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**SUBJECT II**  
**TRENDS IN FOOD CONSUMPTION AND NUTRITION - FOOD**  
**SECURITY CONCERNS**

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**The Dynamics and Inequality of Nutrient  
Consumption in India**

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**I**

**INTRODUCTION**

Food being the foremost basic need gets the priority in the pattern of expenditure of people, especially the poor class. Access to food demands affordability, which depends upon the twin factors, namely, income of the people and prices prevailing in the country. Slower growth in income than prices would undermine the purchasing power, resulting in inadequate access to food and calorie consumption. Foodgrains account for about four-fifth of the calorie intake of the poor and an increase in cereal prices could significantly reduce the calorie intake of the poor, as it is sensitive to cereal prices.

The dietary changes that characterise the “nutrition transition” include both quantitative and qualitative changes in the diet. Income, prices, individual preferences and beliefs, cultural traditions as well as geographical, environmental, social and economic factors all interact in a complex manner to shape the dietary consumption pattern (WHO, 2003).

India has achieved self-sufficiency in food production and also enhanced its capacity to cope with inter year fluctuations in production. Even after these achievements at the national level, the problem of household food insecurity is yet to be solved. The foodgrain self-sufficiency that is visible in India is often argued to be due to the lack of purchasing power among large masses of rural population (Sen, 1983). The problem of transitory food insecurity is associated with issues related to either access or availability of food whereas chronic food insecurity is associated primarily with poverty and arises due to continuously inadequate diet (Radhakrishna, 2002). Though India's achievement in combating transitory food insecurity is commendable, the issue of chronic food insecurity still persists in the country. The average calorie consumption in India is already low by international standards and it has declined despite the much acclaimed economic growth of the country. This paper

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analyses the dynamics of the per capita expenditure on various food groups, including cereals, across income groups and the consumption of cereals and calorie intake in India. The interstate variability and inequality in food and energy intake are also verified in the paper. The study uses data from the 27th, 32nd, 38th, 43rd, 50th and 55th Rounds of household consumption expenditure surveys conducted by the NSSO.

## II

## CHANGING PATTERN OF CONSUMPTION EXPENDITURE

The share of non-cereal items in the monthly per capita expenditure (Table 1) has been consistently increasing in both the rural and urban areas. The fall in percentage share of cereal items in the monthly per capita expenditure was more in rural areas as it declined from 55.70 per cent in 1972-73 to 37.31 per cent in 1999-2000, while in urban areas it declined from 36.12 per cent to 25.7 per cent. The divergence in the percentage share spent on cereals between rural and urban areas narrowed down from 19.58 per cent to 11.61 per cent in the above period.

TABLE 1. SHARE OF MONTHLY PER CAPITA EXPENDITURE ON CEREAL AND NON-CEREAL FOOD ITEMS IN INDIA

Year (1)	Rural areas		Urban areas	
	Cereals (2)	Non-Cereals (3)	Cereals (4)	Non-Cereals (5)
1972-73	55.70	44.30	36.12	63.88
1977-78	51.01 (-8.43)	48.99 (10.59)	34.17 (-5.4)	65.83 (3.06)
1983-84	49.24 (-3.47)	50.76 (3.62)	32.83 (-3.93)	67.17 (2.04)
1987-88	40.99 (-16.76)	59.01 (16.26)	26.46 (-19.41)	73.54 (9.49)
1993-94	38.30 (-6.57)	61.70 (4.56)	25.69 (-2.92)	74.31 (1.05)
1999-2000	37.31 (-2.59)	62.69 (1.61)	25.70 (0.04)	74.30 (-0.02)

Note: Figures in parentheses indicate percentage change over the previous row.

The share of non-food consumption expenditure increased from 27.1 per cent in 1972-73 to 40.6 per cent in 1999-2000 in rural areas while it increased from 35.5 per cent to 51.9 per cent in urban areas (Table 2). In rural areas about 59 per cent of the total expenditure was on food items while it was only 48 per cent in the urban areas in 1999-2000. The share of cereals and pulses in total expenditure in urban areas declined from 26.73 per cent in 1972-73 to about 15 per cent in 1999-2000. The share of vegetable, fruits and nuts indicated an increasing pattern upto 1993-94 and then slightly declined to 7.55 per cent in 1999-2000.

