

Chapter 2

Changing Calorie Consumption and Dietary Patterns

While access to adequate food and appropriate caring practices underlie the formulation of nutrition policy in India, an emerging and different approach to nutrition is the notion of ‘food systems’ and their changing features within dynamic development processes put forward by the International Fund for Agricultural Development.¹

Food systems comprise all the factors and processes that determine the availability, flow, and use of food in a society, and that affect household food security conditions and dietary patterns over time. IFAD has recently drawn attention to the potential of using a food systems focus in the study of changing trends in access to food and dietary patterns. It recognizes in particular the opportunities offered by this approach for treating dietary issues in the wider context and not confining them to so-called ‘nutrition interventions’. The notion of ‘diet’,² as different from single foods is a critical concept: it integrates ecological, economic, social, cultural, and nutritional requirements and determinants for proper food ingestion, a prerequisite for proper nutritional status (IFAD 1992a).

The value of traditional diets in most subsistence economies is now being recognized. These diets are fairly adequate when food supplies are stable and populations at risk of food shortages adopt coping strategies to see them through seasonal or chronic hunger periods. However, feeding practices, particularly in the case of young children, are not always satisfactory as inadequate access to nutritious food as in the case of India and other countries is often exacerbated by a lack of nutritional information and knowledge. Added to these are undesirable dietary habits and practices, fixed attitudes and perceptions shaped by tradition and socio-cultural influences that could adversely affect nutritional status. ‘To attain good health and nutritional status, people need sufficient knowledge and skills to grow, purchase,

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¹ Food systems in economic transition and their significance for change in dietary patterns was the underlying theme of a sub-regional workshop jointly organized by IFAD and UNICEF Regional Office for South Asia in Kathmandu, Nepal, February 1992.

² The term ‘diet’ is used here with the generic meaning of combinations of foods prepared to become daily meals for human beings.

process, prepare, eat and feed their families a variety of foods in the right quantities and combinations' (Integrated Nutrition Programme South Africa).

'Research in recent years has pointed to the effects of rapid economic change on the viability of many traditional dietary patterns' (IFAD 1992a). With the transitioning from gathering and subsistence agriculture to the cultivation of cash crops, more food is purchased than produced and cash income attains major significance. Increasing reliance on markets for food has its own impacts on nutrition: insufficient cash incomes to meet the family's food requirement, the challenge of fluctuating food prices, exposure to aggressive advertising and increased access to a range of new products, which may be attractive but not necessarily nutritious. Kimura (2013) cites the case of Indonesia where 'healthy' instant noodles and fortified cookies to 'smart baby foods' are marketed as must haves for caring mothers, often leading to financial pressure and denigrating the value of traditional foods and eating habits. Similar trends are evident when analysing the changing dietary patterns in rural India and will be discussed further on in the chapter. In addition:

[T]raditional food patterns and eating habits have certain built-in 'codes' for choice, procurement, management and consumption of foods across seasons. Rapid exposure and access to new opportunities without a corresponding availability of new codes leaves people without guidance as to what to choose, and how to distinguish between the 'good' and 'less good' when money is scarce. Dietary confusion results, and there is risk of a critical imbalance in the household and eating patterns³ (IFAD 1992b).

In the last 20 years, there have been no significant changes in patterns of dietary intake in India. Cereals remain the staple food providing most of the energy intake. Since the seventies the consumption of foods like pulses, roots and tubers has fallen, while those of other foods like sugar, 'jaggery' (unrefined brown sugar), fats and oils, and green leafy vegetables has slightly increased. The average Indian diet remains largely deficient in green leafy vegetables, meat, fish, milk and milk products. Moreover, it also remains deficient in some micro-nutrients such as vitamin A, iodine and iron (FAO 2010). While traditional food choices substantively impact nutrition outcomes, there are other determinants at play. The Integrated Nutrition Programme, South Africa explains:

Apart from economic compulsions and modernization, a complex set of processes operating at the level of the household unit, within it and at the level of its individual members influence nutrition security. Household food security is one prerequisite for nutrition security. Within the limits of the household resource base, it is the decisions made within the household on the allocation of its resources that 'filter' these resources into their ultimate destination and finally ascertain the nutrition security of the individual members. The transition from household food security to nutrition security is therefore not a straightforward one (Integrated Nutrition Programme South Africa).

³ Such effects on dietary choices, in combination with social pressure on limited budgets for expenditures other than on food, has in some countries led to what has been called the 'second generation of nutrition problems'. This point was especially highlighted in the final report of the IFAD Nutrition Programming Mission to the Second Badulla Integrated Rural Development Project in Sri Lanka (June 1992).

2.1 Calorie Consumption Status of the Indian Population

The NSS 66th Round conducted during 2009–2010 records the average calorie intake per consumer unit in rural areas as ranging between 2,419 kcal per day in Gujarat to as much as 2,884 in Rajasthan. Only 7 of the 17 states surveyed, record average calorie intakes above the NSSO norm of 2,700 kcal per day, while in the case of urban areas, even lower levels of intake are recorded with only four states exceeding the norm. While Punjab, Orissa, and Andhra Pradesh record per consumer unit calorie intake above the norm in both rural and urban areas, this is not so in the other states. In fact in the case of Uttar Pradesh, calorie intake in rural areas is 10 kcal above the norm, while it is as much as 176 kcal below the norm in urban areas.

The National Statistical Survey (NSS) uses consumer unit as against per capita consumption to provide a more accurate measure of calorie intake. The number of consumer units assigned to a person is calculated on the basis of age and sex as per Table 2.1.

