

RECENT TRENDS IN FOOD CONSUMPTION, NUTRITIONAL ADEQUACY AND POVERTY REDUCTION OF RURAL INDIA

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This paper is concerned with the analysis of food consumption and nutritional well-being in major states of India during 1993-94 to 2011-12. The role of food prices that governs the food consumption habits has also been underscored. The state-wise analysis vindicates that Assam, Uttar Pradesh, Orissa and West Bengal lag behind in terms of income growth, which can be substantiated by their higher expenditure on food. The prices of high value commodities have increased by more than two times during 2004-05 and 2011-12. This could be the reason for the recent sluggishness in diet diversification process of rural India. The analysis of calories and protein consumption across the expenditure classes do not give a justification to the debasement of calorie requirements particularly in rural areas. The direct poverty estimates also point to the interesting finding that the celebrated poverty reduction in rural India could be the result of increased inequality in calorie intake between the top and bottom MPCE classes.

INTRODUCTION

Food and nutrition security has been a topic of special interest to development economists for a long time. There is a consensus among them that national food security does not match with household food security and it has to be viewed through the lens of accessibility rather than availability. A pioneer of this approach is Sen (1981) who viewed famines as a result of weak accessibility. The adjunct line of thinking of Parikh (1998) is that famines might happen as a result of weak access to PDS especially by the rural population. As the rural poor are more vulnerable than any stratum of the population, their issues of food and nutrition security have been placed one in the policy agenda. This has given birth to a number of works such as Radhakrishna (2005), Sen (2005), Ray (2007) and Deaton and Dreze (2009), among others.

The studies on nutrition literature suggest that it is illogical if one tries to delink nutrition security from food security. A major distinction between food consumption and nutrient intake lies in the fact that consumption is behaviour, and nutrient intake is an outcome of the consumption behaviour. The link between food consumption and nutrition is far more complex. The plausible explanation follows that both quantity and quality of food is important for ensuring nutrition security. The nutritional intake of a household is often measured in the average calorie intake, which represents the conversion of food intake into usable energy. The quality of food or the conversion of food intake into usable energy is supplemented by the factors such as safe drinking water, health care and environmental hygiene (Radhakrishna and Ravi, 2004; Radhakrishna, 2005). In addition to the aforesaid factors, food prices, incomes of the poor, nutrition education and adequate care of women and children will determine the level and quality of food intake and ensure food security for all members of the household (Bouis and Hunt, 1999).

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This paper is concerned with the analysis of food consumption and nutritional well-being in major states of India. Our analysis is restricted to 15 major states of India for which population is overrepresented and data is easily available to facilitate the comparison. The Consumer Expenditure Reports of NSS pertaining to the years 1993-94, 2004-05 and 2011-12 have been thoroughly examined. The first section of the paper provides an overview of household expenditure surveys in developing countries. In the next section, the expenditure patterns and nutritional deficiency of different states and expenditure classes are highlighted. The last section describes the role of food prices that governs the food consumption habits.

HOUSEHOLD EXPENDITURE SURVEYS IN DEVELOPING COUNTRIES: AN OVERVIEW

The reliability of food consumption databases in developing countries has been under active debate in many studies (Bouis, 1994; Grosh and Glewwe, 1996; Browning et al 2003; Smith, 2003; Harrison, 2004). For example, Bouis (1994) made the point that the food transfers from the rich to the poor households would entail upwardly biased income elasticity estimates. Bouis makes use of two household surveys conducted in Kenya and the Philippines, by the International Food Policy Research Institute. The food expenditures may overstate family food consumption if meals served to guests and hired labourers are not factored in. The reverse is also possible if food eaten outside the household by low-income groups have not been reported.

In an outstanding paper, Smith (2003) has studied at length the pros and cons of household expenditure surveys. The household expenditure surveys capture the demographic characteristics of households, apart from the identification of food insecure households. Household surveys which are generally meant to study household welfare and behaviour must be free from missing observations, inconsistencies and implausible outliers, and ideally they must provide some estimate of physical activity, if underreporting is of particular interest (Grosh and Glewwe, 1996; Harrison, 2004). Unfortunately, most of these surveys are not carried out on a regular basis owing to time and financial constraints. This may hide the seasonality issue, if certain adjustments are not made. Moreover, the household surveys do not throw light on the access to food by each and every individual in the household. The systematic non-sampling errors can entail biased estimates of food insecurity due to the exclusion of migrants, homeless people and others living in isolated areas. The non-sampling errors such as recall errors, reporting errors, interviewer effects and prestige errors cast an important effect on data quality, amounting to measurement errors.

Browning et al (2003) have pointed to the validity of consumption questions in household surveys. For example, the questions relating to home food consumption and home away food consumption should be viewed as complementary that complete the picture of aggregate food consumption, though the response to recall question is doubtful in the latter. With respect to out of home food consumption, it is pertinent to ask questions about the types and quantities of food consumed, which seems to be missing in current household surveys. By and large, the household surveys can be collected either through recall method or through diary method. In the first method, respondents are asked to report how much they spend on consumption goods in a certain period. In the diary method, the respondents are asked to fill in a diary everything they spent over a certain period of time. It stands to reason that the diary method is not warranted in case the illiterate households fail to respond to the surveys.

Indeed the diary method is less suitable for India, where illiteracy is rampant. The abasement of NSSO database is not something new (Vaidyanathan, 1986; Suryanarayana, 1996; Eli and Li, 2013). Some of the allegations against the official database of household welfare studies in India are worth noting. First, the NSSO data do not throw light on welfare derived from leisure and pure public goods. Second, the size of non-sampling errors have not been taken into consideration due to the plausible overestimation of food grains in the richer households and the identified underestimation of food grains in the poorer households. Third, the phenomenon of missing calories prevails in India as there is a dearth of information on the quantity of most of the processed food items.

