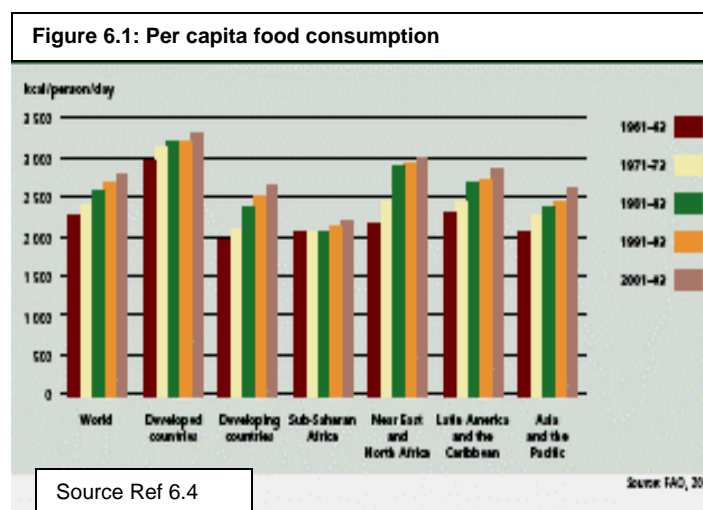


## 6. TRANSITION IN FOOD CONSUMPTION PATTERNS



Food and Agricultural Organisation monitors global, regional and country wise data on food production, availability and consumption of foodstuffs. Time trends and interregional differences in energy intake in the world over the last four decades are shown in Figure 6.1. Per capita food consumption (energy / person / day) in different regions is shown in Figure 6.1. Energy intake is higher in developed countries as compared to developing countries. In 1960-61 energy intake in Sub

Saharan Africa is similar to Asia & Pacific but in 2001-02, energy intake in Asia is higher.

Reported time trends in global and regional per capita food consumption in kcal / per person / per capita is between 1964-1999 and projected consumption in 2015 and 2030 is given in (Table 6.1). South Asia remains to be a region with relative low per capita energy consumption right from sixties till now and is projected to remain the region with lowest energy consumption even in 2030.

### Food consumption patterns in India

In India the surveys carried out by the National Sample Survey Organization (NSSO), a permanent survey organization, set up in the Department of Statistics of the Government of India in 1950, provides data on time trends and interstate differences in food consumption patterns. NSSO collects data on various facets of the Indian economy through nationwide large-scale sample surveys to assist in socio-economic planning and policy making. The NSSO has been carrying out Consumer Expenditure Surveys quinquennially since 1972-73 (27th, 32nd, 38th, 43rd, 50th, 55th and 61st rounds of NSS, at roughly 5-year intervals). A two-stage stratified sampling design was used and at the household selection stage those belonging to the affluent section and others were sampled separately. This survey provides information on consumption expenditure on food and non-food items.

Region	1964-66	1974-76	1984-86	1997-99	2015	2030
World	2358	2435	2855	2803	2940	3050
Developing countries	2064	2152	2450	2881	2850	2980
Near East & North Africa	2290	2591	2953	3008	3090	3170
Sub-Saharan Africa	2058	2079	2057	2196	2380	2540
Latin America & the Carribean	2393	2546	2689	2824	2980	3140
East Asia	1957	2106	2559	2921	3080	3190
South Asia	2017	1986	2205	2403	2700	2900
Industrialized countries	2947	3066	3206	3380	3440	3500
Transition countries	3222	3385	3379	2906	3060	3180

Source: Reference 6.4

Consumption expenditure of food items on per capita and per consumption units are provided using two reference periods of 7 and 30 days immediately preceding the day of the survey. The survey is carried out in sub rounds covering the four seasons. The results presented in the report are based on the 30-day reference period.

As part of these quinquennial surveys data on monthly per capita expenditure on food consumption at the national and state level are collected. The seventh of such surveys was carried out during July 2004-June 2005. The survey covered all the States and UT's in the country. The data were collected from a sample of 79298 rural and 45346 urban households spread over 7999 villages and 4602 urban blocks respectively. The number of persons surveyed was 4, 03,207 in rural areas and 2, 06,529 in urban areas.

NSSO provides data on

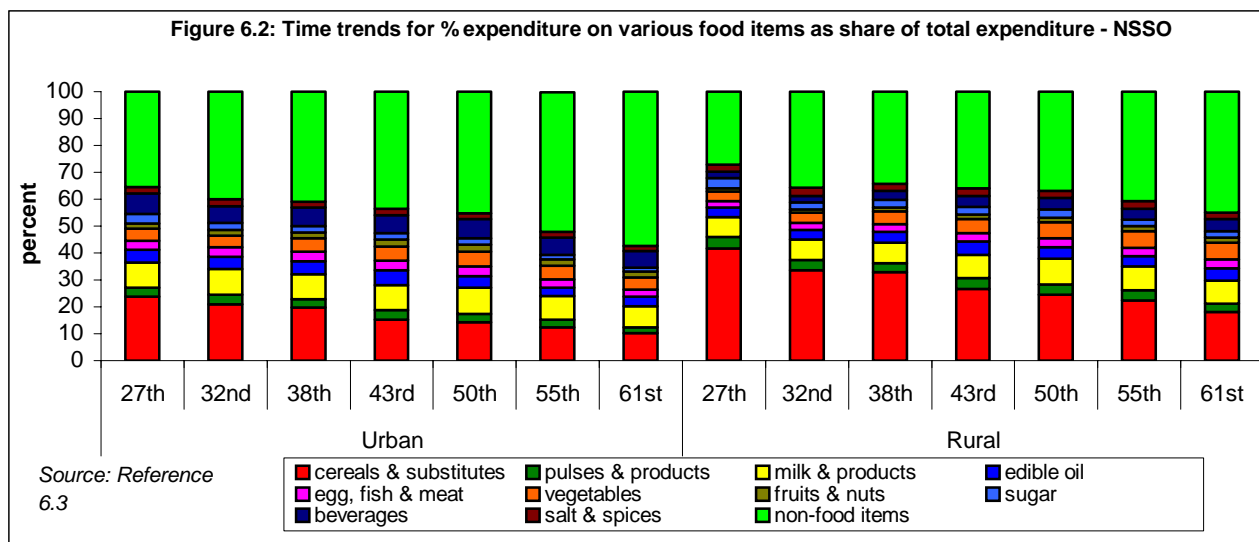
- Consumption expenditure on food and non food items:
- Average quantity of consumption of different foodstuffs per 30 days.
- Food security at the household level
- Per capita and per consumption unit consumption of calorie, protein and fat per day.
- Percentage of total intake of protein and calorie from different groups of food item
- Distribution of households and individuals by calorie intake level
- Cross-tabulations of the above by monthly expenditure classes at national and state levels in urban and rural areas.