However, comparing calorie intake to a common norm for both urban and rural areas may be misleading as energy requirements are considerably higher in rural areas and norms more appropriate to rural and urban energy needs have been prescribed. The Planning Commission of India prescribes a minimum per capita daily requirement of 2,400 kcal in rural areas and 2,100 kcal in urban areas. These norms were established by the Planning Commission Task Force 1979 and continue to be utilized to define the poverty line. The Indian Council of Medical Research prescribes a norm of 2,425 kcal for adult males and 1,875 kcal for adult females, respectively, notwithstanding the location. The FAO has recently prescribed a requirement of 1,770 kcal per capita per day for India. However, the rider is that the requirement applies to those engaged in light or sedentary activity only, which rules out a large part of the population particularly the groups who are the most undernourished and earn their livelihoods through strenuous manual labour.

2.2 Trends in Calorie Consumption

In the almost four decades between the NSS 27th round conducted in 1972–1973 and the 66th round conducted in 2009–2010, there has been a sharp reduction in calorie intake in both rural and urban areas (Fig. 2.1). Only a few states form the exception. At the country level, per capita calorie consumption has decreased by as much as 246 kcal per day in rural areas and 161 in urban areas.

In the early 1970s, the gap between rural and urban per capita calorie intake was almost 200 kcal per day—the urban intake following exactly the prescribed norm. The rural intake was, however, 100 kcal per capita per day lower than the required minimum. By 1993–1994, both rural and urban intakes had fallen, the

Table 2.1 No. of consumer units assigned to a person

Sex	Age in completed years											
	<1	1–3	4–6	7–9	10–12	13–15	16–19	20–39	40–49	50–59	60–69	70+
Male	0.43	0.54	0.72	0.87	1.03	0.97	1.02	1	0.95	0.9	0.8	0.7
Female	0.43	0.54	0.72	0.87	0.93	0.8	0.75	0.71	0.68	0.64	0.51	0.5

Source NSS, 2012

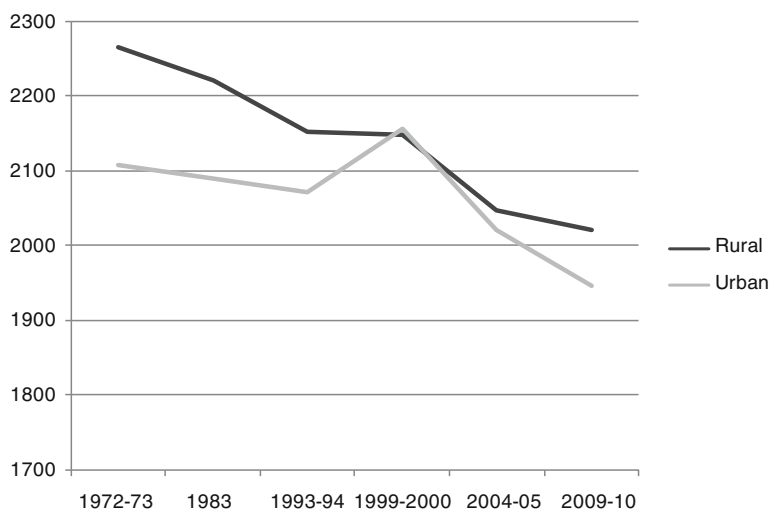


Fig. 2.1 India: Estimated Per Capita Calorie Intake per Day. *Source* Data is from the NSS 27th and 66th rounds

urban intake hovering just below (–29 kcal) the norm, but the rural substantially reduced at 2,153 kcal per capita. By early 2000, with higher incomes, urban calorie intake rose sharply above the required minimum, while rural intake remained stable and calorie intake became uniform cutting across location. For the next 5 years, calorie consumption declined sharply in both rural and urban areas and continues to do so, but at a slower pace. The gap between rural and urban calorie intake has once again emerged with rural intakes being marginally higher than urban (+74 kcal). What is more significant, however, is that both rural and urban calorie intake is below the minimum norms laid down by the Planning Commission Task Force.

At the level of individual states, of the 15 states for which data is available, only three states, i.e. Orissa (+131 kcal), Maharashtra (+156 kcal) and Kerala (+405 kcal) show an increase in per capita calorie consumption in rural areas. An additional state—West Bengal—shows an increase in intake (+6 kcal) which is so

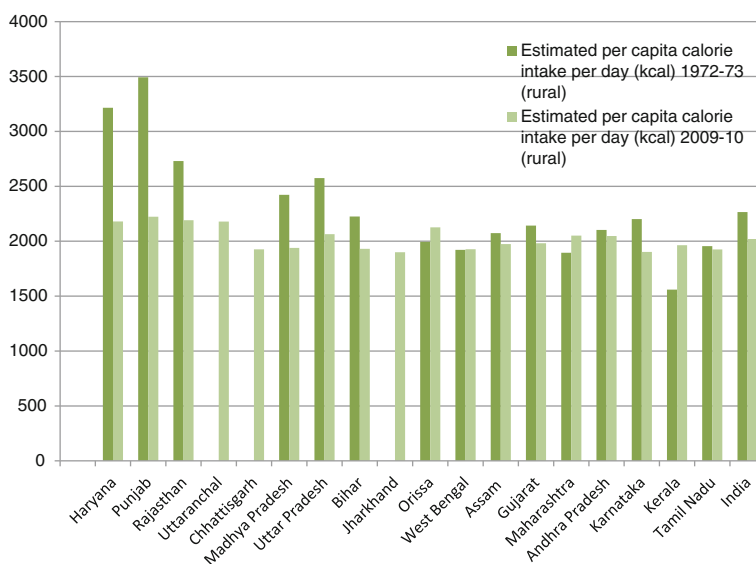


Fig. 2.2 Estimated calorie intake in rural areas (1972 vs. 2009). *Source* Data is from the NSS 27th and 66th rounds

slight as to be negligible. Kerala, however, shows a massive increase in per capita calorie consumption. The rural areas of Punjab and Haryana record the sharpest drop in calorie consumption by as much as 1,270 kcal and 1,035 kcal per day, respectively (Fig. 2.2).