Table 1
State-wise analysis of MPCE and its Growth Rate

| State | 1993-94 | 2004-05 | 2011-12 |
|----------------|-------------|----------------|----------------|
| Andhra Pradesh | 288.7 (6.6) | 585.55 (14.7) | 1533.20 (9.7) |
| Gujarat | 303.3 (6.3) | 596.09 (13.7) | 1460.62 (9.1) |
| Haryana | 385.0 (7.6) | 862.89 (11.8) | 1882.02 (9.2) |
| Karnataka | 269.4 (5.9) | 508.46 (15.6) | 1399.66 (9.6) |
| Kerala | 390.4 (9.1) | 1013.15 (13.8) | 2509.92 (10.9) |
| Maharashtra | 272.7 (6.9) | 567.76 (14.1) | 1433.66 (9.7) |
| Punjab | 433.0 (6.3) | 846.75 (13.7) | 2076.43 (9.1) |
| Tamil Nadu | 293.6 (6.7) | 602.17 (14.0) | 1504.82 (9.5) |
| Assam | 258.1 (7.0) | 543.18 (9.8) | 1043.03 (8.1) |
| Bihar | 218.3 (6.1) | 417.11 (13.4) | 1004.98 (8.8) |
| Madhya Pradesh | 252.0 (5.2) | 439.06 (13.2) | 1044.78 (8.2) |
| Orissa | 219.8 (5.6) | 398.89 (12.0) | 880.24 (8.0) |
| Rajasthan | 322.4 (5.7) | 590.83 (13.5) | 1432.55 (8.6) |
| Uttar Pradesh | 273.8 (8.1) | 647.15 (7.1) | 1046.81 (7.7) |
| West Bengal | 278.8 (6.6) | 562.11 (10.7) | 1143.18 (8.1) |
| Total | 281.4 (6.4) | 558.78 (12.6) | 1278.94 (8.8) |

Note: Growth Rates are given in the parenthesis. Growth rates in the first column show the CAGR between 1993-94 and 2004-05. Growth rates in the second and third columns represent the CAGR from 2004-05 to 2011-12 and from 1993-94 to 2011-12 respectively

Source: Author's calculations based on NSS Consumer Expenditure Surveys

HOUSEHOLD FOOD SECURITY IN RURAL INDIA

Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO 1996). Household food security refers to the ability of a household to produce or purchase the food needed by all household members to meet their dietary requirements and food preferences as well as the assets and services necessary to achieve and maintain an optimal nutritional status. The factors bearing on the household food security are income, food production, prices of food items, and loss of livelihood (Saxena, 2011; Das, 2008). Household food security in rural India is important as there is an evidence of increase in unemployment from 1993-94 to 1999-2000 and from 1999-2000 to 2004-05 (Patnaik, 2007; Mukhopadhyay and Rajaraman, 2007). Though the self-reported hunger in rural India has come down from 5.2 per cent in 1993-94 to 2.5 per cent in 2004-05, calorie deprivation has remained its status quo. These statistics point to the need for an objective assessment of poverty and food insecurity.

Consumption boom in Rural India

The consumption boom in rural India owes much to the income growth via rural transformation. By way of simple, but impeccable logic, the monthly per capita consumption expenditure (MPCE) is taken here as a proxy for income. The MPCE for rural India in 2011-12 is Rs.1279 which has more than doubled relative to 2004-05 (Table 1). The highest growth rate of MPCE (12 per cent) was recorded in the period from 2004-05 and 2011-12. It has also to be noted that states like Haryana, Assam, Orissa, Uttar Pradesh and West Bengal could not achieve the growth rate in MPCE as that of rural India.

In all states, MPCE had grown barring Uttar Pradesh where the growth rate of MPCE decelerated by 1 percentage point between 2004-05 and 2011-12. The growth rate of MPCE has accelerated by 8-10 percentage points in Andhra Pradesh, Karnataka, Madhya Pradesh and Rajasthan during the same period. In other words, these states seem to be the best performers on the income front.

Table 2

Per Capita Expenditure across the Expenditure Classes

| <i>Expenditure Class</i> | <i>1993-94</i> | <i>2004-05</i> | <i>2011-12</i> |
|--------------------------|----------------|----------------|----------------|
| Bottom 30 per cent | 149.79 | 289.90 | 647.39 |
| Middle 40 per cent | 239.45 | 461.58 | 1049.90 |
| Top 30 per cent | 446.78 | 958.07 | 2211.72 |
| All | 281.17 | 559.31 | 1279.26 |

Source: Various Rounds of NSS Consumer Expenditure Surveys

Table 2 exhibits the per capita expenditure across the expenditure classes. In absolute terms, the per capita expenditure was found to be higher among the rich population. It increased to Rs.2212 in 2011-12 from Rs.447 in 1993-94. In relative terms, the per capita expenditure of the middle class was half of the top class and the same phenomenon can also be observed between the bottom and middle classes.

Trends in Food Expenditure

Table 3 reveals that food expenditure has shown a declining trend. However, it is still high in rural India (48.6 per cent), signifying high poverty in the region. Though the consumers in the states of Kerala, Punjab and Rajasthan are distracted by the availability of varied non-food items, a significant portion of their income is spent on high value commodities. Thus, food expenditure on high value commodities ranges between 46 per cent and 50 per cent in these states (See Table 6).

