

Food consumption and nutritional intake in rural India: Emerging trends and patterns

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Abstract

Background/Objectives: This paper is concerned with the analysis of food consumption and nutritional intake in major states of India during 1993-94 to 2011-12. As the rural poor are more vulnerable than any stratum of population, their issues of food and nutrition security have been placed one in the policy agenda.

Methods/Statistical Analysis: The present study is based upon the collection of secondary data. The secondary data will be gleaned from the reports on consumer expenditure by NSSO. The statistical tools like compound annual growth rate, linear extrapolation method and simple average, etc. will be used for analytical purposes.

Findings: The state-wise analysis corroborates 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. Though the share of high value commodities has increased, its rate of increase was not sufficient to surrogate for the decline in cereal consumption. Our results do not support the debasement of calorie requirements particularly in rural areas.

Application: An understanding of how many numbers or percentages of population are nutritionally deprived will ignite further studies in the area.

Keywords: Food intake, Nutritional intake, calories, high value commodities, accessibility.

1. Introduction

Food and nutrition security has been a topic of special interest to development economists for a long time. There is consensus among them that national food security is not parallel with household food security and it has to be viewed through the lens of accessibility rather than availability [1]. Thus famines might happen as a result of weak accessibility or weak access to PDS especially by the rural population [2]. As the rural poor are more vulnerable than any stratum of population, their issues of food and nutrition security have been placed one in the policy agenda and in academic circles [3, 4, 5, 6, 7].

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 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 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 [8]. In addition to the aforesaid factors, food prices, incomes of the poor, nutrition education and adequate care to women and children will determine the level and quality of food intake and ensure food security for all members of the household.

Various studies have pointed to the corruption, leakages and inefficiencies in the functioning of various employment-oriented programmes and food-related schemes. Studies have also confirmed that the Food Security Act is in sleeping mode and working with uneven success in most of the backward states such as Bihar [9, 10]. As the Food Security Act is not working properly, the limited access to the PDS would have worsened the nutritional security of the households. Hence an understanding of the food consumption pattern of the rural population becomes pertinent particularly when food prices escalated during 2007-2008. The first section of the paper provides an

overview of household expenditure surveys in developing countries. The next section provides a description about the data source and the tools employed by the researchers. In the last section, the expenditure patterns and nutritional deprivation of different states and expenditure classes are highlighted providing the direction for further studies.

2. 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 [11, 12, 13, 14, 15]. For example, it is a widely acknowledged fact that the food transfers from the rich to the poor households would entail upwardly biased income elasticity estimates. This is true of the 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.

The pros and cons of household expenditure surveys have been studied in a multitude of studies. 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. 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.

Some studies 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 on 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 diary method is less suitable for India where illiteracy is rampant. The abasement of NSSO database is not something new [16, 17]. 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 foodgrains in the richer households and the identified underestimation of foodgrains in the poorer households. Third, the phenomenon of missing calories prevails in India as there is dearth of information on the quantity of most of the processed food items.

3. Materials and Methods

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 has been thoroughly examined.

In this study, expenditure class-wise data is reconstructed to form the decile-wise data. This is done with the help of linear extrapolation method, as set out in the work by Atkinson and Koletzko [18]. According to the linear extrapolation method, sample population in each MPCE class has to be adjusted to form 10 per cent of the population. Each MPCE class is denoted by $X_1, X_2, X_3, \dots, X_{12}$. Suppose that the percentage of persons in X_1 is 5.0 and the corresponding percentage in X_2 is 5.1 respectively, the formula for finding out the mean calorie intake for the first decile is $5.0X_1 + 5.0X_2$. Thus, the bottom three deciles comprise the lowest 30 per cent of the population (poor);

next four deciles form the middle 40 per cent of the population (middle). The top three deciles consist of the top 30 per cent of the population (rich).

4. Results and Discussion

4.1. 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. 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 [19, 20]. 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 [21, 22]. Though the self-reported hunger in rural India has declined 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.

4.2. 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 was 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.

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)

Source: Authors' calculations based on NSSO data. 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.

In all states, MPCE had grown barring Uttar Pradesh where 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

Expenditure Class	1993-94	2004-05	2011-12
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: Authors' calculations based on NSSO data

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 lower than the top class and the same phenomenon can also be observed between the bottom and middle classes.

4.3. Trends in Food Expenditure

When we look at rural India, food expenditure has shown a declining trend. However, food expenditure is still high in rural India (48.6 per cent), signifying high poverty in the region. With the improvement in income, a decline in food expenditure is expected and it is consistent with the popular Engel's law (1857).

