, the female headed households and the backward classes obtain a greater share of their total calories from their PDS food rations than the rest of the population. Since these minority groups are more poverty prone than the others [see, for example, Meenakshi and Ray (2002), Ray and Lancaster (2005)], this feature needs to be kept in mind in the ongoing debate on the future of the PDS. A comparison of the calorie shares of the PDS items between NSS rounds 50 (1993/94) and 55 (1999/2000) reported in Table 10 shows that, notwithstanding the market driven agenda of economic reforms and the sharp rise in the issue prices of Rice and Wheat [see Rao, C.H. (2005, p. 190)], there is not much evidence of any significant decline in the importance of PDS in supplying calories to the household especially at the All India level.

Further evidence on the importance of PDS and other factors in the household's calorie intake is provided in Table 11 which reports the results of the OLS regression of the household's per capita consumption of cereals (in logarithmic form) on a selection of determinants using the data from rural Kerala in the 57th round (2001/2) of the National Sample Survey. Kerala, which had been the subject of a similar study by Shah (1983), is a particularly interesting case because while it leads the country in literacy rate and life expectancy at birth, this State also had the widest extent of poverty [see Dandekar and Rath (1971)]. Moreover, as Swaminathan and Ramachandran (1999), Ray and Lancaster (2004)

⁴ See Dreze and Sen (1995, Appendix Table A3) for similar evidence for the earlier, pre reform year 1986/87.

have found, while Kerala had one of the lowest levels of calorie intake and suffered from high calorie deprivation, this state also exhibited the largest increase in calorie consumption over the period, 1983-84 to 1999 – 2000.

The OLS regression results, which were found to be free of heteroskedastic errors and reported in Table 11, show that households which did not have access to the PDS experienced lower per capita calorie intake than those which did, though the PDS effect is only weakly significant. Since, as Thorat and Lee (2005) have recently observed⁵, households in the north Indian states have much less access to the PDS because of caste related discrimination, one should detect much stronger PDS effects on calorie intake in the north than in southern states such as Kerala and Andhra Pradesh where the PDS reaches much more widely. The statistical significance and negative sign of the estimated expenditure class dummy coefficients shows that households in the bottom 30% and the middle 40% of the per capita expenditure distribution have sharply lower calorie intake levels than those in the top 30%. While membership of a backward class does not have any impact on the household's calorie intake, the gender of the household head does have a statistically significant effect (at 5%). Female headed households, who are mostly widows in the Indian context, experience higher per capita calorie intake levels than the male headed households reflecting, both, the higher calorie intensity of the Indian widow's diet⁶ and the smaller sized household that she typically belongs to. The unit quantity values of several Food items have significant impact on calorie consumption, though not all of them in the same direction. Of the major calorie sources, only wheat displays the predictable negative impact of unit value inflation on calorie consumption.

⁵ Thorat and Lee (2005)'s observation is consistent with the results reported in Table 10 which confirm the greater importance of the PDS, from the calorie viewpoint, in the south vis-a-vis the north.

⁶ For cultural and religious reasons, the Indian widow does not, usually, consume non vegetarian items such as Meat, Fish and Eggs. Her diet consists largely of the calorie rich cereal items and Fruits and Vegetables.

The changing nature of the household diet in India, via changes in the calorie share of the principal Food items (vis-à-vis the omitted item, Beverages), has strong effects on calorie intake. Contrast this with the insignificance of the impact of calorie share of Cereals on calorie intake, observed by Shah (1983) for rural Kerala (though not for urban Kerala) on ORG data from the 1960s. Note, also, the strong and negative impact of inflation in the unit value of the non-vegetarian items, Meat, Fish and Eggs, on the household's per capita calorie intake. As households, with rising affluence, switch to superior qualities of these items leading to a rise in their unit values, this tends to have an adverse impact on calorie intake. In contrast, the purchase of superior quality Rice has a positive, though less statistically significant, effect on calorie consumption.

5. Changes in Prevalence of Under Nutrition Over the 1990s

The Indian poverty lines for rural and urban population are based on calorie norms of 2400 and 2100 k cal per capita per day, respectively. The age-sex specific daily calorie requirements, corresponding to the overall rural calorie norm, are available from the website www.Medindia.net. These estimates are close to, though not exactly the same as, the energy allowances recommended by an Expert Group of the Indian Council of Medical Research [see ICMR (2002)]. The corresponding urban figures can be obtained by scaling down these numbers by a factor, 0.875 (being the ratio of 2100 and 2400). A household is classified as (calorie) poor (non poor) if its observed calorie intake turns out to be less (more) than the required amount. The prevalence of under nutrition (POU) is, then, measured as the percentage of households who are unable to meet their daily calorie requirement.

The estimates of POU in rural and urban India in NSS rounds 55 (1999/2000) and 57 (2001/2) are presented in Tables 12, 13 respectively. These estimates are much higher than the expenditure based poverty magnitudes using the official poverty line [see Ray and

Lancaster (2005)]. Many argue that the POU and the expenditure based poverty estimates are not directly comparable, since while the former measures “hunger”, the latter measures the failure to buy a minimum bundle of items, both Food and non Food, necessary for survival. The POU measure has been used extensively by the FAO in world wide calculations of hunger [FAO (1992)]⁷ and in the case of individual countries and regions [Harriss (1990)].⁸

Tables 12, 13 suggest that in India over the short period, 1999/2000 – 2001/2, there has been rising hunger, i.e. increasing failure to meet the calorie requirement at the household level. This upward trend is a continuation of that observed between NSS rounds 43 (1987/88) and round 55 (1999/2000), reported in Coondoo, Lancaster, Majumder and Ray (2005). Tables 12, 13 show that the increase in hunger, especially in the rural countryside, has accelerated in recent years. For example, at the All India level, the rural POU rate increased from 57.66% in 1999/2000 to 66.90% in 2001/2. Such a large increase in a relatively short time period is particularly significant in the face of suggestions [e.g. Rao, C.H.H. (2005)] that the minimum calorie requirement has gone down because of increased mechanisation, better rural infrastructure, etc. It is unlikely that the minimum calorie requirement has gone down so sharply in this 2-year period to render the large increase in hunger insignificant. Tables 12, 13, also reveal sharp differences between States on changes to the POU with states such as (rural) Assam and (rural) Bihar improving their state of under nourishment, while Orissa and Andhra Pradesh have fared badly in both rural and urban areas. Consistent with previous evidence, the rural POU exceeds its urban counterpart, largely reflecting the higher calorie requirements in the countryside due to the nature of work done in the rural areas.