An increase in expenditure share of food items like milk, edible oil, meat, fish, egg, vegetables and fruit and nuts is visible in both rural and urban areas and it was discernible in the rural areas. The share of consumption expenditure on milk products increased from 7.29 per cent in the 27th round to a maximum of 9.49 per cent in the

50th Round and then declined to 8.75 per cent in the 55th Round while that of meat, egg and fish increased from 2.47 to 3.34 per cent and then to 3.32 per cent in the respective rounds in rural areas. The consumers in urban areas are more likely to diversify their diets to meat and milk (Huang and Bouis, 1996; Anderson *et al.*, 1997). The improvement in economic access to food, made possible by income growth, did not result in a higher consumption of cereals, but has increased the consumption of vegetables, fruits and nuts and livestock products, especially, milk and eggs.

TABLE 2. PERCENTAGE DISTRIBUTION OF MONTHLY PER CAPITA CONSUMPTION (RURAL) EXPENDITURE IN VARIOUS NSS ROUNDS

NSS Round/ Commodity (1)	27th		32nd		38th		43rd		50th		55th	
	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)	Urban (7)	Rural (8)	Urban (9)	Rural (10)	Urban (11)	Rural (12)	Urban (13)
Cereals	40.6	23.3	32.8	20.5	32.3	19.4	26.3	15	24.2	14	22.2	12.4
Gram	0.6	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1
Cereal substitutes	0.5	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0
Pulses and products	4.3	3.4	3.8	3.6	3.5	3.2	4	3.4	3.8	3	3.8	2.8
Milk and products	7.3	9.3	7.7	9.5	7.5	9.2	8.6	9.5	9.5	9.8	8.8	8.7
Edible oil	3.5	4.9	3.6	4.6	4	4.8	5	5.3	4.4	4.4	3.7	3.1
Meat, egg, fish	2.5	3.3	2.7	3.5	3	3.6	3.3	3.6	3.3	3.4	3.3	3.1
Vegetables	3.6	4.4	3.8	4.4	4.7	5	5.2	5.3	6	5.5	6.2	5.1
Fruits and nuts	1.1	2	1.1	2	1.4	2.1	1.6	2.5	1.7	2.7	1.7	2.4
Sugar	3.8	3.6	2.6	2.6	2.8	2.5	2.9	2.4	3.1	2.4	2.4	1.6
Salt and spices	2.8	2.3	3	2.7	2.5	2.1	2.9	2.3	2.7	2	3	2.2
Beverages, etc.	2.4	7.6	2.5	6.3	3.3	6.8	3.9	6.8	4.2	7.2	4.2	6.4
Non-cereals	32.3	41.2	31.5	39.5	33.3	39.7	37.7	41.4	39	40.7	37.2	35.7
Food total	72.9	64.5	64.3	60	65.6	59.1	64	56.4	63.2	54.7	59.4	48.1
Non-food total	27.1	35.5	35.7	40	34.4	40.9	36	43.6	36.8	45.3	40.6	51.9
Total expenditure	100	100	100	100	100	100	100	100	100	100	100	100

Note: 27th Round- October 1972 to September 1973. 43rd Round- July 1987 to June 1988.  
 32nd Round- July 1977 to June 1978. 50th Round- July 1993 to June 1994.  
 38th Round- January 1983 to December 1983. 55th Round- July 1999 to June 2000.

### III

#### SHIFTING PATTERN OF CONSUMPTION

The per capita consumption of cereals has been declining in India. Over a period of about three decades, the rural per capita consumption of cereals (Table 3) has shown a steeper decline from 15.26 kg per month in 1972-73 to 12.72 kg in 1999-2000, exhibiting a decline of about 15.71 per cent while, it declined from 11.24 kg to 10.42 kg for the same period in urban areas with a reduction of 7.95 per cent. The rural-urban differential in cereal consumption has come down from 3.76 kg in 1972-

73 to 2.30 kg in 1999-2000, even though rural per capita consumption was still higher by as much as 22 per cent in 1999-2000. This difference in consumption could be the result of own foodgrain production and consumption in rural areas, rural-urban price divergence due to market margin, varied preferences due to higher incomes in the urban areas, and variety of foods available in the urban markets. There is a shift in the consumption pattern among different grains both in the rural as well as urban areas. The consumption of rice was hovering around 7 kg per month in rural areas and its share in total cereal consumption increased from 43.18 per cent in 1972-73 to 53.31 percent in 1999-2000 while, it was about 5 kg in urban areas with its share increasing from 43.95 per cent to 50.1 per cent in the above period.