The urban areas of the country reveal a similar situation. Four states record a sharp fall in calorie intake—Punjab (−721 kcal), Haryana (−469 kcal), Rajasthan (−343 kcal) and Madhya Pradesh (−375 kcal). Only three states—Kerala (+218), Karnataka (+62) and Tamil Nadu (+122) have registered an increase in calorie intake. Thus, cutting across the rural–urban divide, only Kerala has registered a substantive increase in per capita calorie consumption, while both Punjab and Haryana record a sharp downward trend (Fig. 2.3).

2.3 Trends in Food Expenditure

Food expenditure accounts for a substantial proportion of household consumer expenditure. In the Indian context, the proportion of expenditure on food is substantially higher in rural areas as compared to urban ones—a difference of 13 percent points (2009–2010). During the 1980s, this difference was much smaller—only about 8 percent points. Figure 2.4 depicts the trend in household food expenditure over 22 years (1987–1988 to 2009–2010).

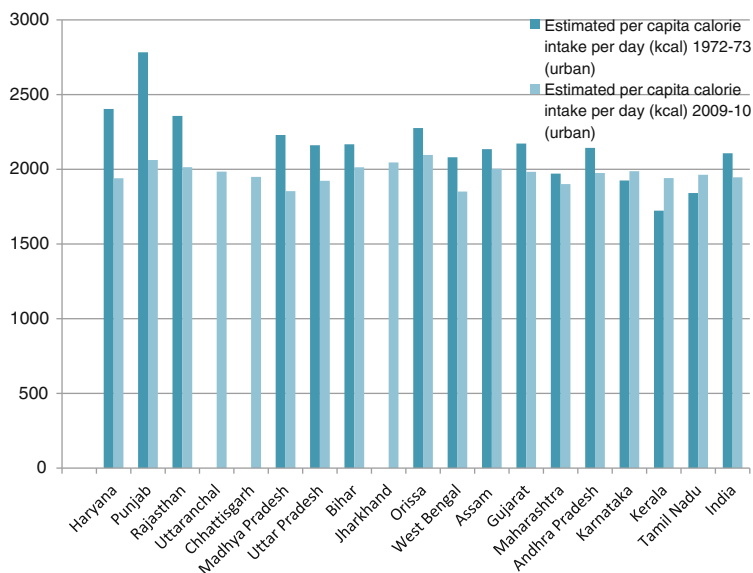


Fig. 2.3 Estimated per capita calorie intake in urban areas (1972 vs. 2000). *Source* Data is from the NSS 27th and 66th rounds

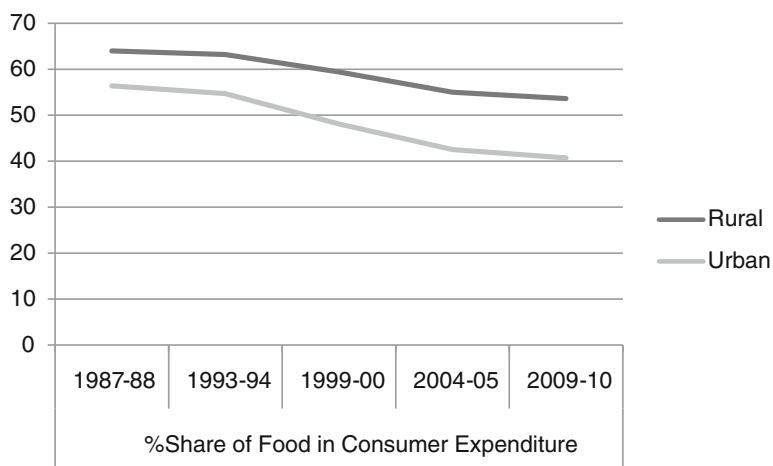


Fig. 2.4 Trends in food expenditure (1987–2009). *Source* Data is from the NSS 66th round

While there has been a steady decline in the proportion of household consumer expenditure on food in both rural and urban areas, the decline in rural areas has been more gradual falling by about 10 % over the period. In urban areas, however,

food expenditure has declined more steeply falling by about 16 % over the same period.

Across the states, there is a significant negative correlation ($r = -0.84$) between monthly per capita consumer expenditure and the proportion spent on food in rural areas indicating that the more affluent rural households allocate a lower proportion of household expenditure for food. In the urban areas, however, this relationship while still negative is not so strong ($r = -0.37$), indicating the higher urban expenditure on non-food items, particularly goods and services in both high income and low income households. The higher food prices in urban areas may also have a levelling effect.