NSSO surveys provide time-series data of expenditure on food and non-food items in different income groups, residence (rural & urban) and state. Taking into account the cost of food in the corresponding year, NSSO computes and reports household level of consumption of different food items.

The dietary data from NSSO, though strong on sampling design, sample size, explicitly stated estimation procedure, national coverage and length of reference period (7 and 30 days) has a potential shortcoming namely, the reliability and validity of data collected on consumption expenditure by a single interview with a reference period of 30 days. Another major problem is that while it captures expenditure of household on food items and derives household consumption of foodstuffs, it does not provide any insight into the critical intrafamilial distribution or food consumption of individuals.

### ***Time trends in consumer expenditure***

There has been a decline in the proportion of expenditure on food items in last three decades in both urban and rural areas. The proportion of expenditure on non-food items has increased from 24% to 37.7%. However, the expenditure on food remained higher in rural areas as compared to urban areas (Figure 6.2). Between 1972-73 and 2004-05, the share of food in total consumer expenditure has fallen from 73% to 55% in rural areas and from 64% to 42% in urban areas. The share of cereals has fallen from 41% of consumer expenditure to 18% in rural India and from 23% to 10% in urban India over the same period (Figure 6.2). The decline in consumption expenditure on food items has mainly due to low cost of cereals; in addition there has been a decline in cereal

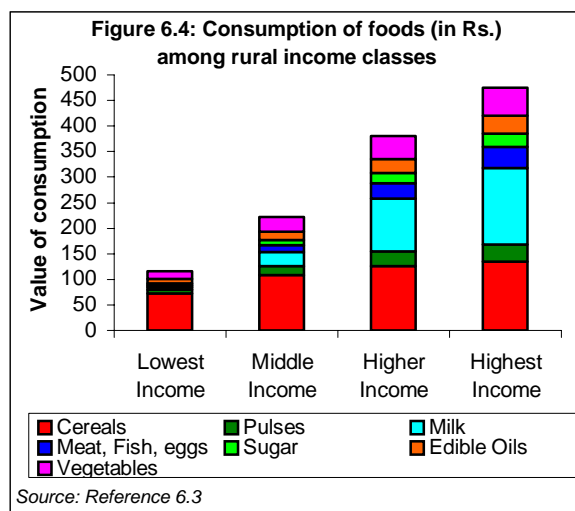
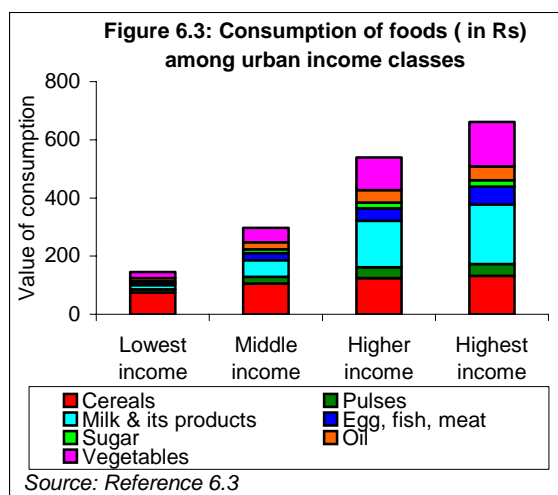


consumption especially among the middle and high-income group. Over years diet has become more diverse especially in the middle and upper income groups. In urban areas expenditure on vegetables, oil and sugar has decreased after 50<sup>th</sup> round whereas in rural areas expenditure on vegetables had increased and expenditure on beverages has almost doubled. The percentage of households reporting milk consumption has grown in both rural and urban areas between 1993-94 and 2004-05 by 5 percentage points – 66% to 71% in rural areas and 80% to 85% in urban areas. Per capita consumption of edible oil has risen over the eleven years following 1993-94 (50<sup>th</sup> round) by as much as 30% in rural India and about 18% in urban India. Over the same period the expenditure on beverages has nearly doubled from 2.4 % to 4.5 % in rural areas. The growing oil consumption is a matter of concern in view of the increasing overnutrition, diabetes and CVD risks factors. If the expenditure on beverages and tobacco are used for purchase of vegetables and fruits, there can be substantial benefit in terms of micronutrient intake.