TABLE 3. PER CAPITA CONSUMPTION OF CEREALS

NSS Round (1)	Rural				Urban			
	Rice (2)	Wheat (3)	Coarse cereals (4)	Total cereals (5)	Rice (6)	Wheat (7)	Coarse cereals (8)	Total cereals (9)
27th	6.59 (43.18)	3.88 (25.43)	4.79 (31.39)	15.26 (100)	4.94 (43.95)	4.82 (42.88)	1.48 (13.17)	11.24 (100)
32nd	7.12 (45.41)	4.05 (25.83)	4.51 (28.76)	15.68 (100) [2.75]	5.48 (47.16)	4.87 (41.91)	1.27 (10.93)	11.62 (100) [3.38]
38th	6.63 (44.8)	4.46 (30.14)	3.71 (25.07)	14.8 (100) [-5.61]	5.32 (47.08)	4.82 (42.65)	1.16 (10.27)	11.30 (100) [-2.75]
43rd	7.04 (47.03)	4.94 (33)	2.94 (19.64)	14.97 (100) [1.15]	5.35 (47.81)	4.98 (44.5)	0.83 (7.42)	11.19 (100) [-0.97]
50th	7.00 (52.24)	4.4 (32.84)	2.00 (14.93)	13.4 (100)[-10.49]	5.28 (49.67)	4.72 (44.4)	0.86 (8.09)	10.63 (100) [-5.00]
55th	6.78 (53.3)	4.55 (35.77)	1.39 (10.93)	12.72 (100) [-5.07]	5.22 (50.1)	4.77 (45.78)	0.43 (4.13)	10.42 (100) [-1.98]

*Note:* Figures in parentheses (ordinary) indicate the percentage to total cereals and figures in square brackets indicate percentage change over previous row.

An obvious increase in the consumption of wheat in rural areas was noticed with the share increasing from 25.43 per cent in 1972-73 to 35.77 per cent in 1999-2000 while it increased from 42.88 per cent to 45.78 per cent in urban areas. The coarse cereal consumption in rural areas declined drastically from 4.79 to 1.39 kg in the above period, with the share in cereal consumption declining to 10.93 per cent from about 31 per cent. With the exception of 32nd and 43rd Rounds, a decline in cereal consumption over the previous NSSO round was noticed in all the consumption surveys.

The two-way effect of increase in income on food consumption is substitution of fine grains for the coarse ones and subsequent replacement of cereals by protective foods like milk, fruits and vegetables depending on income, customs, habits and taste of the people. Higher per capita consumption of cereals in the rural areas are due to the factors other than income and price like higher prices of non foodgrain and non-

food items, higher energy requirements due to manual labour, payment of wages in kind by the large farmers in the form of cooked food and the poor state of health and environment resulting in the low efficiency of conversion of food into energy. Though both the income and price variables do influence the per capita consumption of foodgrains in the expected direction, but their impact is more pronounced among the lower expenditure groups and that the overall impact would drain over a period of time (Rao, 2000).

## IV

## DYNAMICS OF NUTRIENT INTAKE IN INDIA

Food consumption expressed in Kilocalories (Kcal) per capita is a key variable used for measuring and evaluating the evolution of a country's food situation. In defining poverty, the Planning Commission had applied the calorie requirement norm of 2400 Kcal per capita for the rural areas and 2100 Kcal per capita for the urban areas. The NSS estimates of calorie intake have shown a declining trend between 1972-73 and 1999-00 (Table 4). Despite the moderate increase in the food expenditure, the nutrient intake did not improve between 1972-73 and 1993-94. The changes in the composition of diet have increased the cost of calories (Radhakrishna and Ravi, 1991; Murty, 1999). The per capita calorie intake declined by 5.25 per cent in rural areas whereas it increased at 2.32 per cent in urban areas for the period from 1972-73 to 1999-2000. There is a convergence between rural and urban patterns of calorie consumption, in spite of the long-term decline in calorie consumption. Given the perception that the rural population tends to consume more calories because of the greater intensity of work in rural areas, this convergence is worth noticing.