There has been, principally, two criticisms made of the use of the calorie based POU measures. The first, just noted, is based on the belief that the calorie requirements have come down over the years. The second criticism made by, for example, Svedberg (2000), is that the

⁷ See Svedberg (2000) for a critique of the FAO method of measuring under nutrition.

⁸ See, also, the articles in the volume edited by Osmani (1992).

POU estimates used in these FAO type exercises are wildly sensitive to the a-priori specified minimum calorie requirements. The first type of criticism does not have much operational significance since, to my knowledge, no serious physiological study exists, at least in the Indian context, that seeks to scientifically quantify and revise the calorie requirements over time. To examine the second criticism, we perform a sensitivity exercise by repeating the calculations at 80% of the original calorie requirements. This was done for all the major States in each of ten decile groups of households arranged in increasing order of affluence in the expenditure distribution. Tables 14, 15 present the POU estimates for households in the rural and urban areas, respectively, at the bottom (0-10%) and top (90-100%) deciles of the expenditure distribution, using two different vectors of age and gender specific calorie requirements. There is some support to Svedberg (2000)'s point about the high sensitivity of the POU estimates though such variation, also, reflects differences between the magnitude of mild and severe under nutrition. The rural POU exceeds the urban POU almost everywhere. Another feature worth noting is the significant number of households, even in the top expenditure decile, who are unable to meet their daily calorie requirement. For example, in the rural areas, West Bengal, Orissa and Andhra Pradesh stand out for their high POU in the top expenditure decile group, even when the calorie requirement is reduced to 80% of the original values. The obvious policy significance of this result is that, in restricting access to it to only the households that are "below the poverty line" (BPL), the PDS may be missing out several undernourished households that are above the poverty line (APL). Given the positive role that PDS can play in enhancing calorie intake, that our regression estimates confirmed earlier [see Table 11], by providing subsidised Rice and Wheat through the "fair price" shops, there is clearly room for designing a more effective targeting strategy for the PDS than simply restricting it to BPL households, and missing out on APL households altogether. A similar comment applies to the mid day meal scheme for school children that is operational in

several parts of India and is a useful tool for enhancing the nutrient intake of children in under nourished households.

6. Concluding Remarks

This study examines the changes in the nature of household spending on Food in India over a time period that stretches from the late 1980s to the early part of the new millennium. This includes the time interval that witnessed widespread economic reforms in India. This study, which is based on the information on unit quantity and unit value of the principal Food items, at household level, was performed both at state and All India levels and, separately, for rural and urban areas. Special attention was paid to the minority groups, namely, female headed households (who are, typically, widows in the Indian context) and the backward classes.

The exercise documents the decline in cereal consumption, especially in the rural areas, with the decline being particularly marked in case of non cereal items such as barley, maize and cereal substitutes such as tapioca. Since cereals is an inexpensive calorie source, this switch (forced or not) in consumer preferences towards more expensive calorie sources such as Vegetables and Fruits resulted in the calorie price inflation generally exceeding that revealed by the inflation in the unit quantity values or more significantly the commodity price based official inflation figures.

The reforms decade of the 1990s saw an increase in the percentage of households who were unable to meet their daily calorie requirement. The present results suggest a sharp increase in the prevalence of under nourishment (POU) towards the end of our chosen time period. The All India picture hides regional differences in regard to several key consumption and welfare indicators, both between States and between rural and urban areas. The investigation showed that, even in the top expenditure decile, several households suffered from under nourishment. In the rural areas of Orissa and Andhra Pradesh, for example, an

unacceptably large POU exists even when we lower the calorie requirement by as much as 20% of the original calorie norms recommended by the Indian Council of Medical Research.

The last result points to the inadequacy of conventional expenditure based poverty measures in developmental discussions since, when a household crosses the “official poverty line”, it ceases to be of interest to the policy makers, even though such a household may continue to suffer from under nourishment. This is of some policy significance in India in view of the recent discussions on restricting the PDS to households below the official poverty line (BPL). The results of this study call for a better targeting strategy than simply restricting it to BPL households, and, thereby, missing out on all under nourished APL households. The significance of this implication is heightened by the finding that the PDS does play a prominent role in enhancing calorie intake and reducing hunger. The fact that the backward classes rely more on the PDS than the others provides further ground for the belief that, by simply restricting it to BPL households, the PDS may be losing its effectiveness in providing Food and nutrition security.

The results of this study, also, suggest that, especially in a period of economic reforms, pro-active government interventions need to be made to stem the rise in the relative price of cereals vis-à-vis non cereals. Such an increase, caused partly by the large increases in the issue prices of the PDS items, Rice and Wheat, may have contributed to the shift in household’s spending from these cheap sources of calories. As this study finds, the expenditure based figures of cereal shares in the household budget understate the true importance of the cereal items in the household’s overall calorie consumption. Moreover, the sharp decline in the expenditure based share of cereals in the reforms decade in India did not translate into declines of similar magnitude in the calorie shares of cereals. Notwithstanding the significant shift in preferences towards non cereal items such as Meat, Fish and Eggs, and Fruits and Vegetables, the PDS items, Rice and Wheat, continue to supply over 50% of the

household's total calorie intake in the new millennium. The calorie share of cereals increases sharply as one considers households at the lower end of the expenditure distribution.