2.4 Changes in Dietary Patterns

The Indian diet is heavily cereal-based both in response to traditional eating patterns and more recently, as a response to the sharply rising prices of other food items. Looking at calorie intake from cereals across deciles of Monthly Per Capita Expenditure (MPCE),⁴ it is obvious that the bulk of calorie consumption is from cereals. This is as high as 75 % in the lowest decile of MPCE in rural areas and slightly lower at 70 % in urban areas. With an increase in income and expenditure, the proportion gradually reduces following a parallel trend across both rural and urban areas. It is only in the second highest decile corresponding to an MPCE of Rs. 2,500 and 5,900 in rural and urban areas, respectively, that calorie intake from non-cereal sources increases significantly to above 50 % and in the highest expenditure decile to above 60 %.

It is assumed that an increase in income implies a diversification of the food basket with positive impacts on nutrition. While the Indian diet as discussed above is still heavily cereal dependent, the shift towards non-cereal food groups has not, as expected, been a positive one. Table 2.2 documents changes in dietary patterns in rural and urban areas over a decade and a half (1993–1994 to 2009–2010).

While the share of cereals in calorie intake has declined by about 7 percent points in rural areas, the decrease in cereal consumption is compensated by an increase of over 3 percent points in the consumption of oils and fats and a 2.5 percent points increase in the consumption of processed foods and beverages. A slight increase is recorded in milk and milk products and in meat and eggs, but this is counteracted by an equal decrease in the consumption of pulses and nuts and vegetables and fruit.

In urban areas, which started with a lower level of cereal consumption in the early 1990s, the decrease is also much lower—about 3.5 percent points. The consumption of processed foods has registered a slight increase and in fact stands

⁴ The population is divided into 10 decile classes of MPCE, the first decile corresponding to the bottom 10 % of the population and increasing progressively to reach the top 10 % of the population at the 10th decile.

Table 2.2 Changes in dietary patterns (1993–2009)

	Share of calorie intake from cereals (%)	Roots and tubers	Sugar and honey	Pulses, nuts, oilseeds	Veg and fruits	Meat, eggs, fish	Milk and milk products	Oils and fats	Misc. foods
<i>Rural</i>									
1993–1994	71.03	2.65	4.8	4.92	2.02	0.68	6.15	5.34	2.41
1999–2000	67.55	3.25	5.14	5.46	1.97	0.77	6.17	7.37	2.32
2004–2005	67.54	2.95	4.78	4.98	2.23	0.76	6.42	7.36	2.98
2009–2010	64.16	2.78	4.61	4.54	1.84	0.72	6.79	8.53	6.04
<i>Urban</i>									
1993–1994	58.53	2.54	6.21	6.05	3.26	1.02	8	8.79	5.6
1999–2000	55.05	2.9	6.15	6.8	2.94	1.12	8.23	11.24	5.52
2004–2005	56.08	2.82	5.69	6.68	3.17	1.05	8.61	10.58	5.32
2009–2010	55.01	2.59	5.66	5.94	2.62	1	9.37	11.92	5.87

Source NSS 66th Round

below the rural consumption level of this food group. The sharpest increase has been in the consumption of fats and oils (3.13 percent points), and a little over 1 percent points in the case of milk and milk products. In both rural and urban areas, essential foods providing proteins, healthy fats and micro-nutrients like pulses and oilseeds, and fruit and vegetables have registered a slight decline.

2.5 Determinants of Nutrition Status

This section attempts to explore the relationships between nutrition outcomes as expressed in the BMIs of adult men and women and dietary patterns, as well as household expenditure on food across 17 states. Data on underweight men and women in rural and urban areas is sourced from the National Family Health Survey (NFHS-3 2005–2006), while that on dietary patterns and household consumer expenditure is from the NSS 66th round household survey (2009–2010).

In the case of women, average calorie intake in rural areas yields a significant negative correlation ($r = -0.39$) with the proportion of undernourished rural women (BMIs below 18.5, the standard for Protein Energy Malnutrition (PEM)). However, this relationship, while still negative is insignificant in the case of women in urban areas ($r = -0.01$). In the case of rural men, a similar pattern emerges though less strong, with the correlation between energy-deficient men in rural areas returning a coefficient of -0.21 . In urban areas, however, once again the association between calorie intake and nutrition outcomes of adult men is insignificant (0.01).

While a negative relationship between calorie consumption and PEM does emerge though not as strong as expected, a further breakup of the calorie intake pattern provides revealing insights. A major problem with the Indian diet is the dominance of cereals, which leads to a lack of proteins and fats. Analysing the relationship between the average calorie intake from non-cereal foods and the proportion of undernourished women and men reveals a significant association in rural areas. The correlation between per cent undernourished rural women and the average calorie intake from non-cereal foods in rural areas is negative and significant ($r = -0.70$), implying that it is not merely the amount of calories consumed, but the content or quality of the diet which positively impacts nutrition outcomes. In the case of rural men, the association holds though it is weaker ($r = -0.59$). This association holds in urban areas too, being stronger in the case of women (-0.54), than in the case of men (-0.23).

The NSS divides food into nine categories: cereals; pulses; vegetable and fruits; roots and tubers; meat and eggs; milk and milk products; oils and fat; sugar and honey; and a miscellaneous food group composed mainly of beverages including tea, coffee and aerated drinks, together with biscuits, cakes and other processed foods. We have seen that increasing consumption of non-cereal foods is positively associated with the nutrition status of women, especially in rural areas. As all categories of non-cereal foods are not necessarily nutritious, it becomes important to examine whether the consumption of healthy non-cereal foods groups like pulses, vegetables and fruits, meat and eggs, milk and milk products, and oils and fats has an impact on nutrition outcomes. A correlation between the proportion of non-cereal food consumption (comprising of these five healthy food subgroups) in rural areas and the proportion of undernourished rural men and women across 17 states reveals a clear cut negative relationship, stronger in the case of women ($r = -0.33$) than in the case of men ($r = -0.25$). In urban areas, however, the association does not hold with the correlation being insignificant in the case of women ($r = -0.03$) and even positive ($r = 0.25$) in the case of urban men.