During 1993-94 to 2004-05, food expenditure seems to have reported a decline by more than 10 percentage points in the high-income states such as Haryana, Kerala and Tamil Nadu (Table 3). For 2004-05 and 2011-12, the low poverty status is inextricably linked to the declining food expenditure in Bihar, Karnataka, Kerala and Rajasthan. The monthly per capita consumption expenditure of these states has grown substantially during the same period.

Figure 1 reveals that the bottom 30 per cent of the population spent on roughly 73 per cent and 60 per cent in 1993-94 and 2011-12 while the corresponding figures for the middle 40 per cent are 69 per cent and 55 per cent respectively. The statistics would strengthen the argument that neither the bottom 30 per cent of the population, nor middle 40 per cent of the population are better off. If food expenditure is treated as a benchmark for the measurement of poverty, the plight of the middle 40 per cent of the population is deplorable. This is not a serious issue as the middle class population constitutes only less than 10 per cent of the total population (Meyer and Birdsall, 2012)

Figure 1
Proportion of MPCE on Food by MPCE Classes (%)

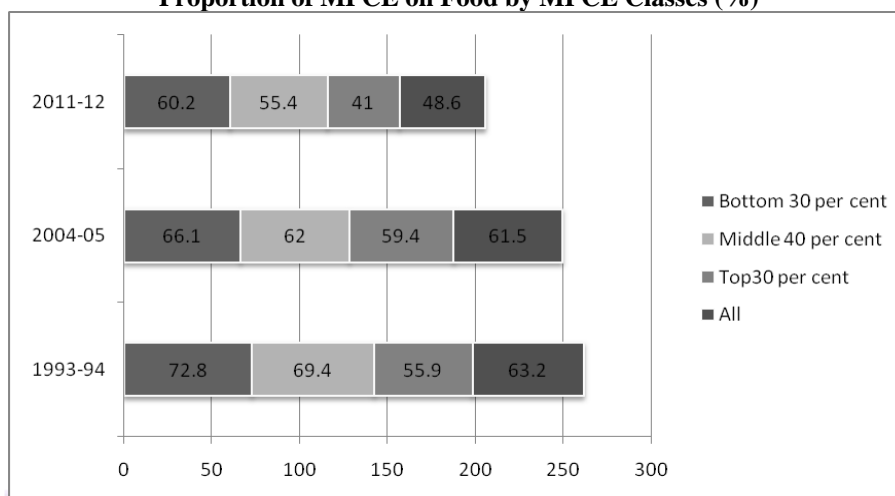


Table 3
State-Wise Proportion of MPCE on Food (in per cent)

| State | 1993-94 | 2004-05 | 2011-12 |
|----------------|---------|---------|---------|
| Andhra Pradesh | 59.6 | 55.2 | 46.7 |
| Gujarat | 67.1 | 57.9 | 48.9 |
| Haryana | 60.0 | 48.6 | 51.0 |
| Karnataka | 61.9 | 55.7 | 45.4 |
| Kerala | 60.4 | 45.0 | 35.4 |
| Maharashtra | 59.5 | 51.6 | 46.8 |
| Punjab | 57.9 | 49.2 | 43.1 |
| Tamil Nadu | 62.8 | 52.4 | 46.1 |
| Assam | 72.2 | 66.0 | 57.3 |
| Bihar | 71.0 | 64.8 | 52.2 |
| Madhya Pradesh | 61.2 | 52.9 | 47.7 |
| Orissa | 68.1 | 61.6 | 53.4 |
| Rajasthan | 62.3 | 54.8 | 43.1 |
| Uttar Pradesh | 61.5 | 53.4 | 50.7 |
| West Bengal | 66.8 | 58.7 | 56.0 |
| Total | 63.2 | 55.0 | 48.6 |

Source: Same as Table 1

Cereal consumption in Rural India

In rural India, the cereal consumption has markedly fallen in leading states as compared to lagging states (Table 4). The result is not surprising given that the leading states having high per capita income above the national average will have a natural tendency to cut down the food grain consumption in response to the increase in income whereas the poorer states still resort to cereal consumption, to supplement their calorie intake. The under consumption of cereals and coarse cereals have several implications on the overall nutritional status of the Indian population as these are vital for getting rid of the problems of protein, iron and fat deficiency (Shariff and Mallick, 1999). Hence the problem of micro nutrient deficiency is likely to exacerbate for rural India.

Table 4
State-Wise Per Capita Cereal Consumption in Rural India (Kg/month)

| State | 1993-94 | 2004-05 | 2011-12 |
|----------------|-------------|-------------|-------------|
| Andhra Pradesh | 13.3 | 12.1 | 11.8 |
| Gujarat | 10.7 | 10.1 | 8.7 |
| Haryana | 12.9 | 10.7 | 9.4 |
| Karnataka | 13.2 | 10.7 | 9.8 |
| Kerala | 10.1 | 9.5 | 8.5 |
| Maharashtra | 11.4 | 10.5 | 9.9 |
| Punjab | 10.8 | 9.9 | 9.3 |
| Tamil Nadu | 11.7 | 10.9 | 9.5 |
| Assam | 13.2 | 13.0 | 12.7 |
| Bihar | 14.3 | 13.2 | 12.1 |
| Madhya Pradesh | 14.2 | 11.8 | 11.5 |
| Orissa | 15.9 | 14.0 | 13.4 |
| Rajasthan | 14.9 | 12.7 | 11.8 |
| Uttar Pradesh | 13.9 | 12.9 | 11.5 |
| West Bengal | 15.0 | 13.2 | 12.0 |
| Total | 13.4 | 12.1 | 11.2 |

Source: Same as Table 1

Since the bottom 30 per cent of the population is more prone to food insecurity and calorie deprivation, their food grain consumption is of prime importance. The gap between the poor and the rich in terms of cereal consumption has declined in 2011-12 as compared to the period 1993-94; the rich people can afford other food items or much superior cereal items in fine quality which is not the case with poor people. Though the difference in calorie intake between the poor and rich has declined from 994 in 1993-94 to 832 in 2004-05 and to 623 in 2011-12, the calorie consumption of the bottom 30 per cent of the population is as low as 1802 calories per capita per day. Hence, pro-poor economists, including Swaminathan (1996) did not support for the reduction of food subsidies with immediate effect. The problem of exclusion and inclusion errors is less likely to emerge, especially when the population is arranged in ascending order of monthly per capita consumption expenditure.