The results of this study raise issues in important areas such as Food and nutrition security that extend beyond the immediate context of India. The results point to the importance of going beyond the standard expenditure based money metric measures of consumption and poverty in assessing household welfare movements in a period of significant political and economic changes. The study, also, demonstrates the usefulness of the unit value information in household surveys that is now increasingly available. Several other developing countries, such as Indonesia and Vietnam, which have experienced significant political and economic changes during the 1990s including the Asian economic downturn, have high quality unit value information in their household surveys similar to the NSS data sets used here. It would be useful to follow up the present investigation on such data sets from other countries for welfare assessment before commenting on the generality of the present results for the developmental experience as a whole in the concluding decade of the previous millennium.

Table 1: Per Capita Food Consumption^(a) (kg./30 days) in Rural Areas

State	Food Items																							
	Rice		Wheat		Other Cereals ^(b)		Pulses		Dairy		Edible Oils		Meat/Fish/Eggs		Vegetables/Fruits		Sugar/Spices		Processed Food		Beverages		Total Cereals	
	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002
Andhra Pradesh	11.8	11.2	0.1	0.2	2.3	0.9	0.8	0.7	2.5	3.7	0.4	0.5	1.7	2.3	6.2	9.0	1.4	1.3	1.1	2.1	2.3	8.0	14.3	12.3
Assam	13.7	12.7	0.9	0.7	0.0	0.0	0.8	0.7	1.5	1.7	0.3	0.5	1.9	2.8	10.0	13.0	1.2	1.1	0.7	1.1	2.8	3.2	14.5	13.3
Bihar	9.1	7.9	5.6	6.1	1.1	0.5	1.1	0.7	1.7	2.4	0.3	0.4	0.5	0.7	6.7	9.7	1.0	0.9	0.3	0.8	0.9	3.2	15.8	14.5
Gujarat	2.0	2.1	4.8	4.1	5.6	3.5	1.0	0.9	4.7	6.1	0.7	1.0	0.3	0.4	6.2	9.4	1.9	1.8	0.3	1.3	1.4	2.5	12.4	9.7
Haryana	0.8	0.7	13.5	8.8	0.5	0.3	0.9	0.6	12.6	12.8	0.3	0.4	0.3	0.1	7.0	10.7	2.5	1.9	0.3	3.0	2.9	4.2	14.8	9.8
Himachal Pradesh	4.3	4.8	7.3	5.9	4.5	1.9	1.6	1.4	8.5	8.9	0.6	0.7	0.6	0.8	6.1	8.8	1.9	1.8	0.2	1.7	2.5	4.6	16.1	12.5
Karnataka	5.3	5.7	0.8	1.1	7.9	4.5	1.0	0.9	2.9	3.3	0.3	0.5	0.9	1.8	7.3	10.1	1.8	1.5	0.8	1.2	4.1	7.7	14.0	11.2
Kerala	9.9	8.6	0.6	0.9	2.0	1.0	0.5	0.5	2.4	3.2	0.3	0.5	3.4	4.8	11.5	15.5	1.6	1.6	0.3	2.7	9.7	7.9	12.5	10.5
Madhya Pradesh	6.9	2.9	5.9	6.8	2.9	1.7	1.3	0.9	2.4	3.6	0.3	0.5	0.3	0.3	5.6	7.1	1.5	1.3	0.3	1.1	1.2	2.5	15.7	11.3
Maharashtra	3.0	3.6	2.4	3.0	7.7	4.5	1.2	1.1	2.5	2.8	0.5	0.7	1.0	1.5	6.2	9.9	1.7	1.7	0.3	4.6	2.4	3.2	13.2	11.1
Orissa	14.7	13.3	0.6	0.4	0.9	0.5	0.5	0.5	0.8	0.6	0.2	0.3	0.5	0.8	6.8	7.8	1.1	0.9	0.3	2.7	0.5	1.6	16.1	14.3
Punjab	0.8	0.9	11.2	9.2	0.4	0.3	1.1	0.8	13.6	11.8	0.5	0.7	0.8	0.6	8.4	9.3	3.0	2.3	0.2	0.8	3.9	2.7	12.4	10.3
Rajasthan	0.2	0.2	12.5	8.2	4.4	4.4	0.7	0.6	7.2	10.7	0.4	0.5	0.2	0.5	4.0	6.8	2.2	1.8	0.2	1.0	2.1	2.1	17.0	12.8
Tamil Nadu	10.1	10.0	0.2	0.3	2.5	0.4	0.8	0.8	1.6	2.1	0.3	0.5	1.1	2.3	6.7	9.7	1.5	1.3	0.9	1.8	4.4	11.7	12.9	10.7
Uttar Pradesh	3.9	3.8	10.7	8.4	1.0	0.4	1.3	0.9	4.5	4.4	0.4	0.5	0.4	0.6	7.7	8.6	1.7	1.3	0.2	1.6	0.9	2.3	15.6	12.7
West Bengal	13.6	12.0	1.5	1.1	0.0	0.0	0.5	0.5	1.4	1.8	0.3	0.5	1.9	3.9	8.5	11.3	1.1	1.1	0.3	2.6	1.7	4.7	15.1	13.1

(a) Source: Own Calculations Based on NSS Rounds 43,57.

(b) Other Cereals consists of smaller cereal items such as barley, maize and cereal substitutes (e.g. tapioca).