Analysing the relationship between per capita calorie consumption and household expenditure on food, a significant relationship emerges in urban areas both in the case of expenditure on food as a whole ($r = 0.43$) and that on cereals alone ($r = 0.33$). As cereals are a major component of the Indian diet, it was necessary to examine the role of cereals independently from food as a whole. However, this association does not hold in rural areas with the correlations between household expenditure on food and that on cereals alone returning a negative coefficient with per capita calorie consumption ($r = -0.34$) in the case of food and ($r = -0.31$) in the case of cereals. (Also see Fig. 2.5.) A possible explanation may lie in the fact that in rural areas a significant proportion of free meals are obtained from schools, *balwadis* (ICDS centres), employers and other sources as compared to urban areas, thus obscuring the relationship between expenditure on food and calorie intake. The proportion of free meals averages

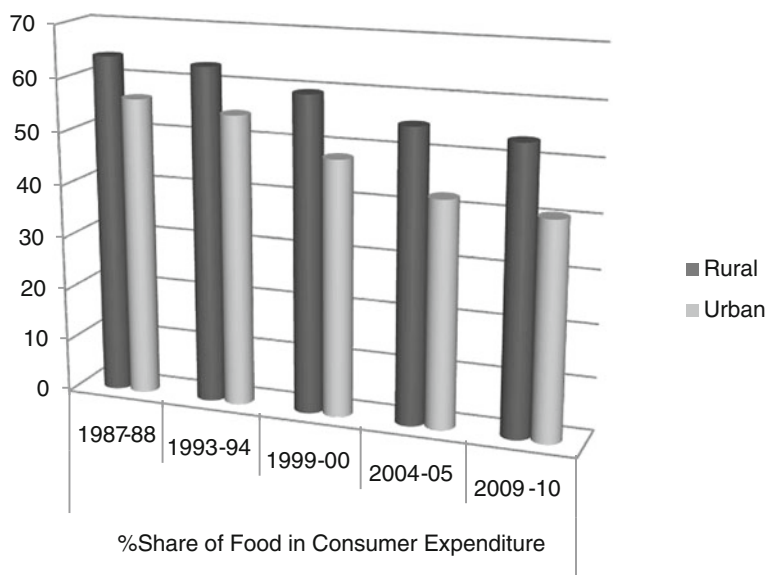


Fig. 2.5 Share of food in household consumer expenditure

Table 2.3 Average number of free meals per household per month

	Average number of free meals consumed per household over 30 days			
	From school, balwadi, etc.	From employer	Others	All
Rural	8.68	0.33	3.62	12.63
Urban	2.85	0.68	3.66	7.19

NSS 66th Round

12.63 free meals per 30 days for rural households across all expenditure deciles and 7.19 in the case of urban areas. The source-wise breakup can be seen in Table 2.3.

2.6 Nutrition Outcomes: Best and Worst Performing States

An attempt is made in this section to develop a composite index of nutrition outcomes at state level, rank the states on this index and explore possible explanatory factors. The NFHS provides state-wise data on the body mass index of adult men and women (aged 15–49) with rural–urban breakups. Data on under-weight children below 3 years of age is also available with rural–urban breakup.

Table 2.4 Underweight adults and children in rural areas: state-wise percentages and ranks

State	Underweight women (rural) (%)	Rank	State	Underweight men (rural) (%)	Rank	State	Underweight children <3 years (rural) (%)	Rank	State	Composite score nutrition outcomes (rural)	Composite rank nutrition outcomes (rural)
Sikkim	10.6	1	Mizoram	6.7	1	Sikkim	22.1	1	Sikkim	4	1
Meghalaya	13.1	2	Sikkim	7.4	2	Manipur	25.2	2	Meghalaya	8	2
Kerala	14.3	3	Meghalaya	7.9	3	Mizoram	28.8	3	Punjab	12	3
Punjab	14.5	4	Punjab	11.2	4	Punjab	29.9	4	Mizoram	12	4
Manipur	15.5	5	Nagaland	11.3	5	Jammu & Kashmir	31.6	5	Manipur	14	5
Nagaland	16.9	6	Kerala	12.3	6	Nagaland	31.8	6	Kerala	16	6
Arunachal Pradesh	18.6	7	Manipur	13	7	Kerala	31.9	7	Nagaland	17	7
Mizoram	20.7	8	Arunachal Pradesh	13.8	8	Tamil Nadu	34.8	8	Jammu & Kashmir	26.5	8
Himachal Pradesh	25.8	9	Goa	20.6	9	Himachal Pradesh	36.4	9	Himachal Pradesh	28	9
Jammu & Kashmir	26.1	10	Himachal Pradesh	21.7	10	Goa	38.6	10	Goa	29.5	10
Goa	26.1	11	Jammu & Kashmir	22.2	11	Tripura	39.2	11	Arunachal Pradesh	31	11
Tamil Nadu	30	12	Tamil Nadu	22.3	12	Andhra Pradesh	40.4	12	Tamil Nadu	32	12
Uttarakhand	30.8	13	Uttarakhand	25.6	13	Uttarakhand	40.8	13	Uttarakhand	39	13
Haryana	32.5	14	Andhra Pradesh	29.2	14	Assam	41.1	14	Haryana	44	14
Assam	35.9	15	Haryana	30	15	Haryana	41.8	15	Andhra Pradesh	44.5	15