Dietary diversification and an increase in vegetable intake is the only sustainable method of improving micro nutrient status of the population. One of the major factors responsible for the low consumption of vegetables is the non-availability of vegetables; especially green leafy vegetables through out the year at an affordable cost both in urban and rural areas. Data from NNMB also shows that over this period there has not been any significant increase in the intake of vegetables and micro nutrients (vitamin – A, iron and folic acid). The Tenth Plan envisaged a paradigm shift from food security to nutrition security to meet the needs of macro, micro and phyto nutrients through dietary diversification. In order to ensure sustained increase in vegetable consumption, it is important to improve availability, affordability, access and awareness about the need for increased vegetable intake. Focus on cultivation of low cost vegetables at home and in wasteland areas can go a long way in meeting vegetable needs of rural poor. Horticulture products provide higher yield per hectare and are economically viable options for small farmers especially when backed up by appropriate storage, processing and transportation facilities. If sustained, it would also improve access to vegetables at an affordable cost throughout the year in urban and rural areas. A small increase in

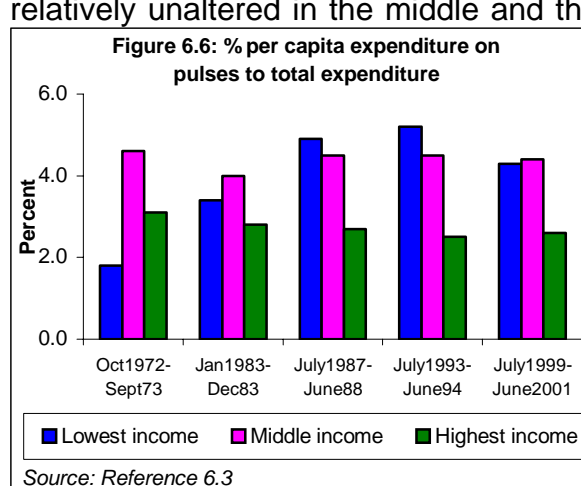
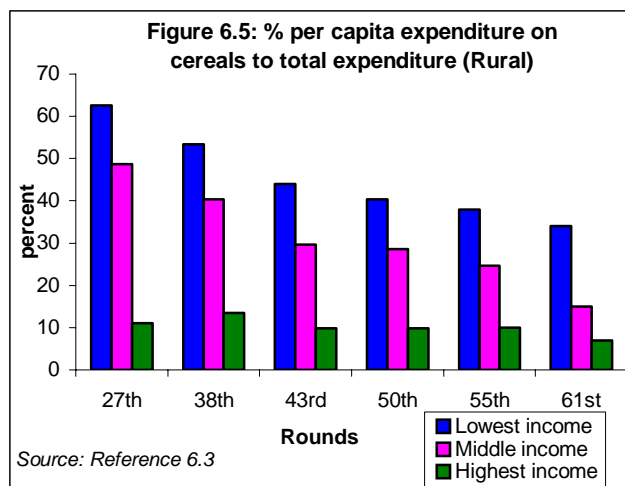
expenditure on vegetable and phytonutrient may ensure that there is increased vegetable consumption to meet the nutritional needs of the population.

### Consumption expenditure in different income groups



Dietary diversification increases with increasing family income. Consumption of milk and animal products increases with increase in income. In the highest income group, they are the major sources of protein in the diet (Figure 6.3 and 6.4). There is also an increase in the intake of vegetables with increasing family income. However, the current high levels of consumption of sugar and oil in the highest income group are a matter of concern. Health education efforts are underway to reduce the current high levels of consumption of “empty” calories.

Data from NSSO surveys from 1972 to 2005 shows that in the lowest and middle-income groups, the expenditure on cereal had declined. In the highest income group expenditure on cereals form relatively low proportion of the total expenditure and the proportion have remained essentially unaltered over the last three decades except in 2004-05 where it showed a decline (Figure 6.5). Figure 6.6 shows that between 1972-2001 there has been a substantial increase in the proportion of expenditure on pulses to total expenditure in the lowest income group. Expenditure on pulses has remained relatively unaltered in the middle and the



highest income group. In spite of continued high expenditure on pulses there has been a fall in amount of pulses consumed because of escalating cost of pulses.

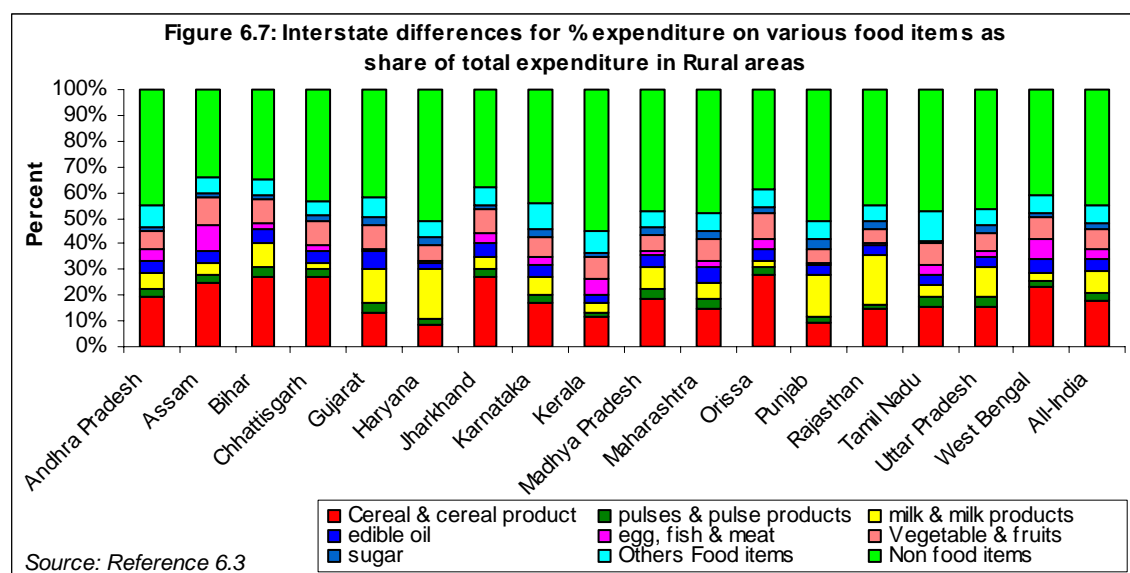
	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Cereals	900.86	908.87	907.48	966.27	855.43	898.00	894.34
Pulses	134.61	139.94	122.59	138.34	124.59	136.85	116.95
Sugar & Gur	226.29	211.57	215.95	254.57	228.81	251.62	268.79
Oil & Oilseeds	260.43	239.79	252.08	288.20	211.65	337.09	268.20
Fruits & Veg.	702.24	743.25	742.94	729.53	783.95	837.35	861.69
Potato & tubers	69.69	67.47	70.40	83.67	66.56	78.46	75.97
Milk & milk products	522.94	537.33	587.82	621.78	651.48	668.94	752.62
Meat, egg & fish	243.96	257.14	263.46	275.57	273.45	285.82	291.91