Table 2: Per Capita Food Consumption^(a) (kg./30 days) in Urban Areas

State	Food Items																							
	Rice		Wheat		Other Cereals ^(b)		Pulses		Dairy		Edible Oils		Meat/Fish/Eggs		Vegetables/Fruits		Sugar/Spices		Processed Food		Beverages		Total Cereals	
	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002	1988	2002
Andhra Pradesh	10.3	9.2	0.7	0.8	0.5	0.3	0.9	0.8	3.9	4.1	0.5	0.6	2.5	2.9	10.0	12.8	1.5	1.3	2.0	3.3	5.9	12.6	11.5	10.2
Assam	10.5	9.4	1.3	1.4	0.0	0.0	1.1	0.8	2.1	1.8	0.5	0.7	3.0	3.7	12.3	13.8	1.3	1.1	0.4	6.8	6.4	16.0	11.9	10.8
Bihar	7.7	5.8	5.8	6.0	0.2	0.0	1.2	0.9	2.5	3.9	0.4	0.6	1.1	1.6	10.0	14.3	1.2	1.1	0.2	3.4	2.7	10.4	13.7	11.8
Gujarat	2.3	1.8	5.7	4.9	1.6	1.2	1.2	0.9	6.2	7.5	1.0	1.1	0.7	0.8	8.9	11.3	1.8	1.6	0.2	3.0	3.5	7.9	5.2	7.9
Haryana	6.8	1.0	10.1	7.9	0.1	0.0	1.1	0.7	8.7	9.3	0.6	0.7	1.4	2.9	12.6	15.3	1.9	1.9	0.3	1.8	8.5	6.2	17.0	8.9
Himachal Pradesh	3.8	3.5	6.2	5.7	0.4	0.2	1.6	1.2	7.7	8.8	0.6	0.7	2.3	1.9	13.6	11.7	1.8	1.5	0.3	9.2	6.3	13.8	10.3	9.4
Karnataka	5.6	5.1	1.4	1.8	3.1	2.2	1.0	1.0	3.9	5.1	0.4	0.6	1.7	2.2	9.7	14.1	1.6	1.5	2.3	4.4	6.2	11.5	10.1	9.0
Kerala	7.9	7.2	0.9	1.0	0.6	0.4	0.6	0.6	3.5	4.2	0.4	0.5	4.9	5.3	14.1	16.5	1.6	1.6	0.2	9.5	9.7	13.4	9.4	8.6
Madhya Pradesh	3.9	2.3	7.3	7.5	0.5	0.2	1.4	0.9	4.5	4.8	0.6	0.7	1.3	1.0	10.6	10.5	1.8	1.6	0.3	1.8	5.9	6.9	11.7	10.0
Maharashtra	2.9	3.2	4.3	4.0	2.4	1.2	1.2	1.0	4.8	5.3	0.7	0.9	2.4	2.4	13.4	14.2	1.7	1.5	0.7	5.1	6.6	12.9	9.6	8.4
Orissa	10.6	10.2	2.3	2.1	0.1	0.0	0.8	0.8	2.3	2.7	0.4	0.5	1.8	2.2	11.5	15.3	1.5	1.2	0.4	4.1	3.4	8.0	13.0	12.4
Punjab	1.2	1.3	8.7	7.8	0.1	0.0	1.2	0.9	10.1	10.6	0.7	0.7	1.3	2.2	12.5	13.0	2.3	2.0	0.3	4.9	8.6	13.0	10.0	9.1
Rajasthan	0.6	0.6	11.4	9.2	0.8	0.9	0.9	0.7	7.3	7.7	0.6	0.7	0.7	1.0	9.9	11.3	2.1	1.6	0.2	2.0	6.4	6.5	12.7	10.7
Tamil Nadu	8.9	8.1	0.7	0.6	0.2	0.1	0.9	0.9	3.3	4.0	0.4	0.5	2.9	3.7	11.2	12.5	1.6	1.4	1.7	5.5	6.6	12.5	9.8	8.8
Uttar Pradesh	2.5	2.5	8.9	7.3	0.1	0.1	1.2	0.9	5.3	5.9	0.5	0.6	1.0	1.5	13.0	13.4	1.7	1.4	0.4	2.2	4.4	7.0	11.5	9.9
West Bengal	8.3	7.3	2.9	2.4	0.0	0.0	0.7	0.6	2.8	2.9	0.5	0.7	3.3	5.0	11.9	16.6	1.2	1.1	0.7	8.0	5.5	15.3	11.3	9.7

(a) Source: Own Calculations Based on NSS Rounds 43,57.

(b) Other Cereals consists of smaller cereal items such as barley, maize and cereal substitutes (e.g. tapioca).