Table 5
Monthly Per Capita Consumption of Cereals and Calories across the Expenditure Classes

| Expenditure Class | 1993-94 | | 2004-05 | | 2011-12 | |
|--------------------|--------------|-------------|--------------|-------------|--------------|-------------|
| | Cereals | Calories | Cereals | Calories | Cereals | Calories |
| Bottom 30 per cent | 11.75 | 1680 | 11.15 | 1654 | 10.75 | 1802 |
| Middle 40 per cent | 13.59 | 2115 | 12.18 | 2011 | 11.32 | 2078 |
| Top 30 per cent | 14.78 | 2674 | 12.87 | 2486 | 11.58 | 2425 |
| All | 13.40 | 2152 | 12.12 | 2046 | 11.23 | 2099 |

Source: Same as Table 1

Table 6 presents the state-wise share of cereals and high value commodities. During 2011-12, the share of cereals on total food expenditure was the highest in Orissa (35%), closely followed by West Bengal (32%) and Assam (32%). At the same time, the share of high value commodities on total food expenditure was higher in as many states as Haryana (61%), Punjab (50%), Rajasthan (50%), Kerala (46%) and Gujarat (43%). In all the states and in all the periods, the share of high value commodities has increased, but its rate of increase was not sufficient to surrogate for the decline in cereal consumption.

Table 6
Share of cereals and high value commodities on food expenditure

| State | 1993-94 | | 2004-05 | | 2011-12 | |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | C | HVC | C | HVC | C | HVC |
| Andhra Pradesh | 41.16 | 27.73 | 35.15 | 31.74 | 24.32 | 39.29 |
| Gujarat | 24.91 | 36.31 | 23.03 | 39.62 | 18.02 | 43.18 |
| Haryana | 21.19 | 53.20 | 17.79 | 54.48 | 12.72 | 60.68 |
| Karnataka | 36.85 | 29.36 | 29.61 | 32.57 | 23.77 | 35.16 |
| Kerala | 28.98 | 39.66 | 24.47 | 42.03 | 15.92 | 46.55 |
| Maharashtra | 30.02 | 29.72 | 28.08 | 32.67 | 22.11 | 34.95 |
| Punjab | 18.18 | 48.28 | 17.89 | 46.18 | 13.63 | 50.58 |
| Tamil Nadu | 39.35 | 26.34 | 29.63 | 31.73 | 22.18 | 38.07 |
| Assam | 48.58 | 30.62 | 37.61 | 37.60 | 32.26 | 38.55 |
| Bihar | 51.93 | 26.06 | 41.80 | 31.32 | 31.67 | 37.48 |
| Madhya Pradesh | 42.93 | 27.24 | 34.16 | 31.89 | 26.06 | 34.45 |
| Orissa | 57.22 | 23.93 | 45.89 | 27.59 | 35.41 | 31.33 |
| Rajasthan | 28.93 | 44.77 | 26.42 | 46.69 | 18.54 | 49.69 |
| Uttar Pradesh | 35.23 | 35.11 | 28.51 | 38.80 | 24.41 | 39.97 |
| West Bengal | 50.67 | 28.77 | 39.95 | 34.39 | 32.48 | 35.98 |
| Total | 38.30 | 32.62 | 32.72 | 35.89 | 24.62 | 39.94 |

Source: Same as Table 1

The share of cereals and high value commodities in food expenditure, reported in Table 6, however, does not enable us to make a detailed analysis. Hence, a disaggregated profile is imperative and is given in the following figure. For the sake of analysis, nine broad commodity groups are considered here.

Accordingly, food expenditure can be shared by different commodity groups such as Cereals and Cereal Substitutes (CCS), Pulse and its Products including Gram (PPG), Edible Oil (EO), Milk and Milk Products (MMP), Meat, Egg and Fish (MEF), Vegetables (VEG), Fruits and Nuts (FN), Beverages (BEV) and Other Foods (OF). The category of beverages includes refreshments, processed food and cooked meals purchased. However, tea or fruit juice prepared at home is not included in refreshments as its ingredients have already been reported under various heads. The category of 'other food' includes salt, sugar, spices.

It is observed that among the bottom expenditure groups, beverages and milk and milk products were predominant in the food budgets. The increase in food expenditure due beverages and milk and milk products were appreciably higher as compared to the other commodity groups. The food expenditure on vegetables marked a decline after 2004-05, and the pattern was uniform across all expenditure groups. At the same time, the category of beverages showed an improvement, irrespective of all expenditure groups.

PRICE OF MAJOR FOODGRAINS

Food inflation has been a major issue in all countries and at all times. In India, food prices have been escalated at the rate of 10.20% from January 2008 to July 2010. Some of the widely acknowledged reasons for food inflation are growth in per capita income and food demand, bottlenecks in agricultural production, increase in world crude oil and food prices, and so on (Nair and Eapen, 2012; Sasmal, 2015).