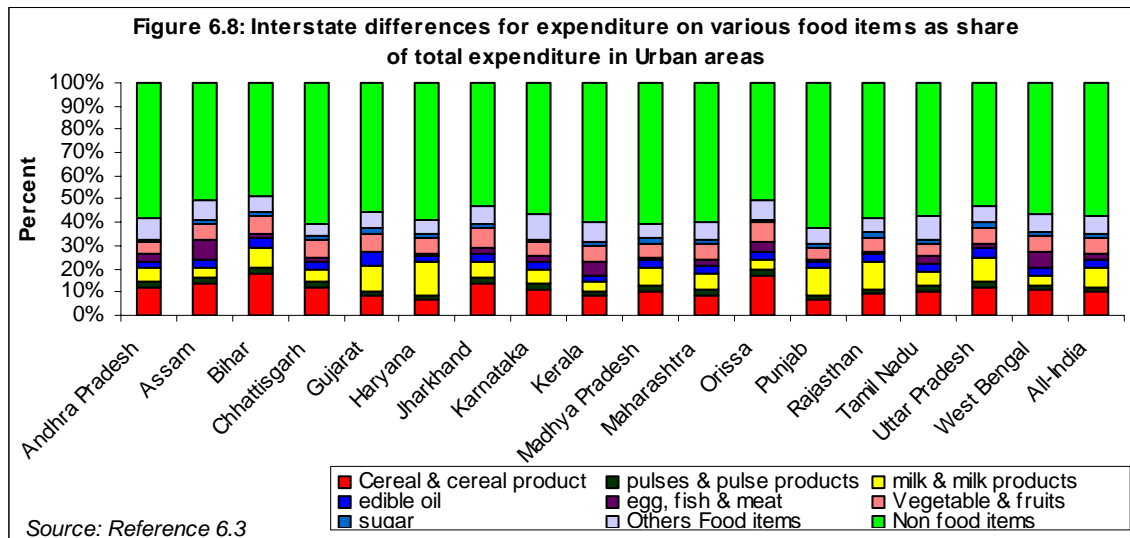
Source: Reference 6.1

Time trends in consumption expenditure on different food items compiled from the National Accounts Statistics (NAS) are given in is given in (Table 6.2). Data from NAS indicates that expenditure on cereals and pulses have remained essentially unaltered, expenditure on sugar and oil fluctuates. There is a considerable increase in the consumption expenditure on vegetables and fruits and milk and milk products. This is an encouraging trend suggesting that the people are aware of the need for dietary diversification in order to meet the nutritional needs (macro, micro and phyto nutrients) and are making efforts to diversify their dietary intake. It is important to improve access to the vegetables, fruits, dairy products at affordable cost through out the year in urban and rural areas in all states, because this trend towards dietary diversification is the first step towards sustainable food based intervention for prevention of macro and micronutrient deficiencies.

### **Interstate differences in consumption expenditure**

In rural areas of Haryana and Punjab, expenditure on cereals in 2004-05 formed only 9% of total consumer expenditure. But in rural areas of West Bengal and Assam cereals contributed 23% or more to total consumer expenditure, and in rural areas of Orissa, Chattisgarh, Jharkhand and Bihar, they formed 27-28% of consumer expenditure