Table 3: All-India Mean Consumption and Expenditure Shares

Food Items	Urban			Rural		
	1988	2002	Change	1988	2002	Change
	(Round 43)	(Round 57)	(%)	(Round 43)	(Round 57)	(%)
<i>Consumption/Capita (kg/30 days)</i>						
Rice	5.65	4.85	-14.2	7.35	6.79	-7.7
Wheat	4.57	4.03	-11.70	4.80	4.05	-15.7
Cereals Nes	0.83	0.56	-32.5	2.59	1.38	-46.8
Total Cereals	11.05	9.44	-14.5	14.75	12.21	-17.2
Pulses	1.06	0.86	-18.8	0.97	0.77	-20.9
Dairy	4.52	5.25	16.2	3.34	3.94	17.9
Edible Oils	0.56	0.69	23.6	0.35	0.51	45.4
Meat/Fish/Eggs	2.01	2.49	23.8	0.91	1.50	65.6
Veg/Fruit	11.46	13.44	17.3	6.99	9.48	35.6
Sugar/Spices	1.63	1.46	-10.4	1.53	1.34	-12.7
<i>Share of Total Food Expenditure (%)</i>						
Rice	16.33	14.06	-13.9	24.97	21.32	-14.6
Wheat	9.07	8.70	-4.1	10.99	9.58	-12.8
Other Cereals	1.80	1.18	-34.4	5.87	2.83	-51.7
Total Cereals	27.20	23.94	-12.0	41.82	33.74	-19.3
Pulses	6.16	5.66	-8.1	6.48	6.31	-2.6
Dairy	13.23	15.71	18.7	9.87	12.02	21.8
Edible Oils	8.65	6.55	-24.4	7.41	6.53	-11.9
Meat/Fish/Eggs	5.37	5.58	4.0	4.27	5.34	25.1
Veg/Fruit	12.29	15.03	22.3	10.32	14.56	41.1
Sugar/Spices	8.12	7.44	-8.4	8.73	8.36	-4.2
Processed Food	13.59	13.49	-0.7	8.28	9.31	12.5
Beverages	5.38	6.61	22.8	2.83	3.83	35.5
<i>Share of Total Expenditure (%)</i>						
All Food	66.1	50.0	-24.4	72	60.9	-16.1

Source: Own calculations based on NSS Rounds 43, 57.

**Table 4: Unit Value Index of Food Items (Round 43, 1987/1988 = 1.0) in Round 57 (2001/2002)
in Rural Areas Based on Median Purchase^(a)**

State	<i>Rice</i>	<i>Wheat</i>	<i>Other Cereals</i>	<i>Pulses</i>	<i>Dairy</i>	<i>Oils</i>	<i>Meat/Eggs</i>	<i>Veg/Fruit</i>	<i>Sugar/Spices</i>	<i>Processed Food</i>	<i>Beverages</i>
Andhra Pradesh	3.18	3.13	3.00	3.08	3.33	1.88	1.56	2.01	2.89	1.93	2.02
Assam	2.67	3.33	6.00	3.84	3.01	1.62	1.74	2.91	2.95	1.72	2.10
Bihar	2.18	2.50	2.00	3.78	2.67	1.43	3.20	2.78	3.16	1.67	0.10
Gujarat	3.24	3.20	2.99	3.18	3.00	2.09	1.56	2.60	2.88	1.90	3.00
Haryana	3.00	3.00	2.00	3.79	3.00	1.44	8.67	2.65	2.96	2.06	3.50
Himachal Pradesh	2.86	3.23	3.00	4.01	3.00	1.69	2.50	2.82	2.96	1.42	0.22
Jammu & Kashmir	3.27	3.20	3.50	3.62	2.52	1.54	3.01	2.73	3.15	0.89	1.07
Karnataka	2.86	3.28	2.88	3.24	3.20	1.67	1.05	1.88	2.73	2.54	2.48
Kerala	3.18	3.88	3.33	3.52	3.11	1.69	2.12	1.90	2.90	0.79	4.91
Madhya Pradesh	2.75	2.42	2.73	3.37	2.50	1.33	2.29	2.51	2.98	2.00	2.50
Maharashtra	3.11	2.91	3.27	3.23	3.00	1.64	1.55	2.34	2.82	1.76	2.78
Orissa	2.18	3.56	2.50	3.38	2.50	1.43	3.33	3.12	3.32	1.66	3.00
Punjab	2.75	3.05	2.67	3.76	3.02	1.50	3.97	3.02	2.76	1.12	3.33
Rajasthan	2.80	2.92	2.00	3.89	2.50	1.34	3.33	2.77	2.80	2.29	3.00
Tamil Nadu	2.17	4.31	2.73	3.16	2.86	1.64	1.19	2.43	3.01	2.12	2.57
Uttar Pradesh	2.50	2.81	2.25	3.17	2.90	1.39	2.67	3.62	3.40	2.06	3.00
West Bengal	2.53	3.20	2.50	3.88	3.00	1.60	1.16	3.20	3.35	1.63	0.61
All India	2.56	2.80	2.75	3.47	2.92	1.60	1.71	2.72	3.03	1.75	0.67

^(a) R43 denotes Round 43 (1987/88), R57 denotes Round 57 (2001/2002).

Table 5: Unit Value Index of Food Items (Round 43, 1987/1988 = 1.0) in Round 57 (2000/2001) in Urban Areas Based on Median Purchase^(a)

State	Rice	Wheat	Other Cereals	Pulses	Dairy	Oils	Meat/Eggs	Veg/Fruit	Sugar/Spices	Processed Food	Beverages
Andhra Pradesh	3.69	3.35	3.41	2.92	3.00	1.85	2.19	2.51	2.87	2.08	2.89
Assam	2.88	3.45	4.00	3.69	2.68	1.76	2.12	2.57	2.99	0.70	2.35
Bihar	2.35	2.43	2.10	3.13	2.49	1.43	2.00	2.71	2.99	0.84	1.85
Gujarat	3.23	3.00	2.73	3.04	3.02	1.76	2.57	2.28	2.80	1.22	1.53
Haryana	2.89	2.80	2.86	3.79	3.20	1.44	2.69	2.73	2.57	1.04	13.96
Himachal Pradesh	3.25	3.00	2.80	3.87	3.03	1.61	3.46	2.95	2.94	0.57	2.19
Jammu & Kashmir	3.67	3.40	3.37	3.54	2.90	1.64	1.60	2.62	3.22	0.35	0.25
Karnataka	3.50	3.60	3.14	3.11	3.00	1.83	1.74	2.14	2.94	1.72	3.66
Kerala	3.28	4.71	3.33	3.64	2.60	1.79	2.71	2.14	3.02	0.32	4.47
Madhya Pradesh	3.00	2.82	3.67	3.04	2.73	1.27	1.48	2.66	2.69	1.10	3.47
Maharashtra	3.38	3.33	3.60	3.12	3.00	1.83	2.25	2.72	2.86	0.89	2.59
Orissa	2.31	3.50	2.40	2.81	2.80	1.43	1.51	2.67	3.11	0.66	0.12
Punjab	3.00	3.00	2.57	3.83	3.08	1.56	2.00	2.80	2.57	0.96	7.85
Rajasthan	2.97	2.87	2.00	3.75	2.72	1.36	0.68	2.39	2.79	1.51	35.00
Tamil Nadu	2.61	5.16	2.80	3.19	2.98	1.77	2.01	2.40	2.89	1.56	3.83
Uttar Pradesh	2.50	2.68	3.50	3.19	2.80	1.38	1.61	3.10	2.93	0.86	0.24
West Bengal	2.98	3.57	3.14	3.71	2.59	1.68	1.64	2.93	3.52	0.73	1.90
All India	3.00	3.25	3.20	3.23	2.79	1.602	1.80	2.64	2.88	1.07	3.00