This section considers the price of food grains including rice, wheat and cereals in general. The average prices have been arrived at dividing the per capita expenditure by the total quantity. However, we have not taken care of the quality effect associated with the unit values, and therefore our analysis may fail to capture the regional variations in food prices.

Table 7 depicts that in most of the states, rice prices have been much higher as compared to wheat. Interestingly, it shows a reverse pattern in states such as Andhra Pradesh and Orissa. However, no consistent pattern has emerged in the states of Karnataka, Kerala, Tamil Nadu and Assam where the rice price has dominated in some years while the wheat price has overtaken rice price in other years.

Table 7
Average Price of Food grains

| State | 1993-94 | | | 2004-05 | | | 2011-12 | | |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| | R | W | C | R | W | C | R | W | C |
| Andhra Pradesh | 5.61 | 6.50 | 5.32 | 9.51 | 14.04 | 9.43 | 13.96 | 27.39 | 14.82 |
| Gujarat | 7.10 | 4.60 | 4.74 | 10.96 | 7.79 | 7.90 | 20.24 | 13.32 | 14.75 |
| Haryana | 7.57 | 3.60 | 3.80 | 13.51 | 6.61 | 7.00 | 26.61 | 11.81 | 12.96 |
| Karnataka | 6.54 | 5.00 | 4.66 | 8.34 | 8.98 | 7.81 | 13.96 | 16.63 | 15.48 |
| Kerala | 6.84 | 6.13 | 6.78 | 11.49 | 13.60 | 11.70 | 15.86 | 20.81 | 16.65 |
| Maharashtra | 6.57 | 5.09 | 4.27 | 9.75 | 8.02 | 7.84 | 15.48 | 13.20 | 15.02 |
| Punjab | 7.86 | 3.96 | 4.22 | 11.87 | 7.13 | 7.51 | 26.13 | 11.72 | 13.14 |
| Tamil Nadu | 6.49 | 6.33 | 6.21 | 8.48 | 13.85 | 8.58 | 16.12 | 16.96 | 16.18 |
| Assam | 7.00 | 4.43 | 6.86 | 10.40 | 9.20 | 10.34 | 15.10 | 16.68 | 15.18 |
| Bihar | 6.53 | 4.68 | 5.63 | 9.43 | 7.77 | 8.64 | 16.12 | 11.12 | 13.71 |
| Madhya Pradesh | 5.90 | 4.16 | 4.66 | 8.57 | 6.52 | 6.52 | 15.00 | 10.27 | 11.28 |
| Orissa | 5.41 | 5.50 | 5.39 | 7.95 | 11.74 | 8.06 | 12.11 | 17.36 | 12.41 |
| Rajasthan | 9.00 | 4.03 | 3.90 | 14.12 | 7.05 | 6.77 | 27.25 | 10.51 | 10.80 |
| Uttar Pradesh | 5.60 | 3.81 | 4.27 | 8.53 | 6.71 | 7.66 | 13.19 | 10.26 | 11.31 |
| West Bengal | 6.42 | 5.17 | 6.29 | 10.05 | 9.33 | 10.00 | 17.94 | 13.15 | 17.36 |
| Total | 6.21 | 4.16 | 5.08 | 9.37 | 7.32 | 8.30 | 15.02 | 11.59 | 13.65 |

Source: Same as Table 1

If one believes that the decline in cereal consumption is due to the price effect, Table 7 reveals some interesting patterns. The average price of cereals has gone up from Rs.5 in 1993-94 to Rs.8 in 2004-05 and then to Rs.14 in 2011-12. The decline in cereal consumption is utmost 1 per cent in all the NSS periods. The rural population is less responsive to the rise in cereal price.

Quantity and Price of High Value Commodities

This section looks at whether there is an unbridled demand for high value commodities or not. As the name indicates, high value commodities are costlier commodities having a low calorie density. In contrast, cereals have low prices and high calorie density. By and large, the high value commodities are milk, eggs, fish and meat, and fruits and vegetables. The 50th round of NSS Consumer Expenditure Survey (1993-94) brings out the 'Consumption of Some Important Commodities in India'. These important commodities that come under the category of high value commodities are milk, eggs, fish, mutton, goat meat, chicken, beef, buffalo meat, potato, onion, cauliflower, cabbage, brinjal, lady's finger, palak, tomato, green chilli, banana, coconut, mango, apple and the ground nut. Our analysis is restricted to these 22 major commodities for the three rounds (50th, 61st and 68th rounds) in question.

As given in Table 8, all the commodities are represented in kilograms. Such an exercise would be difficult, if some of the commodities have not been converted to kilograms. For that, appropriate conversion of food items to kilograms was done wherever possible as in Majumdar et al (2011) and in Das (2014). The following conversions are used: 1 litre milk = 1kg; 1 egg = 58 gms; 10 bananas = 1kg; 1 coconut = 1kg. This is what is displayed in the quantity (Q) column of the table. The total expenditure on high value commodities divided by the quantity of those commodities yields the price column (P) of respective commodities.

A marginal increase in the consumption of high value commodities was recorded in all the NSS periods (See Table 8). Thus, its consumption increased from 8 kg to 9 kg and later to 11 kg. Interestingly, the prices of high value commodities have inflated by more than two times in between the period 2004-05 and 2011-12. In Andhra Pradesh, Karnataka and Orissa, the prices of high value commodities have been relatively high during the period 2011-12.