(continued)

Table 2.4 (continued)

State	Underweight women (rural) (%)	Rank	State	Underweight men (rural) (%)	Rank	State	Underweight children <3 years (rural) (%)	Rank	State	Composite score nutrition outcomes (rural)	Composite rank nutrition outcomes (rural)
Rajasthan	36.5	16	Bihar	30.9	16	Arunachal Pradesh	42.1	16	Assam	51	16
Uttar Pradesh	37.2	17	Karnataka	31.6	17	Maharashtra	43.5	17	Karnataka	55	17
Tripura	37.5	18	Maharashtra	31.8	18	Karnataka	45.1	18	Tripura	56.5	18
Andhra Pradesh	37.5	19	Orissa	34.5	19	Orissa	45.7	19	Maharashtra	57	19
Karnataka	38.2	20	Gujarat	35.2	20	Rajasthan	45.9	20	Rajasthan	61	20
Gujarat	41.9	21	Chhattisgarh	35.6	21	West Bengal	46.7	21	Orissa	61	21
Maharashtra	43	22	Assam	35.9	22	Meghalaya	48	22	Uttar Pradesh	63	22
Orissa	43.7	23	Uttar Pradesh	36.5	23	Uttar Pradesh	49.4	23	Gujarat	65	23
Madhya Pradesh	44.2	24	West Bengal	38	24	Gujarat	50	24	Bihar	69	24
West Bengal	44.9	25	Rajasthan	38.5	25	Chhattisgarh	54.6	25	West Bengal	70	25
Chhattisgarh	45.7	26	Jharkhand	38.6	26	Bihar	59.3	26	Chhattisgarh	72	26
Bihar	45.9	27	Tripura	39.5	27	Madhya Pradesh	62.6	27	Madhya Pradesh	79	27
Jharkhand	47.8	28	Madhya Pradesh	41.1	28	Jharkhand	63.1	28	Jharkhand	82	28

Source NFHS-3 (2005–2006)

Fig. 2.6 Dietary diversity in Punjab

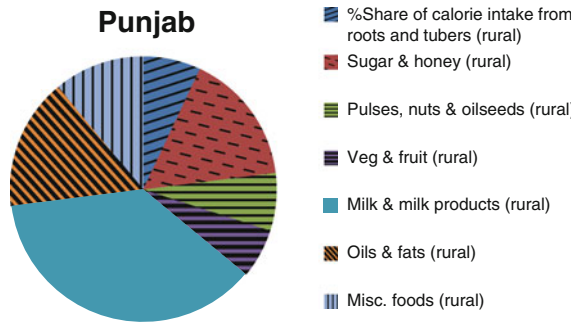
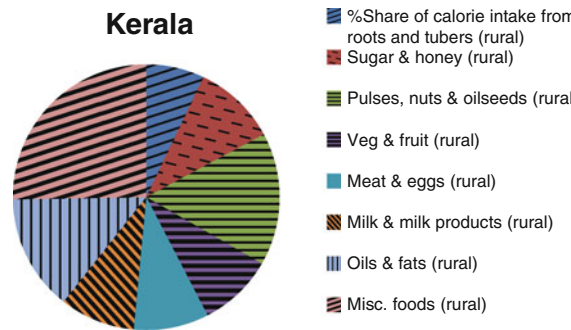


Fig. 2.7 Dietary diversity in Kerala



Data on the percentage of underweight men, women and children in rural areas was arranged in ascending order and ranked. The ranks were then totaled to yield a composite index of nutrition status. A final ranking of the composite values yielded a range of states with the best to the worst performance on nutrition outcomes (Table 2.4).

Of the 28 states for which comparable data was available, the top five states in terms of family nutrition status are Sikkim, Meghalaya, Mizoram and Manipur—all from the North East and the northern state of Punjab. The five worst performing states on family nutrition outcomes include the Bihar-Jharkhand, Madhya Pradesh-Chhattisgarh cluster of underdeveloped states together with West Bengal. Nutrition outcomes as has been discussed above are not only a result of calorie intake, but stem from several other food and non-food factors. One of these is the composition of the diet. We have looked at the changes taking place in the calorie consumption pattern across India over the last few decades and also examined the relationship between consumption of healthy food groups and nutrition outcomes. In this section we attempt to further examine the variations in dietary patterns in the rural and urban areas of the best and worst performing states with a view to identifying contributing factors. In Sect. 2.5 the impact of five healthy food groups was assessed. In this section, however, the breakup of calorie consumption across all seven food groups is analysed. As NSS data on dietary patterns is not available

Fig. 2.8 Dietary diversity in Madhya Pradesh

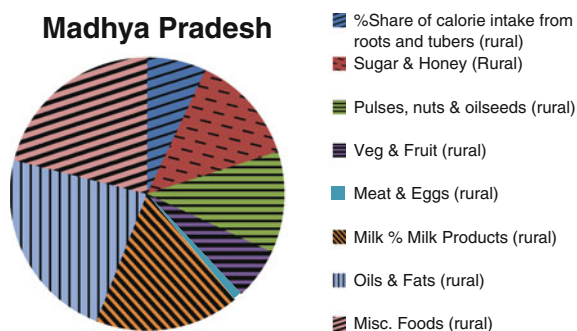
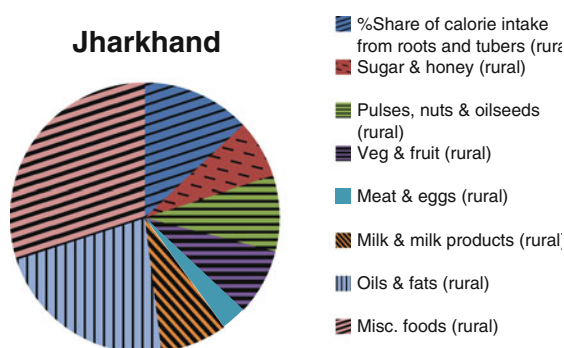