^(a) R43 denotes Round 43 (1987/88), R57 denotes Round 57 (2001/2002).

Table 6: Changes in the Calorie Share (%) of Various Food Items between 1987/88 and 2001/2002

NSS Round	Rural Shares											
	<i>Rice</i>	<i>Wheat</i>	<i>Other Cereals</i>	<i>Pulses</i>	<i>Dairy</i>	<i>Edible Oils</i>	<i>Meat/Fish/Eggs</i>	<i>Veg/Fruit</i>	<i>Sugar/Spices</i>	<i>Processed Food</i>	<i>Beverages</i>	<i>Total Cereals</i>
Round 43 (1987/88)	38.0	22.40	12.90	4.6	5.0	4.4	0.7	4.0	5.8	2.0	0.1	73.32
Round 55 (1999/00)	39.53	21.82	6.99	4.41	6.38	6.52	0.85	5.91	5.97	1.45	0.17	68.34
Round 57 (2001/02)	42.98	18.04	7.07	4.03	6.48	7.27	1.02	5.73	5.87	1.31	0.20	68.09
Urban Shares												
Round 43 (1987/88)	31.4	24.0	4.6	5.4	7.5	7.6	1.0	5.7	7.2	5.2	0.3	60.08
Round 55 (1999/00)	30.12	23.40	2.35	5.15	9.38	9.35	1.20	7.26	7.15	4.22	0.41	55.88
Round 57 (2001/02)	29.42	25.59	2.59	4.80	9.37	9.92	1.13	6.94	6.87	3.03	0.36	57.60

Table 7: Calorie Share (%) of Various Food Items by Expenditure Class in 2001/2002

Rural											
<i>Expenditure Class</i>	<i>Rice</i>	<i>Wheat</i>	<i>Other Cereals</i>	<i>Pulses</i>	<i>Dairy</i>	<i>Edible Oils</i>	<i>Meat/Fish/Eggs</i>	<i>Veg/Fruit</i>	<i>Sugar/Spices</i>	<i>Processed Food</i>	<i>Beverages</i>
Bottom 30%	46.28	17.10	9.82	3.69	3.52	6.75	0.78	5.42	5.36	0.94	0.32
Middle 40%	43.22	18.14	6.18	4.07	6.21	7.48	1.04	5.90	5.97	1.54	0.25
Top 30%	35.84	18.03	3.97	4.53	9.83	8.42	1.31	6.85	6.80	4.11	0.31
Urban											
<i>Expenditure Class</i>	<i>Rice</i>	<i>Wheat</i>	<i>Other Cereal</i>	<i>Pulses</i>	<i>Dairy</i>	<i>Edible Oils</i>	<i>Meat/Fish/Eggs</i>	<i>Veg/Fruit</i>	<i>Sugar/Spices</i>	<i>Processed Food</i>	<i>Beverages</i>
Bottom 30%	33.03	27.48	4.19	4.17	5.41	8.77	0.91	6.89	6.29	1.95	0.91
Middle 40%	28.69	24.50	1.75	4.83	9.07	10.39	1.16	7.18	6.95	4.99	0.50
Top 30%	20.76	20.13	0.65	5.11	12.78	10.47	1.27	7.96	6.92	13.17	0.79

**Table 8: Calorie Price Index of Food Items (Round 43, 1987/88 = 1.0) in Round 57 (2001/2002)
in Rural Areas Based on Median Purchase**

State	Rice	Wheat	Other Cereals	Pulses	Dairy	Oils	Meat/Eggs/ Fish	Veg/Fruit	Sugar/Spices	Processed Food	Beverages
Andhra Pradesh	3.26	3.41	2.13	3.04	1.10	1.85	2.88	1.86	1.13	5.03	2.77
Assam	2.76	3.50	NA	3.73	2.57	1.58	3.10	2.13	1.33	1.64	3.06
Bihar	2.14	2.41	NA	3.56	2.32	1.43	2.81	1.33	1.01	4.16	2.64
Gujarat	3.19	2.87	3.04	3.11	2.69	2.06	3.32	3.47	0.98	3.32	2.91
Haryana	2.95	2.93	NA	3.70	3.05	1.44	3.58	2.52	1.17	4.28	2.60
Himachal Pradesh	2.70	3.22	NA	4.05	2.87	1.82	2.96	1.99	0.77	1.53	3.98
Karnataka	2.88	3.07	4.80	3.29	3.01	1.73	2.97	1.35	0.76	6.84	3.04
Kerala	3.00	4.02	4.73	3.53	2.39	1.58	3.21	2.07	1.36	6.73	3.92
Madhya Pradesh	2.77	2.70	4.48	3.32	1.53	1.35	2.82	1.56	0.79	4.63	2.98
Maharashtra	2.91	2.91	3.01	3.16	3.42	1.68	3.22	2.37	1.13	3.68	3.26
Orissa	2.16	3.53	3.46	2.92	2.93	1.49	3.60	0.91	0.67	7.03	2.86
Punjab	2.85	3.16	NA	3.67	3.30	1.45	2.88	2.15	0.99	4.37	4.07
Rajasthan	3.18	2.87	NA	3.85	1.61	1.43	3.06	0.84	0.38	4.43	3.16
Tamil Nadu	2.31	4.26	2.77	3.13	2.01	1.71	3.25	2.18	1.34	19.38	4.12
Uttar Pradesh	2.41	5.08	8.47	3.12	2.72	1.43	2.74	2.63	2.07	2.87	6.02
West Bengal	2.55	3.14	0.49	3.77	1.10	1.65	2.65	3.07	2.01	2.70	2.88
All India	2.84	3.74	2.14	3.60	2.13	1.66	3.05	1.92	1.20	4.29	3.56