TABLE 4. PER CAPITA INTAKE OF CALORIE, PROTEIN AND FAT IN VARIOUS NSS ROUNDS

NSS Round (1)	Rural			Urban		
	Calorie (cals.) (2)	Protein (gms) (3)	Fat (gms) (4)	Calorie (cals.) (5)	Protein (gms) (6)	Fat (gms) (7)
27th	2,266	62	24	2,107	56	36
38th	2,204	62	27	2,086	56	35
50th	2,153	60	31	2,071	57	42
55th	2,149	59	36	2,156	59	50
Percentage change over the previous round						
38th	-2.74	0.00	12.50	-1.00	0.00	-2.78
50th	-2.31	-2.90	16.30	-0.72	2.14	20.00
55th	-0.19	-1.83	14.97	4.10	2.27	18.10
Total change (55th over 27th)	-5.24	-4.73	43.76	2.39	4.42	35.32

Despite the increase in food expenditure between 1972-73 and 1999-2000 the nutrient intake did not improve in both the rural and urban areas with the exception of fat (Table 4). While the intake of calorie was observed to be lower, the level of protein and fat consumption were considerably higher than the standard minimum requirement in both rural and urban areas. The protein consumption slightly declined in rural areas from 62 to 59 grams while it increased from 56 to 59 grams in urban areas. There is a convergence between rural and urban patterns of calorie and protein consumption in spite of the long-term decline in calorie consumption. The percentage increase in fat consumption as compared to previous round was found to be more in urban areas. The percentage decline in protein consumption between 27th and 55th NSS Rounds was 4.73 per cent and increase in fat consumption was 43.76 per cent in rural areas. For urban areas the percentage increase in protein and fat consumption for the above period was 4.42 and 35.32 per cent respectively. In rural areas, the contribution of calories from cereals declined from 75.16 per cent in the 38th Round to 67.55 per cent in the 55th Round whereas in urban areas it declined from 61.43 per cent to 55.05 per cent.

The average intake of protein from cereals in the rural areas was found to be 69.42 per cent in the 50th Round and declined to 67.43 per cent in the 55th Round, whereas it was about 59.41 and 57.03 per cent in urban areas in 50th and 55th Round respectively (Table 5). Next to cereals, pulses were the major source of protein. The contribution of milk and milk products as a source of protein is consistently increasing in different rounds and the increase was more in urban areas. The contribution from meat, fish and eggs to protein slightly increased and was found to be higher in the urban areas. The urban consumers also often prefer foods that offer variety and convenience rather than maximum calorie content (Delgado *et al.*, 1999).

TABLE 5. PERCENTAGE OF CALORIE AND PROTEIN INTAKE FROM DIFFERENT FOOD ITEMS

NSS Round (1)	Calorie		Protein			
	Cereals (2)	Cereal substitutes (3)	Cereals (4)	Pulses (5)	Milk and products (6)	Meat, fish and eggs (7)
Rural						
38th	75.16	0.36	74.07	10.17	5.35	3.44
50th	71.01	0.19	69.42	9.76	8.81	3.66
55th	67.55	0.16	67.43	10.91	9.19	4.04
Total change (55th over 38th)	-10.13	-55.56	-8.96	7.28	71.78	17.44
Urban						
38th	61.43	0.14	63.35	12.63	9.08	5.16
50th	58.52	0.14	59.41	11.54	11.66	5.29
55th	55.05	0.09	57.03	13.10	12.43	5.98
Total change (55th over 38th)	-10.39	-35.71	-9.98	3.72	36.89	15.89