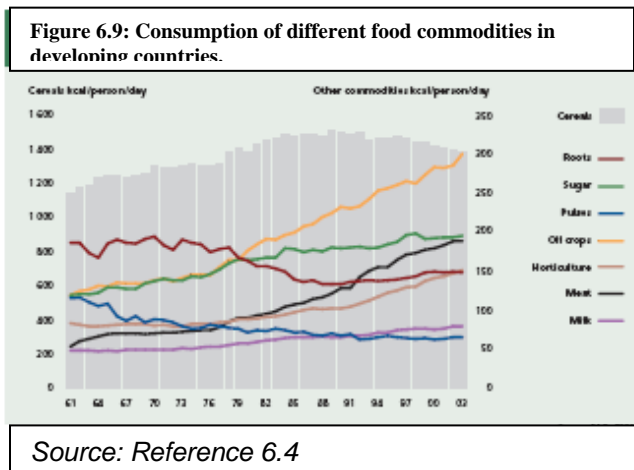




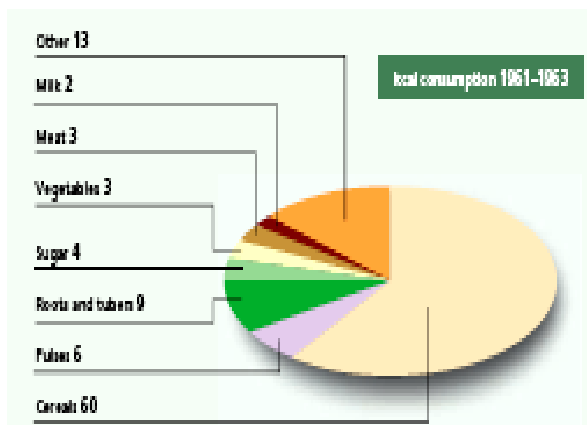
(Figure 6.7). In urban areas of Punjab and Haryana cereals took up 6-7% of the household (consumption) budget in 2004-05; in urban areas of Bihar and Orissa they took up 17% (Figure 6.8). Differences in states are partly due to differences in the food and non-food expenditures and partly to the food basket consumed. For instance the low food expenditure in Punjab and Haryana are due to more diverse food basket while in rural Orissa and Bihar with higher poverty rates and low per capita income, cereals formed the major food item.

### Consumption pattern of foodstuffs

Over the last four decades there has been major changes in energy consumption from different food commodities in developing countries. Data from FAO computation show that Over the last four decades energy

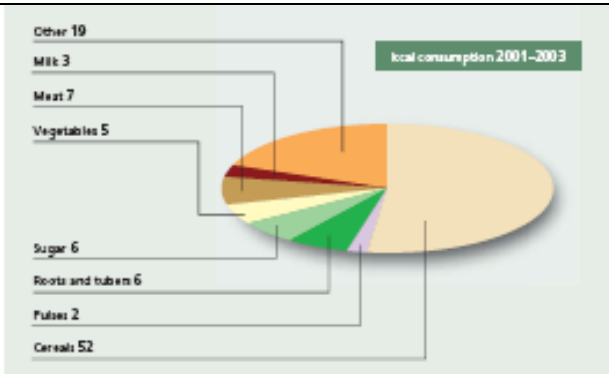


**Figure 6.10: Composition of food consumption in developing countries (%)**



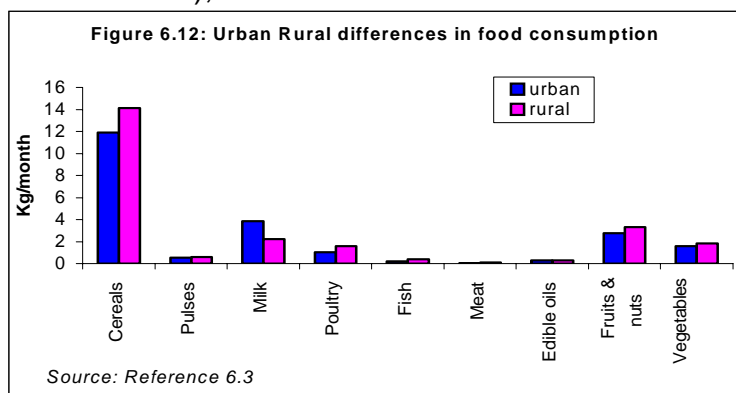
Source: Reference 6.4

**Figure 6.11: Composition of food consumption in developing countries (%) 2001-03**



Source: Reference 6.4

from oils, meats, vegetables and sugar have gone up while energy from pulse and roots & tubers has decreased. Energy from cereals showed an increase till mid nineties but subsequently there has been a reduction in energy derived from cereals. (Figure 6.9, 6.10 and 6.11),



In India, NSSO computes consumption pattern of foodstuffs at national, state and household level from the data on expenditure on food and local cost of food. Data on consumption pattern of foodstuffs in the most recent quinquennial survey is presented here below.

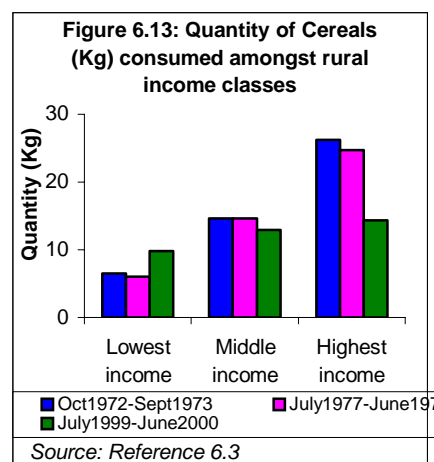
In 2004-05, cereals formed the largest component of the diet. Consumption of pulses was very low; this is may be due to increasing prices of pulses. Consumption of milk, fruits and vegetables, and animal food continue to be quite low (Figure 6.12). Consumption of all foodstuffs increases with increasing income. This is especially true for sugar, oil, milk and animal products. Data from NNMB also indicate that energy consumption in highest income group is higher than the lower income groups. The higher energy intake combined with lower energy expenditure in these income groups accounts for the observed increase in overweight and obesity especially in affluent segments of population.

### Interstate differences

The interstate differences in consumption pattern of various foodstuffs in 2004-05 are given in (Annexure 6.1 and 6.2). Cereal forms the main portion of the diet in both urban and rural areas followed by milk and fruits. There are huge urban rural and interstate differences in the monthly per capita consumption even in cereals. Some of these differences are due to access to other foods for eg. Fish consumption in Lakshadweep, Andaman and Nicobar Islands, Goa; and others are related to percapita income such as higher consumption of milk and fruit intake in Punjab. However some urban rural differences such as cereal consumption in urban and rural UP (5kg vs. 8 kg) are difficult to explain either on the basis of percapita income or on the basis of food availability. The reason for very low vegetable consumption in semi tropical rural India producing plenty of vegetables and fruits is another poorly understood phenomenon.