**Table 9: Calorie Price Index of Food Items (Round 43, 1987/88 = 1.0) in Round 57 (2001/2002)
in Urban Areas Based on Median Purchase**

State	Rice	Wheat	Other Cereals	Pulses	Dairy	Oils	Meat/Eggs/ Fish	Veg/Fruit	Sugar/Spices	Processed Food	Beverages
Andhra Pradesh	3.55	3.55	14.00	2.89	2.03	1.87	3.02	2.26	1.18	8.34	3.54
Assam	2.80	3.39	NA	3.57	1.85	1.73	2.77	3.01	1.26	2.92	2.71
Bihar	2.35	2.57	NA	3.11	2.40	1.46	2.47	2.69	1.60	2.92	3.24
Gujarat	3.17	3.09	2.74	3.02	2.75	1.79	3.15	2.73	0.86	3.84	2.90
Haryana	3.02	2.86	NA	3.78	2.80	1.44	2.66	3.04	1.16	2.21	6.63
Himachal Pradesh	3.43	3.21	NA	3.86	2.60	1.62	3.15	3.25	1.28	1.57	3.82
Karnataka	3.57	3.61	3.69	3.06	2.55	1.97	2.94	2.26	1.19	18.30	3.94
Kerala	3.18	4.55	4.92	3.55	1.70	1.71	3.29	2.29	1.34	3.15	4.45
Madhya Pradesh	2.90	2.74	1.66	3.06	2.50	1.32	2.32	2.94	1.27	3.15	2.99
Maharashtra	3.33	3.26	1.94	3.08	3.01	1.82	2.97	2.96	1.22	3.48	3.41
Orissa	2.41	3.63	NA	2.81	1.52	1.53	2.63	2.42	1.29	3.86	3.81
Punjab	2.63	2.81	4.81	3.72	2.92	1.50	2.69	3.22	1.18	2.87	3.83
Rajasthan	2.71	2.86	NA	3.67	2.58	1.42	2.85	2.59	1.02	3.93	3.11
Tamil Nadu	2.58	4.89	2.46	3.11	2.22	1.86	2.83	2.80	1.36	8.93	5.22
Uttar Pradesh	2.67	2.71	7.56	3.14	2.62	1.42	2.51	3.09	1.62	2.64	4.42
West Bengal	2.94	3.71	NA	3.50	1.03	1.82	2.40	3.72	2.18	1.76	3.68
All India	3.04	3.45	2.61	3.29	2.23	1.72	2.85	2.90	1.36	4.01	3.85

Table 10: Calorie Share of PDS Items in Rural Households

State	All Households		Female Headed Households		SC/ST Households	
	NSS Round 50 (1993/94)	NSS Round 55 (1999/00)	NSS Round 50 (1993/94)	NSS Round 55 (1999/00)	NSS Round 50 (1993/94)	NSS Round 55 (1999/00)
Andhra Pradesh	0.177	0.153	0.251	0.191	0.207	0.184
Assam	0.051	0.058	0.076	0.089	0.037	0.058
Bihar	0.022	0.022	0.021	0.027	0.022	0.026
Gujarat	0.093	0.076	0.108	0.094	0.126	0.105
Haryana	0.025	0.019	0.022	0.018	0.022	0.027
Himachal Pradesh	0.143	0.140	0.126	0.118	0.143	0.165
Karnataka	0.084	0.111	0.123	0.158	0.104	0.141
Kerala	0.303	0.280	0.325	0.313	0.345	0.392
Madhya Pradesh	0.038	0.042	0.043	0.052	0.041	0.050
Maharashtra	0.070	0.085	0.092	0.125	0.075	0.094
Orissa	0.021	0.112	0.021	0.150	0.020	0.123
Punjab	0.018	0.014	0.018	0.012	0.023	0.017
Rajasthan	0.067	0.024	0.062	0.049	0.074	0.027
Tamil Nadu	0.157	0.242	0.199	0.292	0.170	0.280
Uttar Pradesh	0.027	0.026	0.047	0.052	0.030	0.030
West Bengal	0.028	0.035	0.031	0.037	0.028	0.038
All India	0.071	0.078	0.114	0.126	0.067	0.083