## V

## INEQUALITY IN NUTRIENT INTAKE

Inequality in calorie, protein, and fat intake among different states in different rounds was measured by Gini coefficients. The magnitude of the Gini coefficients has shown a continuously declining pattern. Inequality in consumption of calories, protein and fats between states as well as income classes continuously declined with the exception of calorie intake in urban class in the 50th Round and protein intake in the 38th Round. The highest decline in the case of calorie consumption was found between the 27th and 38th Rounds and the inequality in calorie consumption as given by the Gini coefficient declined by more than 50 per cent in the case of rural population while it was about 65 per cent in the case of urban class. The Gini coefficient indicating the statewide disparity in calorie intake declined by 12.5 per cent between the 38th and 50th Rounds for rural India whereas it increased by about 16 per cent for urban population indicating an increased inequality in calorie consumption in the case of urban population in different states in India. In the case of rural protein consumption, the reduction in disparity among states was the highest between the 27th and 38th Rounds. The inequality in urban class was considerably low when compared to that in rural class.

TABLE 6. INEQUALITY BETWEEN STATES AND EXPENDITURE CLASSES IN AVERAGE PER CAPITA INTAKE OF CALORIES, PROTEINS AND FATS IN DIFFERENT NSS ROUNDS (GINI COEFFICIENT)

Rounds (1)	Average per intake					
	Calories (Kcal)		Proteins (gm)		Fats (gm)	
	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)	Urban (7)
Inequality between States						
27th Round	0.1146	0.0607	0.1338	0.0807	0.2691	0.1648
	-	-	-	-	-	-
38th Round	0.0568	0.0213	0.0986	0.0834	0.2168	0.1420
	(-50.44)	(-64.91)	(-26.31)	(3.35)	(-19.44)	(-13.83)
50th Round	0.0497	0.0247	0.0954	0.0736	0.2151	0.1221
	(-12.5)	(15.96)	(-3.25)	(-11.75)	(-0.78)	(-14.01)
55th Round	0.0479	0.0245	0.0942	0.0488	0.1986	0.1843
	(-3.62)	(-0.81)	(-1.26)	(-33.7)	(-7.67)	(50.94)
Inequality between Monthly Per Capita Expenditure Classes (India)						
38th Round	0.2581	0.2505	0.2446	0.2220	0.4109	0.3986
	-	-	-	-	-	-
50th Round	0.1353	0.1256	0.1398	0.1216	0.2876	0.2738
	(-47.58)	(-49.86)	(-42.85)	(-45.23)	(-30.01)	(-31.31)
55th Round	0.1271	0.1164	0.1365	0.1109	0.2789	0.2461
	(-6.06)	(-7.32)	(-2.36)	(-8.8)	(-3.03)	(-10.12)

Note: Figures in parentheses indicate the percentage change over the preceding round.

The inequality in fat consumption for rural population in different states declined from 0.2691 in the 27th Round to 0.2168 in the 38th Round (a reduction of 19.44 per cent) and Gini coefficient declined further to 0.1986 in the 55th Round (Table 6). For the urban class, while the Gini coefficient declined in the 38th and 50th Rounds when



compared to the previous rounds it increased by about 51 per cent to 0.1843 in the 55th Round denoting rising inequality in fat consumption among the urban population.

The Gini coefficient in the 55th Round over that in the 38th Round more than halved, in the rural as well as urban classes for calorie as well as protein intake. In the case of fat intake, the inequality index among different monthly per capita expenditure (MPCE) classes declined by about 33 and 41 per cent between the 38th and 55th Rounds, for rural and urban classes respectively.