In Kerala, Punjab and Rajasthan food expenditure is considerably low making a room for non-food expenditure. In addition, the higher expenditure on high value commodities in these states is striking. This is rooted in Bennett's law which establishes the positive relation between income growth and the demand for high value commodities.

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.

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: Calculated from Consumer Expenditure Reports, NSSO

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

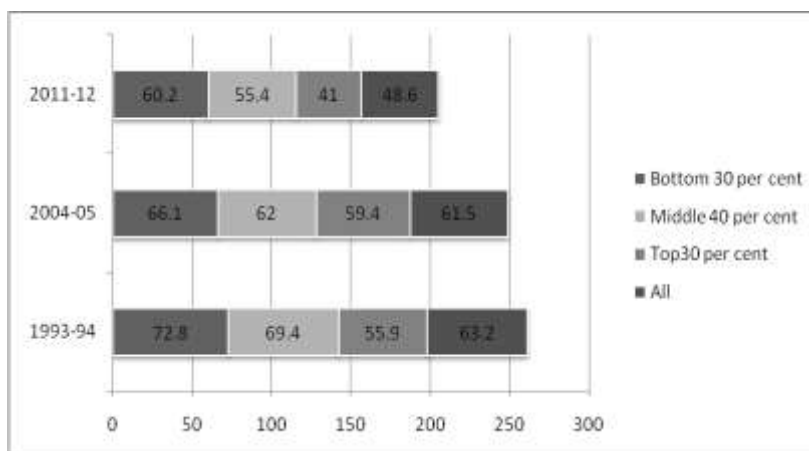


Figure 1 reveals that the bottom 30 per cent of the population spent on roughly 73 per cent and 60 per cent in 1993-94 and 2011-12 while the corresponding figures for middle 40 per cent are 69 per cent and 55 per cent respectively. The statistics would strengthen the argument that neither the bottom 30 per cent of the population nor middle 40 per cent of the population are better off.

4.4. 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 foodgrains 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 much 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 [23, 24]. 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: Consumer Expenditure Reports, NSSO

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: Author's Calculations based on NSS data

Since the bottom 30 per cent of the population is more prone to food insecurity and calorie deprivation, their food grains 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 (Table 5). 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 Madhura Swaminathan did not support for the reduction of food subsidies with immediate effect. Unlike the BPL surveys, the problem of exclusion and inclusion errors are less likely to emerge in NSS data on consumer expenditure when population is arranged in ascending order of monthly per capita consumption expenditure.

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.

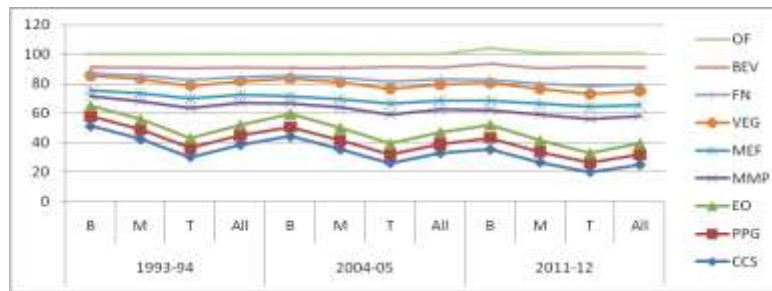
The share of cereals and high value commodities in food expenditure, reported in Table 6, however, does not enable us to make a detailed analysis between the rich and poor segments of the population. Hence, a disaggregated profile is imperative and is given in Figure 2. For the sake of convenience, nine broad commodity groups have been taken.

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: Author's calculations based on NSSO data

Figure 2. Share of expenditure on food in rural India by commodity and expenditure groups



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.

As observed from Figure 2, among the bottom expenditure groups, beverages and milk and milk products was 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.

5. Nutrient Consumption in Rural India

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 7 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 though 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.

By and large, the calories consumption was far from satisfactory taking all the NSSO rounds together. The causalisation of the work force, spatial differences in cropping patterns, ever-declining cereal consumption are the alleged factors, often cited in scholarly works [25]. For instance, 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 in Haryana (27%), Karnataka (26%), Rajasthan (21%) and West Bengal (20%), cereal consumption has sharply declined during the same period.

Table 7. 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: Consumer Expenditure Reports, NSSO

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.

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.

Table 8. Mean Per Capita Consumption of Calories, Protein and Fat across the Expenditure Classes

Expenditure Class	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: Calculated from Consumer Expenditure Reports, NSSO

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 8). 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.

6. Conclusion

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 shows 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.

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 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. A final verdict in this regard requires how many number or percentage of population is nutritionally deprived.

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