**Table 11: OLS Regression Estimates of Log of Per Capita Calorie Consumption
(Dependent Variable) in Rural Kerala**

Explanatory Variable	Estimated Co-efficient ^(a)
Caste dummy	.008 (.026)
No access to PDS dummy	-.041 (.025)
Male headed household dummy	-.064 ^(b) (.026)
Religion dummy (1, if Hindu or Muslin, 0, otherwise)	.024 (.028)
No. of adults	-.00006 (.007)
No. of children	-.046 ^(c) (.009)
Calorie Share of Rice	3.873 ^(c) (.178)
Calorie Share of Wheat	3.955 ^(c) (.235)
Calorie Share of Other Cereals	2.957 ^(c) (.635)
Calorie Share of Pulses	3.337 ^(c) (.526)
Calorie Share of Dairy	4.212 ^(c) (.255)
Calorie Share of Edible Oils	2.967 ^(c) (.338)
Calorie Share of Meat, Fish and Eggs	5.749 ^(c) (.325)
Calorie Share of Vegetables and Fruits	4.265 ^(c) (.228)
Calorie Share of Sugar and Spices	2.333 ^(c) (.342)
Calorie Share of Processed Food	4.276 ^(c) (.188)
Log of Unit value of Rice	.133 ^(b) (.063)
Log of Unit value of Wheat	-.106 ^(b) (.047)
Log of Unit value of Other Cereals	.003 (.022)
Log of Unit value of Pulses	.126 ^(c) (.048)
Log of Unit value of Dairy	.017 (.015)
Log of Unit value of Edible Oils	-.106 (.076)
Log of Unit value of Meat, Fish and Eggs	-.044 ^(b) (.017)
Log of Unit value of Vegetables and Fruits	-.002 (.030)
Log of Unit value of Sugar and Spices	-.157 ^(b) (.062)
Log of Unit value of Processed Food	.024 ^(c) (.009)
Log of Unit value of Beverages	.003 (.007)
Expenditure Class 1 (bottom 30%) Dummy	-0.474 ^(c) (.043)
Expenditure Class 2 (middle 40%) Dummy	-0.203 ^(c) (.031)
R ² = 0.6941, F(29, 2461) = 38.77 ^(c) , No. of observations = 2491	

(a) Robust standard errors in parenthesis. (b) Statistically significant at 5%. (c) Statistically significant at 1%.

Table 12: Percentage of Rural Households Undernourished

State	NSS Round 55 (1999/2000)	NSS Round 57 (2001/2002)
Andhra Pradesh	64.28	73.50
Assam	75.55	73.06
Bihar	56.49	50.91
Gujarat	66.08	77.31
Haryana	42.22	63.23
Himachal Pradesh	35.28	40.83
Karnataka	66.54	77.39
Kerala	66.55	71.04
Madhya Pradesh	62.54	77.61
Maharashtra	65.44	67.10
Orissa	58.93	68.60
Punjab	43.49	54.53
Rajasthan	35.21	53.85
Tamil Nadu	75.93	84.03
Uttar Pradesh	41.83	56.94
West Bengal	60.36	68.90
All India	57.66	66.90

Table 13: Percentage of Urban Households Undernourished

State	NSS Round 55 (1999/2000)	NSS Round 57 (2001/2002)
Andhra Pradesh	44.44	57.70
Assam	44.29	47.84
Bihar	32.28	43.58
Gujarat	44.32	57.58
Haryana	38.63	56.31
Himachal Pradesh	13.56	26.05
Karnataka	45.76	50.63
Kerala	45.04	49.02
Madhya Pradesh	42.01	58.63
Maharashtra	44.91	51.47
Orissa	29.21	39.94
Punjab	36.15	41.35
Rajasthan	27.13	41.55
Tamil Nadu	50.90	63.84
Uttar Pradesh	38.97	52.30
West Bengal	45.71	50.68
All India	41.49	51.00

Table 14: Percentage of Rural Households Undernourished in Bottom and Top Deciles in NSS Round 57 (2001/02)

State	Bottom 10%		Top 10%	
	Original (100%) Calorie Requirements	80%	Original (100%) Calorie Requirements	80%
Andhra Pradesh	94.04	56.49	16.75	8.25
Assam	98.89	87.22	24.37	2.29
Bihar	87.30	29.97	3.57	0.45
Gujarat	99.47	86.34	15.84	2.14
Haryana	100.00	92.39	14.30	5.66
Himachal Pradesh	100.00	73.16	18.50	2.73
Karnataka	99.14	97.97	49.03	3.32
Kerala	84.04	66.76	6.97	0.34
Madhya Pradesh	99.11	84.99	34.64	6.17
Maharashtra	99.41	80.06	15.17	0.00
Orissa	100.00	83.92	24.45	17.83
Punjab	93.29	49.00	12.96	0.22
Rajasthan	96.69	86.55	13.05	2.71
Tamil Nadu	94.23	72.18	23.53	5.15
Uttar Pradesh	76.84	28.67	11.73	2.54
West Bengal	98.75	90.09	22.60	8.79
All India	95.63	75.58	23.06	4.49

Table 15: Percentage of Urban Households Undernourished in Bottom and Top Deciles in NSS Round 57 (2001/02)

State	Bottom 10%		Top 10%	
	Original (100%) Calorie Requirements	80%	Original (100%) Calorie Requirements	80%
Andhra Pradesh	75.27	20.36	18.75	3.09
Assam	94.22	57.77	5.33	0.33
Bihar	77.03	36.42	3.66	0.23
Gujarat	71.64	32.33	10.22	2.83
Haryana	90.69	44.53	35.66	0.10
Himachal Pradesh	82.41	27.36	11.49	2.10
Karnataka	93.08	72.71	12.34	5.44
Kerala	85.44	52.21	13.74	6.73
Madhya Pradesh	92.44	51.92	21.51	4.26
Maharashtra	84.14	43.41	3.89	0.11
Orissa	95.96	53.40	14.08	7.51
Punjab	83.43	45.00	9.29	0.71
Rajasthan	97.90	80.76	4.73	0.00
Tamil Nadu	79.33	39.82	20.70	2.27
Uttar Pradesh	68.07	16.93	1.38	1.28
West Bengal	100.00	73.18	1.19	0.21
All India	87.57	50.04	14.65	3.35

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