Fig. 2.9 Dietary diversity in Jharkhand



for the north eastern states, Punjab (ranked 5th) from the five best performing states and the next highest ranking state for which data is available, i.e. Kerala (ranked 6th) are selected for the analysis. Of the worst performing states, Madhya Pradesh (ranked 27th) and Jharkhand (ranked 28th) of 28 states are analysed (see Figs. 2.6, 2.7, 2.8, 2.9).

What immediately strikes one is the extremely large share of miscellaneous foods in the composition of calorie intake. Of the four states examined here, only Punjab has a fairly low share at 11 %. In the other three states, with both high nutrition status (Kerala) and extremely poor nutrition levels (Jharkhand and Madhya Pradesh), the contribution of processed foods and beverages is well over 25 %, in the case of Jharkhand reaching as high as 30 %. What makes the dietary composition healthier in the two top performing states is perhaps, the dominance of milk and milk products in Punjab (37 %) and the fine balance between various food groups in Kerala.

In the case of the worst performing state Jharkhand, however, over half (52 %) of the calories from non-cereal food groups are accounted for by miscellaneous foods, and oils and fats. In Madhya Pradesh too, the contribution of miscellaneous foods, and oils and fats is extremely high at 44 %, but milk and milk products account for almost twice as much of the calorie intake as in the case of Jharkhand.

2.7 Rural–Urban Variations in Nutrition Outcomes

It is an unquestioned fact that undernutrition is much more severe in rural than in urban areas—this despite the fact that the urban population contains large segments of slum dwellers, daily wage earners, homeless people and itinerants seeking better livelihoods. This section seeks to explore the variations in nutrition status of urban and rural populations across the major states of the country with a view to answering the following questions:

1. Is the nutrition status of a population determined by its geographical location/regional boundaries?
2. Does urban–rural location have a stronger role in determining nutrition levels?

The methodology adopted here involves the development of a composite index of nutrition status in the urban areas of the 28 major states. The process is detailed in [Sect. 2.6](#), which describes the preparation of a similar index for rural areas. [Table 2.5](#) below ranks the major states by the nutrition status of urban men, women and children separately and on a composite index of nutrition levels of the urban population.

The five best performing states ([Table 2.6](#)) once again include three from the north east, i.e. Mizoram, Sikkim and Manipur. The other two top performers are Jammu and Kashmir followed by Kerala. Based on the composite score, Mizoram clearly outperforms the other four states. At the bottom on the nutrition outcomes list are Madhya Pradesh, Jharkhand and Bihar joined by Tripura and Rajasthan. Comparing the performance of the states in urban and rural areas ([Tables 2.4](#) and [2.5](#)), it is evident that only three states retain best performance status across rural and urban areas. These are Mizoram, Manipur and Sikkim. The two other states falling in the best nutrition outcome class vary according to urban/rural location. In the rural areas, Punjab and Meghalaya perform well, while in the urban areas they yield place to Kerala and Jammu and Kashmir.

Similarly, among the states with the poorest nutrition outcomes, Madhya Pradesh, Jharkhand and Bihar cut across rural–urban differences and score uniformly poor ranks. The new states joining the worst performance ranks are West Bengal and Chhattisgarh in rural areas and Rajasthan and Tripura in urban ones.

What needs to be noted here is that West Bengal scores a rank of 15 out of 28 where the nutrition status of the urban population is concerned, but drops to an extremely low rank of 25 where the nutrition status of the rural population is considered. The reverse is true in the case of Meghalaya, which scores second rank in rural areas, but drops to 12th rank in urban areas. Punjab follows a similar pattern, but the difference is not so sharp—third rank (rural) and seventh rank (urban). It appears puzzling that states which ensure good nutrition to one segment of their population relative to other major states are unable to do the same for the other segment. Further research is called for to understand this anomaly.

Table 2.5 Underweight adults and children in urban areas: state-wise percentages and ranks

State	Underweight women (urban) (%)	Rank	State	Underweight men (urban) (%)	Rank	State	Underweight children <3 years (urban) (%)	Rank	State	Composite score nutrition outcomes (urban)	Composite rank nutrition outcomes (urban)
Sikkim	5.1	1	Mizoram	5.5	1	Mizoram	13.8	1	Mizoram	8	1
Jammu & Kashmir	9.1	2	Sikkim	6.4	2	Manipur	20.3	2	Sikkim	12	2
Kerala	9.1	3	Himachal Pradesh	6.8	3	Jammu & Kashmir	20.6	3	Manipur	12	3
Manipur	10.1	4	Meghalaya	8.2	4	Nagaland	21.3	4	Jammu & Kashmir	16	4
Himachal Pradesh	10.3	5	Nagaland	9.6	5	Punjab	21.5	5	Kerala	17	5
Mizoram	11	6	Manipur	10.6	6	Goa	21.6	6	Nagaland	18	6
Uttaranchal	11.1	7	Kerala	11.2	7	Kerala	22.5	7	Punjab	21	7
Punjab	11.8	8	Punjab	13.2	8	Arunachal Pradesh	23.8	8	Himachal Pradesh	24	8
Nagaland	13.1	9	Uttaranchal	13.2	9	Sikkim	26	9	Uttaranchal	27	9
Arunachal Pradesh	14.3	10	Arunachal Pradesh	13.5	10	Andhra Pradesh	29.1	10	Arunachal Pradesh	28	10
Meghalaya	15.7	11	Jammu & Kashmir	14.1	11	Uttaranchal	29.4	11	Goa	31	11
Goa	16.1	12	Tamil Nadu	14.4	12	West Bengal	30	12	Meghalaya	34	12
Tamil Nadu	16.2	13	Goa	14.5	13	Tamil Nadu	31.3	13	Andhra Pradesh	34	13
Andhra Pradesh	16.4	14	Andhra Pradesh	15.3	14	Orissa	33.3	14	Tamil Nadu	38	14