### Cereals

Analysis of data in time trends in consumption of cereal by lowest, middle and higher income groups shows that quantity (in kg) of cereals consumed by lowest income group has increased inspite of



reduction in the proportion of expenditure on cereals (Figure 6.13), because over the years there has been a reduction in relative cost of cereals especially that supplied through the Public Distribution System (PDS). Data on time trends in cereal intake from NNMB surveys confirm that there has been a reduction in the percentage of individuals consuming less than 70% of RDI for cereals. NSSO surveys showed that there has been a small decline in the household consumption of cereals in middle-income groups. The reported per capita “consumption” of cereals in high-income households in rural area was 26.2 kg (about 1kg/day). This has declined to 14.4kg in 1999-2000. Data from diet surveys conducted by NNMB have shown that average dietary intake of cereals even in the highest income group never exceeded 400g/day.

**Table 6.3: Changes in per capita cereal consumption in quantity terms over the last decade in different percentile classes of population ranked by MPCE**

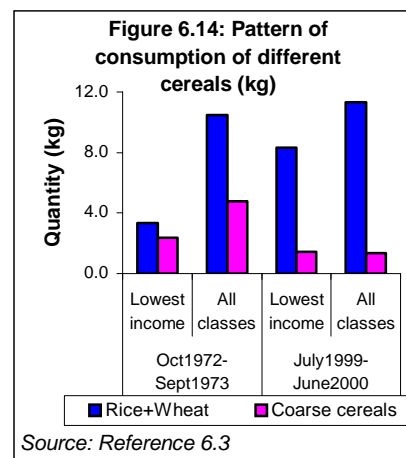
Year	Rural					
	0-5 p	5-10 p	10-20 p	20-30 p	30-40 p	40-50 p
1993-94	9.68	11.29	12.03	12.63	13.19	13.33
1999-2000	9.78	11.15	11.64	12.27	12.56	12.89
2004-05	9.88	10.87	11.33	11.70	11.98	12.16
Year	50-60 p	60-70 p	70-80 p	80-90 p	90-95 p	95-100 p
1993-94	13.72	14.07	14.41	14.59	14.98	15.78
1999-2000	13.03	13.36	13.45	13.67	13.73	14.19
2004-05	12.37	12.61	12.77	12.72	12.77	13.50
Year	Urban					
Year	0-5 p	5-10 p	10-20 p	20-30 p	30-40 p	40-50 p
1993-94	8.91	10.11	10.61	10.75	10.89	10.99
1999-2000	8.99	10.15	10.25	10.75	10.61	10.8
2004-05	9.25	10.04	10.09	10.24	10.12	10.25
Year	50-60 p	60-70 p	70-80 p	80-90 p	90-95 p	95-100 p
1993-94	10.91	10.95	10.73	10.68	10.19	10.29
1999-2000	10.69	10.66	10.50	10.52	9.94	9.72
2004-05	10.08	10.09	9.97	9.63	9.50	9.10

Source: Reference 6.3

It would therefore appear that reported high cereal consumption among highest income group households, especially, in rural areas might be due to food sharing with guests, relatives and servants. The change in life style over the last two decades may perhaps account for the steep reduction in “consumption” of cereals in high-income group households. Analysis of NSSO data on cereal consumption by different income groups in urban and rural areas are from the last three surveys (1993-94 – 2004-2005) is given in Table 6.3. There has not been much change in per capita cereal consumption in the last ten years in both urban and rural areas. Average quantity of cereals consumed per person per month in 2004-05 was

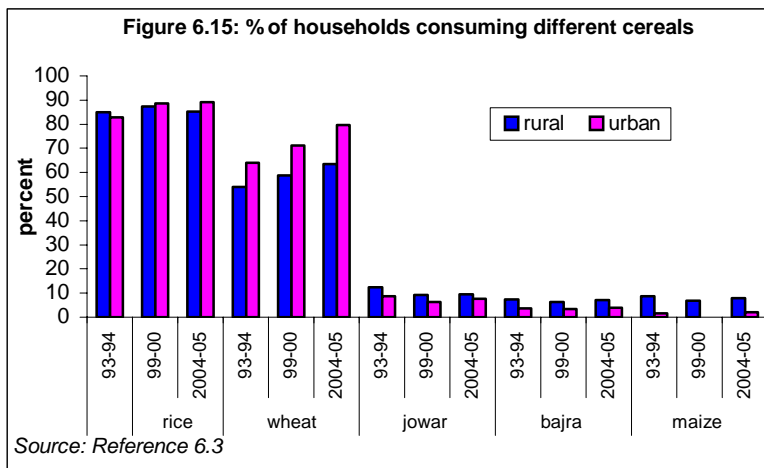
12.1 kg in rural areas and 9.9 kg in urban areas. The cereal consumption remained high in middle and high income groups in rural area as compared to low income group, this may be due to sharing of food is still prevalent in the rural areas of the country. However, in urban areas there is not much difference in consumption of cereals in terms of quantity across the income levels (Table 6.3).