Table 8

| Average quantity (Kg) and price of Major High Value Commodities in Rural India | | | | | | |
|---|----------------|-------------|----------------|--------------|----------------|--------------|
| State | 1993-94 | | 2004-05 | | 2011-12 | |
| | Q | P | Q | P | Q | P |
| Andhra Pradesh | 5.84 | 7.06 | 7.28 | 12.25 | 10.91 | 31.08 |
| Gujarat | 8.53 | 7.05 | 8.68 | 13.09 | 11.22 | 27.07 |
| Haryana | 17.26 | 6.12 | 17.08 | 11.54 | 21.64 | 26.76 |
| Karnataka | 6.80 | 6.29 | 7.88 | 10.38 | 7.90 | 33.28 |
| Kerala | 10.69 | 7.76 | 12.76 | 13.02 | 15.23 | 28.59 |
| Maharashtra | 5.74 | 7.36 | 6.79 | 12.20 | 9.77 | 29.05 |
| Punjab | 18.34 | 6.06 | 15.79 | 10.72 | 18.69 | 23.84 |
| Tamil Nadu | 6.21 | 6.85 | 7.35 | 11.81 | 11.21 | 27.07 |
| Assam | 4.65 | 9.27 | 6.27 | 16.46 | 8.49 | 31.31 |
| Bihar | 6.90 | 5.05 | 8.33 | 8.95 | 12.24 | 19.72 |
| Madhya Pradesh | 5.71 | 6.02 | 6.75 | 9.38 | 9.51 | 19.72 |
| Orissa | 4.72 | 5.88 | 5.88 | 9.43 | 8.90 | 35.97 |
| Rajasthan | 12.61 | 6.17 | 12.26 | 10.63 | 14.05 | 15.09 |
| Uttar Pradesh | 9.89 | 5.16 | 9.50 | 9.27 | 11.31 | 22.01 |
| West Bengal | 7.00 | 6.25 | 8.18 | 11.57 | 10.64 | 16.40 |
| Total | 7.98 | 6.18 | 8.67 | 10.87 | 11.45 | 23.52 |

Source: Calculated from Various Rounds of NSS Consumer Expenditure Surveys

NUTRIENT CONSUMPTION IN RURAL INDIA

Calorie Intake

The food requirements are usually estimated in terms of calories. It is the amount of heat necessary to raise the temperature of one kilogram of water by 1°C from 14.5°C to 15.5°C. Calories are required for the actual physical activity of an individual. In addition to this, some amount of calories are also expended at the time of rest for essential functions such as respiration, blood circulation, digestion, absorption and excretion, maintenance of body temperature etc.

Table 9 shows the mean per capita consumption of calories in 15 major states of India. In rural India, calorie consumption has declined from 2153 calories in 1993-94 to 2047 in 2004-05. Between 1993-94 and 2004-05, the mean per capita consumption of calories has declined virtually in all the states but Kerala and Assam. However, these trends have got reversed in 2011-12. As

compared to the rest of the states, Kerala, Assam and Gujarat failed to increase the mean per capita consumption of calories.

In 1993-94, the states having excess daily consumption of calories are Haryana, Punjab and Rajasthan. However, none of the states have gained the status of excess calories in 2004-05. The mean per capita consumption of calories was figured at 2307 calories in UP in 1993-94 which slightly declined to 2200 calories in 2004-05 has shown a marked improvement after 2004-05. In fact, Uttar Pradesh was the only state which had excess calories (2436) in 2011-12.

Table 9

Mean Per Capita Consumption of Calories, Protein and Fat Per Day in Rural India

| State | 1993-94 | | | 2004-05 | | | 2011-12 | | |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | C | P | F | C | P | F | C | P | F |
| Andhra Pradesh | 2052 | 50.8 | 27.2 | 1995 | 49.8 | 33.5 | 2186 | 53.6 | 43.4 |
| Gujarat | 1994 | 55.6 | 47.4 | 1923 | 53.3 | 50.9 | 1915 | 50.8 | 56.5 |
| Haryana | 2491 | 78.4 | 53.6 | 2226 | 69.6 | 55.4 | 2254 | 67.9 | 62.7 |
| Karnataka | 2073 | 55.1 | 28.6 | 1845 | 48.8 | 33.9 | 2003 | 50.4 | 44.0 |
| Kerala | 1965 | 50.8 | 32.7 | 2014 | 55.4 | 40.8 | 1975 | 54.6 | 44.7 |
| Maharashtra | 1939 | 54.8 | 33.5 | 1933 | 55.7 | 41.5 | 2013 | 56.0 | 52.1 |
| Punjab | 2418 | 74.7 | 59.8 | 2240 | 66.7 | 58.7 | 2328 | 66.4 | 64.7 |
| Tamil Nadu | 1884 | 46.8 | 24.7 | 1842 | 44.9 | 29.6 | 1926 | 48.8 | 39.0 |
| Assam | 1983 | 49.5 | 21.0 | 2067 | 52.7 | 26.7 | 2010 | 49.3 | 26.1 |
| Bihar | 2115 | 60.2 | 23.0 | 2049 | 57.8 | 28.4 | 2057 | 57.3 | 33.9 |
| Madhya Pradesh | 2164 | 63.0 | 28.3 | 1929 | 58.8 | 35.1 | 2110 | 61.8 | 41.6 |
| Orissa | 2199 | 52.7 | 14.8 | 2023 | 48.3 | 17.8 | 2116 | 49.9 | 24.4 |
| Rajasthan | 2470 | 79.4 | 52.8 | 2180 | 69.6 | 50.9 | 2263 | 68.4 | 57.7 |
| Uttar Pradesh | 2307 | 70.4 | 35.5 | 2200 | 65.9 | 37.5 | 2436 | 68.2 | 52.8 |
| West Bengal | 2211 | 54.8 | 21.4 | 2070 | 52.0 | 26.5 | 2092 | 51.7 | 32.4 |
| Total | 2153 | 64.2 | 31.4 | 2047 | 57.0 | 35.5 | 2099 | 56.5 | 41.6 |

Source: Various Rounds of NSS Consumer Expenditure Surveys

By and large, the calorie consumption was far from satisfactory taking all the NSSO rounds together. The ever-declining cereal consumption is one alleged factor, often cited in scholarly works (Radhakrishna, 2005; Deaton and Dreze, 2009). In rural India, cereal consumption has steeply declined by almost 16 per cent between 1993-94 and 2011-12. It can also be observed that Haryana (27%), Karnataka (26%), Rajasthan (21%) and West Bengal (20%) are trying their level best to bring down the cereal consumption.