(continued)

Table 2.5 (continued)

State	Underweight women (urban) (%)	Rank	State	Underweight men (urban) (%)	Rank	State	Underweight children <3 years (urban) (%)	Rank	State	Composite score nutrition outcomes (urban)	Composite rank nutrition outcomes (urban)
Haryana	16.9	15	Karnataka	15.5	15	Karnataka	33.8	15	West Bengal	46	15
Gujarat	19.5	16	West Bengal	15.9	16	Himachal Pradesh	33.9	16	Karnataka	47	16
Karnataka	19.8	17	Maharashtra	17.3	17	Assam	34.1	17	Maharashtra	54	17
West Bengal	19.9	18	Jharkhand	17.4	18	Maharashtra	34.8	18	Haryana	61	17.5
Maharashtra	20.7	19	Chhattisgarh	17.9	19	Meghalaya	35.9	19	Gujarat	61	17.5
Assam	22.5	20	Gujarat	18.3	20	Rajasthan	36.3	20	Orissa	61	20
Uttar Pradesh	23.3	21	Bihar	18.6	21	Tripura	37	21	Assam	64	21
Chhattisgarh	23.5	22	Haryana	19.3	22	Uttar Pradesh	37.9	22	Chhattisgarh	64	22
Tripura	23.8	23	Orissa	19.4	23	Chhattisgarh	38.9	23	Uttar Pradesh	67	23
Orissa	24.1	24	Uttar Pradesh	21.9	24	Haryana	42.1	24	Rajasthan	71	24
Bihar	25	25	Rajasthan	22.8	25	Gujarat	42.7	25	Tripura	72	25
Rajasthan	25.6	26	Madhya Pradesh	22.8	26	Jharkhand	43.3	26	Bihar	73	26
Jharkhand	26.1	27	Assam	22.8	27	Bihar	51.5	27	Jharkhand	81	27
Madhya Pradesh	28.7	28	Tripura	32.6	28	Madhya Pradesh	52.8	28	Madhya Pradesh	82	28

Source NFHS-3 (2005–2006)

Table 2.6 Nutrition outcomes (composite scores): best and worst performing states

Rural areas	Composite score nutrition outcomes (rural)	Composite rank nutrition outcomes (rural)	Urban areas	Composite score nutrition outcomes (urban)	Composite rank nutrition outcomes (urban)
<i>Five best performing states</i>					
Sikkim	4	1	Mizoram	8	1
Meghalaya	8	2	Sikkim	12	2
Punjab	12	3	Manipur	12	3
Mizoram	12	4	Jammu & Kashmir	16	4
Manipur	14	5	Kerala	17	5
<i>Five worst performing states</i>					
Bihar	69	24	Rajasthan	71	24
West Bengal	70	25	Tripura	72	25
Chhattisgarh	72	26	Bihar	73	26
Madhya Pradesh	79	27	Jharkhand	81	27
Jharkhand	82	28	Madhya Pradesh	82	28

References

- FAO. (2010). Nutrition country profiles: India. Retrieved January 10, 2010, from http://www.fao.org/ag/agn/nutrition/ind_en.stm
- IFAD. (1992a). Sub-regional workshop jointly organized by IFAD and UNICEF Regional Office for South Asia in Kathmandu, Nepal. February 1992. Retrieved January 12, 2010, from http://www.ifad.org/hfs/approach/hfs/nutrition/nut_2.htm
- IFAD. (1992b). Nutrition programming mission to the second Badulla Integrated Rural Development Project in Sri Lanka. Retrieved January 12, 2010, from http://www.ifad.org/evaluation/public_html/eksyst/doc/country/pi/srilanka/srilanka.pdf
- Kimura, Aya Hirata. (2013). *Hidden hunger: Gender and the politics of smarter foods*. Ithica and London: Cornell University Press.
- National Family Health Survey (NFHS-3). (2005–2006). Ministry of Health and Family Welfare, Government of India (Vol. 1).
- National Sample Survey Organisation (NSSO). Government of India. (1983). A note on per capita per diem intake of calories, protein and fat based on the data collected in the Household Survey on Consumer Expenditure, NSS 27th round: October 1972–September 1973. *Sarvekshana*, VI, 3–4, 1983.
- National Sample Survey Organisation, Government of India. (2012). Nutritional intake in India. NSS 66th round, (July 2009–June 2010). Report no. 540. New Delhi: National Statistical Organisation, National Sample Survey Office.
- The Integrated Nutrition Programme (2011). Nutritional status. Directorate Nutrition, National Department of Health of South Africa. Retrieved March 13, 2011, from <http://www.doh.gov.za/programmes/inp/status.htm>

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