There has been a change in the type of cereals consumed among the lowest income group. With the availability of wheat and rice through PDS the poorer segments of population have changed over to rice and wheat as staple cereals. Coarse cereals such as bajra, ragi, maize and jowar, which are rich in micronutrients and minerals, are no longer being consumed in



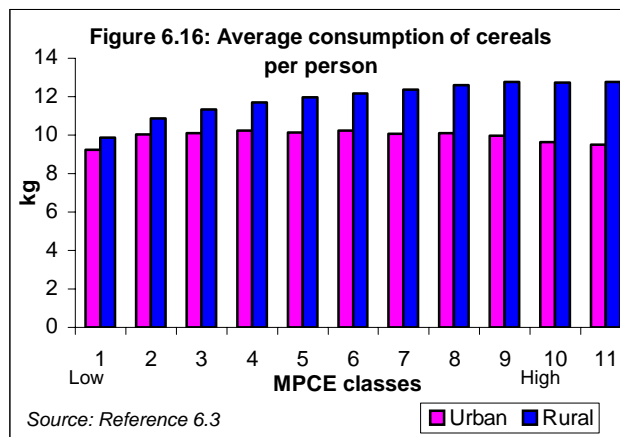


substantial quantity by the lowest income group (Figure 6.14). Data from last three NSSO surveys show over the last decade there has been a progressive increase in wheat consumption and reduction in consumption of coarse cereals (Figures 6.14 and 6.15). It was seen that cereal consumption per person per month has declined from 13.4 kg to 12.1 kg (by nearly 10%) between 1993-94 and 2004-05 in rural India and from 10.6 kg to 9.9 kg in urban India (by 6-7%).

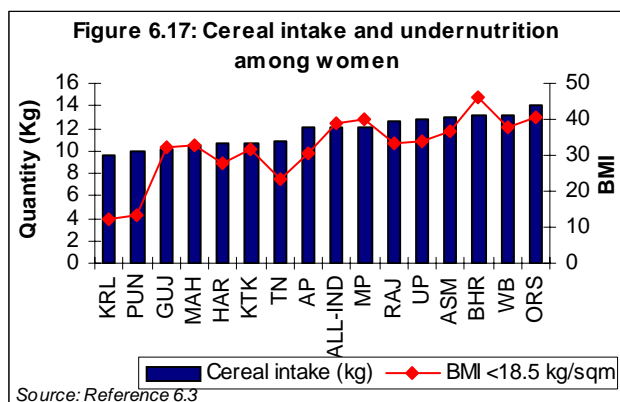


Though rice and wheat, individually, experienced a fall in consumption per capita since 1993-94, the decline was less marked than for cereals as a whole. On the other hand, consumption of *jowar* and its products appears to have dropped by over 40% in both rural and urban areas. In rural areas, consumption of *bajra* and its products, too, has fallen since 1993-94, the absolute fall in monthly per capita consumption being of the order of 0.1 kg (Figure 6.15).

Data from NSSO 61<sup>st</sup> round showed that even in 2004-05 urban populations consumed less cereal than rural population (Figure 6.16). In rural areas, amount of cereals consumed increased with increase in income. In addition to higher consumption by the household members it is possible that higher “consumption” may be due to guests and servants sharing the food prepared at home in rural high income group families. Coarse cereals traditionally used in different regions can be provided to the BPL families at a subsidised cost through TPDS. This will encourage local production, procurement and distribution right in rural areas.



This may substantially bring down subsidy cost without any reduction in the calories provided. This will also improve targeting, as only the most needy are likely to buy these coarse grains. Millets are rich in micronutrients and hence their increased consumption will improve the micronutrient intake among the poorest segments of the population.



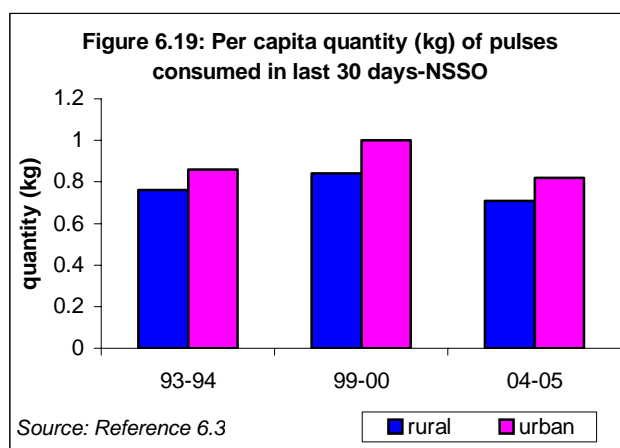
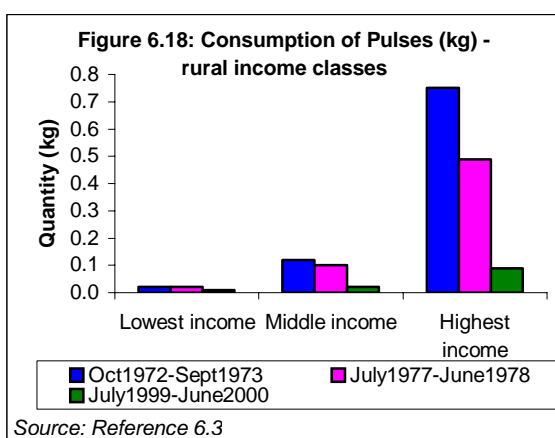
## Interstate differences

NSSO provides data on state wise consumption expenditure on foodstuffs (Annexure 6.3 and 6.4). Cereals remain to be the major sources of energy in adults both in urban and rural areas. The average per capita cereal consumption has decreased in all the states over the last ten years in both urban and rural areas (Annexure 6.5 & 6.6).