Table 10

Mean Per Capita Daily Consumption of Calories, Protein & Fat across Expenditure Classes

| State | 1993-94 | | | 2004-05 | | | 2011-12 | | |
|--------------------|---------|------|------|---------|------|------|---------|------|------|
| | C | P | F | C | P | F | C | P | F |
| Bottom 30 per cent | 1680 | 73.6 | 46.7 | 1654 | 45.5 | 20.8 | 1802 | 47.2 | 27.1 |
| Middle 40 per cent | 2115 | 70.6 | 58.6 | 2011 | 55.6 | 33.2 | 2078 | 55.9 | 40.2 |
| Top 30 per cent | 2674 | 60.2 | 75.8 | 2486 | 67.5 | 53.1 | 2425 | 66.7 | 58.1 |
| All | 2152 | 68.4 | 60.2 | 2046 | 56.2 | 35.5 | 2099 | 56.5 | 41.6 |

Source: Same as Table 1

Protein Intake

Proteins are an important component of a well-balanced diet. They are essential for body growth and help the body to defend against infections. The recommended daily protein intake is 60 grams per person. Rice and pulses are the richest sources of vegetable proteins; egg, milk, meat and fish constitute the important sources of animal proteins. As regards the protein consumption, it was low in Tamil Nadu, Assam and Orissa where the protein intake was lower than that of the required dietary allowance of 60 grams.

Fat Intake

As a constant source of energy, fat is a necessary ingredient in the diet. It is essential for the absorption of fat soluble vitamins like Vitamin A, D, E and K. Fats can be of two types, visible and invisible fats. The visible fats are sourced from groundnut, mustard, coconut, safflower, till, butter and ghee. The invisible fats are concentrated in food items like cereals, pulses, oilseeds, milk, egg, meat, etc. These invisible fats contribute significantly to our diets. The recommended daily consumption of fats (both visible and invisible) is 40 grams per person. As regards the fat consumption, it was lower in Tamil Nadu, Assam, Bihar, Orissa and West Bengal.

When the expenditure class division is poised, it can be observed that calorie deficiency has overshadowed all expenditure classes, but the richer sections of the population (Table 10). Following the calorie deprivation, protein deficiency was prevalent in both bottom and middle expenditure classes when the last two quinquennial rounds are considered. Fat deficiency also showed a similar pattern, but it began to diminish in 2011-12 particularly among the middle 40 per cent of the population.

HUNGER-POVERTY DIVERGENCE

Broadly speaking, poverty shows the extent to which basic human needs are deprived of. There are two ways to measure poverty: one is the direct method and the other is the indirect method the measurement of which has been the routine exercise for the Planning Commission. The direct method is based on the respective calorie norm, whereas the indirect method is based on the minimum consumption expenditure. The difference between both direct and indirect estimates of poverty is largely due to the invariant consumption basket. Many economists were hypocrites in regard to the Planning Commission's indirect estimates of poverty. According to the view held by Patnaik (2007), Planning Commission's methodology in the estimation of poverty is not free from flaws, given its 32 years of experience in serving the nation. She substantiated her argument with the example of cloth to bring home the point that the needs of an individual are also changing as age goes up and so, the necessary price adjustments only will not serve the purpose of estimating poverty in India. For rural India, the divergence between hunger and poverty slightly declined in 1993-94, but the gap widened since then (Mehta and Venkatraman, 2000; Basu and Das, 2014). This could be the reflection of the fact that the expenditure-based poverty among the rural population has gone up from 39.1 per cent in 1987-88 to 50.1 per cent in 1993-94.

The poverty experience of the disadvantaged classes – the female-headed and SC/ST households has received considerable attraction among the researchers, particularly during the period of economic reforms when the state support was found to be abysmally minimal. Ray and Lancaster (2005) attempted to give credence to their analysis by working out the true cost of obtaining the minimum calorie requirements. The superiority of their methodology lies in that it captures the

changes in consumer preferences, household size, composition and other characteristics in the calculation of the household specific poverty lines by relaxing the assumptions of equivalence scales which might have a significant impact on poverty estimates. Thus, Ray and Lancaster's work raised serious apprehensions as to the declining poverty rates in India during the 1990s.

The divergence between hunger and poverty stems from the growth in real per capita expenditures and falling calorie intake over time (Basu and Das, 2014). In fact, choice does not matter in the critical decision of being food insecure or undernourished. What matters most is the price of non-food items which has engulfed all the increase in real per capita expenditures in the past three decades or more so. Other factors are also at work when we look at the availability of non-food items relative to the food items. The higher the variety of non-food items available, the lower will be the resultant calorie intake (Almas et al, 2011). Along with these, shrinking social expenditure, occupational diversification of the workforce, and diversification of the food expenditure of the poor via demonstration effect continues to be the predominant factors for calorie deprivation in India.