## VI

### DISTRIBUTION OF STATES ACCORDING TO CALORIE INTAKE

Substantial differences are noticed in the average calorie intake in different states. In this paper the depth of calorie deficiency is measured in terms of the deficit from the norm of 2100 Kcal and 2400 Kcal for urban and rural areas respectively as prescribed by the Planning Commission. All the states of the country without any exception had contributed to the decline in calorie intake in the country (Table 7 and 8). While the average calorie intake had fallen in all the states, the significance of the decline differs qualitatively across the states. In the 27th Round of NSSO, the calorie intake among the rural population was maximum (3493Kcal) in Punjab and was the least in Kerala (1559 Kcal). Out of the 15 states, 10 states had calorie consumption below the norm of 2400 Kcal. The shortfall in rural calorie intake was maximum in Kerala (-841 Kcal) and minimum in Bihar (-175 Kcal). In 1972-73, five states were in the above norm category and the above norm intake was as high as +1093 Kcal in Punjab and it was the lowest in Madhya Pradesh (+23 Kcal). In the 38th Round, the number of states in the below norm category increased to 12 and the shortfall from the norm was from -1 Kcal in Uttar Pradesh to -539 Kcal in Tamil Nadu. The calorie consumption was the lowest in Tamil Nadu (1861 Kcal) and was followed by Kerala (1884 Kcal). In the case of states in the above norm category, the maximum calorie intake was in Punjab (2677 Kcal). The percentage fall in calorie intake between the 27th and 38th Rounds was as high as about 24 per cent for Punjab and was followed by rural Haryana with a reduction of 20 per cent. The calorie intake in the 50th Round ranged from 2491 Kcal in Haryana to 1884 Kcal in Tamil Nadu while in the 55th Round also the maximum per capita calorie intake was in Haryana (2491 Kcal) and the least was in Tamil Nadu (1826 Kcal). In the 50th and 55th Rounds, the state with the highest shortfall in rural calorie consumption was Tamil Nadu. The only two states in the above norm category were Haryana and Rajasthan. It is a matter of concern that even rural Punjab was pushed to the below norm category as per the 55th Round of NSS. The coefficient of variation of the shortfall in calorie intake from the norm level increased from 49.54 in 1972-73 to 59.65 in 1983, but it declined to 39.2 in 1993-94 with a further increase to 45.44 per cent in 1999-2000. The coefficient of variation of the increased intake in above norm category continuously declined from 92.48 in 1973-74 to 53.03 in 2000-01.

TABLE 7. CHANGE IN AVERAGE CALORIE CONSUMPTION ACROSS STATES

States (1)	Average per intake of calories (Kcal)							
	27th Round (1972-1973)		38th Round (1983)		50th Round (1993-1994)		55th Round (1999-2000)	
	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)	Urban (7)	Rural (8)	Urban (9)
Andhra Pradesh	2,103	2,143	2,204	2,009	2,052	1,992	2,021	2,052
Assam	2,074	2,135	2,056	2,043	1,983	2,108	1,915	2,174
Bihar	2,225	2,137	2,186	2,131	2,115	2,188	2,121	2,171
Gujarat	2,142	2,172	2,113	2,000	1,994	2,027	1,986	2,058
Haryana	3,215	2,404	2,554	2,242	2,491	2,140	2,455	2,172
Karnataka	2,202	1,925	2,260	2,124	2,073	2,026	2,028	2,046
Kerala	1,559	1,723	1,884	2,049	1,965	1,966	1,982	1,995
Madhya Pradesh	2,423	2,229	2,323	2,137	2,164	2,082	2,062	2,132
Maharashtra	1,895	1,971	2,144	2,028	1,939	1,989	2,012	2,039
Orissa	1,995	2,276	2,103	2,219	2,199	2,261	2,119	2,298
Punjab	3,493	2,783	2,677	2,100	2,418	2,089	2,381	2,197
Rajasthan	2,730	2,357	2,433	2,255	2,470	2,184	2,425	2,335
Tamil Nadu	1,955	1,841	1,861	2,140	1,884	1,922	1,826	2,030
Uttar Pradesh	2,575	2,161	2,399	2,043	2,307	2,114	2,327	2,131
West Bengal	1,921	2,080	2,027	2,048	2,211	2,131	2,095	2,134
All India	2,266	2,107	2,221	2,089	2,149	2,071	2,149	2,156

In the case of urban population, in the 27th Round the calorie intake was maximum for Punjab (2783 Kcal) and was followed by Haryana (2404 Kcal) while it was the lowest in Kerala (1723 Kcal) and followed by Tamil Nadu (1841 Kcal). The number of states having calorie intake below the norm increased from five in the 27th Round to seven in the 38th Round. In the 55th Round out of the five states in the below norm category, with the exception of Kerala, the deficit in all other states was less than 100 Kcal. The CV of the below norm intake of calorie among urban population in states declined from 70.15 per cent in the 27th Round to 28.88 per cent in the 38th Round. In the 50th Round the coefficient of variation more than doubled to 64 per cent while in the last quinquennial round it declined to 35.75 per cent. In the case of coefficient of variation of the positive deviation in the calorie intake, in the category of above norm states, there was a decline from 111.76 per cent in the 27th Round to 78.56 in the 55th Round.