Table 11
State-Wise Comparison of Poverty Ratios in Rural India

| State | Direct Poverty Ratio 1993-94 | Direct Poverty Ratio 2004-05 | Direct Poverty Ratio 2011-12 | Indirect Poverty Ratio 1993-94 | Indirect Poverty Ratio 2004-05 | Indirect Poverty Ratio 2011-12 |
|----------------|------------------------------|------------------------------|------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Andhra Pradesh | 84.6 | 92.0 | 28.6 | 15.92 | 11.2 | 12.7 |
| Gujarat | 82.4 | 90.6 | 87.6 | 22.18 | 19.1 | 31.4 |
| Haryana | 53.2 | 62.4 | 10.0 | 28.02 | 13.6 | 11.0 |
| Karnataka | 77.1 | 95.6 | 60.4 | 29.88 | 20.8 | 19.8 |
| Kerala | 81.7 | 88.1 | 26.3 | 25.76 | 13.2 | 7.3 |
| Maharashtra | 86.4 | 73.6 | 55.3 | 37.93 | 29.6 | 22.5 |
| Punjab | 55.5 | 58.7 | 6.8 | 11.95 | 9.1 | 7.4 |
| Tamil Nadu | 81.4 | 91.9 | 68.3 | 32.48 | 22.8 | 24.3 |
| Assam | 92.7 | 88.4 | 88.5 | 45.01 | 22.3 | 42.0 |
| Bihar | 72.6 | 83.8 | 82.2 | 58.21 | 42.1 | 40.1 |
| Madhya Pradesh | 72.6 | 78.9 | 79.4 | 40.64 | 36.9 | 45.2 |
| Orissa | 74.0 | 83.3 | 87.2 | 49.72 | 46.8 | 47.8 |
| Rajasthan | 46.0 | 71.2 | 37.2 | 26.46 | 18.7 | 21.4 |
| Uttar Pradesh | 61.7 | 69.1 | 89.5 | 42.28 | 33.4 | 38.1 |
| West Bengal | 74.5 | 86.5 | 73.6 | 40.80 | 28.6 | 30.1 |
| Total | 75.0 | 85.2 | 66.3 | 37.27 | 28.3 | 30.9 |

Note: The poverty ratios (direct and indirect) for 1993-94 and 2004-05 are based on URP as per Lakdawala Methodology. The poverty ratios (direct and indirect) for 2011-12 are based on MMRP as per Rangarajan Methodology.

Source: Same as Table 1

In an attempt to measure poverty based on the calorie norm, we have employed the methodology of arriving at direct poverty ratios. Accordingly, the reference class has been chosen from the 12 MPCE classes that yields the minimum calorie thresholds. The direct poverty ratios have been then calculated which correspond to the mid-point of the cumulative proportion of population up to and including the reference class (See Table 11). Such a methodology can validate the claim that the recent poverty estimates are calorie-based or not. Furthermore, the nutritional adequacy of the rural population can be elicited from the analysis.¹

Going by the direct poverty estimates, it can be seen that there is no perceptible difference between leading and lagging states in terms of the number of poor persons. In addition, the difference between direct and indirect poverty ratios is too large.² It implies that the claim by Lakdawala committee that calorie deprived persons are reflected in the number of poor persons is fundamentally wrong. The Rangarajan committee on these lines has improved to the extent that it could capture the reduction of poor persons in the states of Andhra Pradesh, Haryana, Kerala, Punjab and Rajasthan. The direct poverty ratios also show the same result.

The celebrated poverty reduction could be the result of increased inequality in calorie intake between the top and bottom MPCE classes. The NSS estimates leave out the top 1 per cent of the population. If it hadn't been so, the decline in poverty might have spread to other states as well. Hence, it is illogical to cast aside the direct poverty estimates to the core.

SUMMING UP

In this paper, we examined the trends and patterns of food consumption and nutritional intake in rural India between different states and expenditure classes using three NSS rounds right from the 1993-94 to 2011-12. The analysis shows that income, proxied by monthly per capita consumption expenditure, has recorded the highest ever increase between 2004-05 and 2011-12 at 12 per cent. In regard to the food expenditure, it declined by 7.4 per cent during 2004-05 and 2011-12. The state-wise analysis depicts that Assam, Uttar Pradesh, Orissa and West Bengal lag behind in terms of income growth, which can be substantiated by their higher expenditure on food. The analysis has led us to come to the finding that though the share of high value commodities in total food expenditure has gone up in all the periods, the rate of increase was not sufficient to make up with the decline in cereal consumption. If the decline in cereal consumption may be attributed to the price effect, it can be seen that the average price of cereals has increased from Rs.5 in 1993-94 to Rs.8 in 2004-05 and then to Rs.14 in 2011-12. The decline in cereal consumption is utmost 1 per cent in all the NSS periods which implies that the rural population is less responsive to the rise in cereal price. On the other hand, the prices of high value commodities have increased by more than two times during 2004-05 and 2011-12. This could be the reason for the recent sluggishness in diet diversification process for rural India (Gaiha et al, 2012).

When nutritional intake is considered, the states such as Tamil Nadu, Assam, Orissa can be labeled as the protein deprived states in rural India. As the growth of children is more likely to be confounded by protein deficiency, the nutritional status of the child population in these states would be worrisome.

In the remarkable period of income growth (2011-12), the rural population has taken the occasion that eventually led to an increase in the average consumption of both calories and proteins, particularly among the poor and middle expenditure classes. This does not give a justification to the debasement of calorie requirements at least for rural India.

Notes

¹ Nutritional adequacy is the difference between nutritional intake of the population and their nutritional requirements.

² We have not made any comparison of direct and indirect poverty ratios in different periods because they are based on different recall periods and different calorie threshold

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