TABLE 8. DISTRIBUTION OF STATES ACCORDING TO AVERAGE PER CAPITA CALORIE INTAKE IN DIFFERENT ROUNDS

Particulars (1)	States			
	27th Round (2)	38th Round (3)	50th Round (4)	55th Round (5)
Rural				
Below Norm	Kerala (-841) Maharashtra (-505) West Bengal (-479) Tamil Nadu (-445) Orissa (-405) Assam (-326) Andhra Pradesh (-297) Gujarat (-258) Karnataka (-198) Bihar (-175)	Tamil Nadu (-539) Kerala (-516) West Bengal (-373) Assam (-344) Orissa (-297) Gujarat (-287) Maharashtra (-256) Bihar (-214) Andhra Pradesh (-196) Karnataka (-140) Madhya Pradesh (-77) Uttar Pradesh (-1)	Tamil Nadu (-516) Maharashtra (-461) Kerala (-435) Assam (-417) Gujarat (-406) Andhra Pradesh (-348) Karnataka (-327) Bihar (-285) Madhya Pradesh (-236) Orissa (-201) West Bengal (-189) Uttar Pradesh (-93)	Tamil Nadu (-574) Assam (-485) Kerala (-418) Gujarat (-414) Maharashtra (-388) Andhra Pradesh (-379) Karnataka (-372) Madhya Pradesh (-338) West Bengal (-305) Orissa (-281) Bihar (-279) Uttar Pradesh (-73) Punjab (-19)
C.V	-49.54	-59.65	-39.20	-45.44
Above Norm	Punjab (1093) Haryana (815) Rajasthan (330) Uttar Pradesh (175) Madhya Pradesh (23)	Punjab (277) Haryana (154) Rajasthan (33)	Haryana (91) Rajasthan (70) Punjab (18)	Haryana (55) Rajasthan (25)
C.V	92.48	78.88	62.98	53.03
Urban				
Below Norm	Kerala (-377) Tamil Nadu (-259) Karnataka (-175) Maharashtra (-129) West Bengal (-20)	Gujarat (-100) Andhra Pradesh (-91) Maharashtra (-72) Assam (-57) Uttar Pradesh (-57) West Bengal (-52) Kerala (-51)	Tamil Nadu (-178) Kerala (-134) Maharashtra (-111) Andhra Pradesh (-108) Karnataka (-74) Gujarat (-73) Madhya Pradesh (-18) Punjab (-11)	Kerala (-105) Tamil Nadu (-70) Maharashtra (-61) Karnataka (-54) Andhra Pradesh (-48) Gujarat (-42)
C.V	-70.15	-28.88	-64.00	-35.75
Above Norm	Punjab (683) Haryana (304) Rajasthan (257) Orissa (176) Madhya Pradesh (129) Gujarat (72) Uttar Pradesh (61) Andhra Pradesh (43) Bihar (37) Assam (35)	Rajasthan (155) Haryana (142) Orissa (119) Tamil Nadu (40) Madhya Pradesh (37) Bihar (31) Karnataka (24) Punjab (0)	Orissa (161) Bihar (88) Rajasthan (84) Haryana (40) West Bengal (31) Uttar Pradesh (14) Assam (8)	Rajasthan (235) Orissa (198) Punjab (97) Assam (74) Haryana (72) Bihar (71) West Bengal (34) Madhya Pradesh (32) Uttar Pradesh (31)
C.V	111.76	87.80	89.04	78.66
India				
Rural				
Below Norm	(-134)	(-179)	(-251)	(-251)
Above Norm	-	-	-	-
Urban				
Below Norm	-	(-11)	(-29)	-
Above Norm	(7)	-	-	(56)

Notes: 1. Norm - 2100Kcal for Urban and 2400Kcal for Rural.

2. Figures in parentheses indicate deviation from the norm in Kcal.

In the case of rural India, the shortfall in calorie intake from the norm was –134 Kcal in the 27th Round, showed an increasing trend and it increased to –251 Kcal in 1993-94 and remained stagnant at this level. In the case of urban population for the country as a whole, the 27th and 55th Rounds showed above norm intake of calorie and the calorie intake exceeded the norm of 2100 Kcal by 7 and 56 Kcal respectively. In the 38th and 50th Rounds, the calorie intake was deficient by –11 and –29 Kcal respectively. Thus, the deficiency in calorie intake was more pronounced in the rural areas of the country. The critical issue is the initial level of intake of calorie as in some states the decline evidently does not signify a nutritional deterioration. On the contrary, it could well reflect an improvement in the nutritional standards as the fall in calorie intake might be due to qualitative improvement in the diet. In other words, the decline in calorie intake reflects a tendency to substitute more nutritious and palatable food item for cereals, which become inferior.

## VII

### CONCLUSION

Despite the increase in food expenditure between 1972-73 and 1999-2000 the nutrient intake, with the exception of fat did not improve in both the rural and urban areas. The per capita calorie intake declined by 5.24 per cent in rural areas whereas it increased by 2.39 per cent in urban areas for the period from 1972-73 to 1999-2000. Inequality in the consumption of calories, protein and fats between states as well as income classes given by the Gini coefficients showed a continuously declining pattern. The Gini coefficient indicating the statewide disparity in calorie intake declined by 12.5 per cent between the 38th and 50th Round for rural India whereas it increased by about 16 per cent for the urban population indicating an increased inequality in the calorie consumption in case of urban population in different states in India. The improvement in the economic access to food, made possible by income growth, did not result in a higher consumption of cereals, but has increased the consumption of vegetables, fruits and nuts and livestock products. The critical issue is the initial level of intake of calorie as in some states the decline evidently does not signify a nutritional deterioration. On the contrary, it could well reflect an improvement in the nutritional standards as the fall in calorie intake might be due to qualitative improvement in the diet.

The thrust of market intervention policy must shift to accelerating the production of non-cereal food items and also making both cereal and non-cereal food items accessible to the poor by improving their income.

### REFERENCES

- Anderson, K., B. Dimaranan, T. Hertal, and W. Martin. (1997), "Asia-Pacific Food Markets and Trade in 2005: A Global, Economy-wide Perspective", *Australian Journal of Agricultural and Resource Economics*, Vol.41, March, pp.19-44.

- Delgado, Christopher, Mark Rosegrant, Henning Steinfeld, Simeon Ehui and Claude Courbois (1999), *Livestock to 2020: The Next Food Revolution, Food, Agriculture and the Environment Discussion Paper 28*, International Food Policy Research Institute, Washington, D.C., U.S.A.
- Huang J., and H. Bouis(1996), Structural Changes in the Demand for Food in Asia, Food, Agriculture and the Environment Discussion Paper 11, International Food Policy Research Institute, Washington, D.C., U.S.A.
- Murty, K.N. (1999), Decomposition of Changes in Cereals Demand into Its Components in Semi-Arid Tropical Area, Paper presented at the 35th Indian Econometrics Society Meeting held at the Department of Economics, University of Rajasthan, Jaipur, March 11-13.
- Radhakrishna, R. and C. Ravi (1991), *Food Demand Projection for India*, Centre for Economic and Social Studies, Hyderabad.
- Radhakrishna, R. (2002), *India Development Report 2002*, Kirit S. Parikh and R. Radhakrishna Eds., Oxford University Press.
- Rao, Hanumantha C.H. (2000), "Declining Trend for Foodgrains in Rural India - Causes and Implications, *Economic and Political Weekly*, Vol.35, No.4, January 22-28, pp.201-206.
- Sen, Amartya (1983), "India: The Doing and the Undoing", *Economic and Political Weekly*, Vol.18, No.7, February 12, pp 237-40.
- World Health Organisation (WHO) (2003), *Diet, Nutrition and the Prevention of Chronic Diseases*, Technical Report Series 916, Geneva.