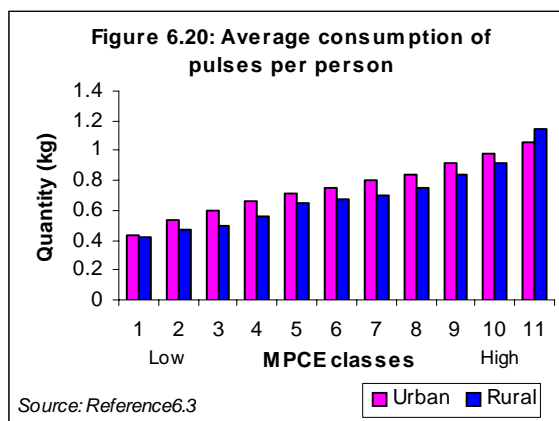
Cereal consumption as assessed by NSSO-2004-05 in different states along with data on undernutrition in women (by NFHS-III) is shown in (Figure 6.17). It is obvious that in states like Kerala with low cereal consumption and relatively low energy intake, undernutrition rates are very low. In states like MP and Orissa, cereal consumption and intake of energy is high but undernutrition rates are also high. This is perhaps due to high-energy expenditure among poor in these states among manual labour.

## Pulses

Pulses are the major source of protein in the Indian diet especially in the lowest income group. In spite of increased expenditure on pulses, there is a decline in household “consumption” of pulses in all the income groups both in the urban and rural areas



(Figure 6.18 and 6.19). There was nearly a three-fold difference in pulses consumption between income groups both in urban and rural areas in 2004-05 (Figure 6.20). In the lowest income group, this might be attributable to the steep increase in prices of pulses over the years. Data from NNMB survey also indicates that the pulse consumption, which has always been far below the RDI, has further declined over the years. In order to ensure adequate protein intake in this group, it is essential to invest in steps to increase cultivation of a wide variety of pulses, which could be made



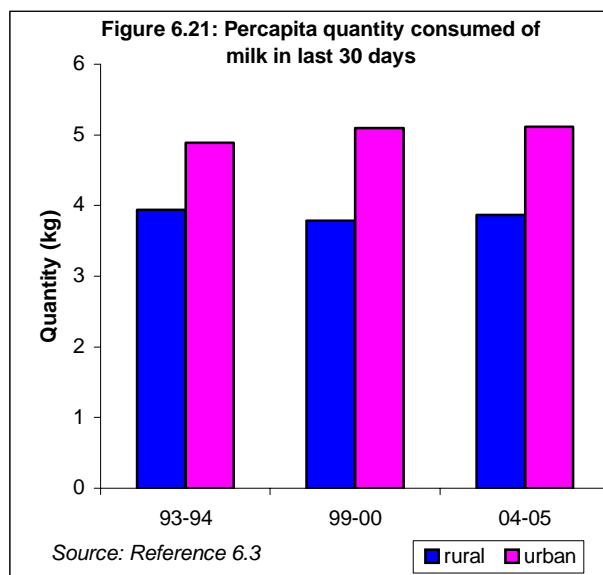
available at an affordable cost to the poorer segments of population, perhaps through PDS.

### Milk and milk products

Region	Meat (kg per year)			Milk (kg per year)		
	1964-66	1997-99	2030	1964-66	1997-99	2030
World	24.2	36.4	45.3	73.9	78.1	89.5
Developing countries	10.2	25.5	38.7	28	44.6	65.8
Near East & North Africa	11.9	21.2	35	68.6	72.3	89.9
Sub-Saharan Africa	9.9	9.4	13.4	28.5	29.1	33.8
Latin America & the Caribbean	31.7	53.8	76.6	80.1	110.2	139.8
East Asia	8.7	37.7	58.5	36	100	17.8
South Asia	3.9	5.3	11.7	37	67.5	106.9
Industrialized countries	61.5	88.2	100.1	185.5	212.2	221
Transition countries	42.5	46.2	60.7	156.6	159.1	178.7

Source: Reference 6.4

In developed countries milk and meat consumption has been high. In developing countries milk and meat intake is low; Table 6.4. There has been an increase in milk and meat consumption between 1964-1999 in all the countries and FAO's projections suggests that the increase will continue in all



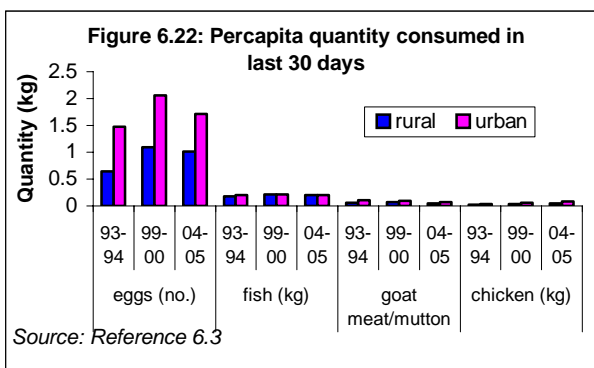
countries till 2010.

In India there was no change in per capita consumption of milk and milk products in the last ten years in both urban and rural areas (Figure 6.21). However, the percentage of households reporting milk consumption has grown in both rural and urban areas between 1993-94 and 2004-05 by 5 percentage points – 66% to 71% in rural areas and 80% to 85% in urban

areas.

### Poultry, Fish and meat

The consumption of eggs, fish, meat/mutton and chicken is higher in urban areas as compared to rural areas. The consumption of eggs has increased in the last ten years. Per capita egg



consumption in rural India – about 1 egg per month in 2004-05 – has increased by nearly 60% since 1993-94 (Figure 6.22).

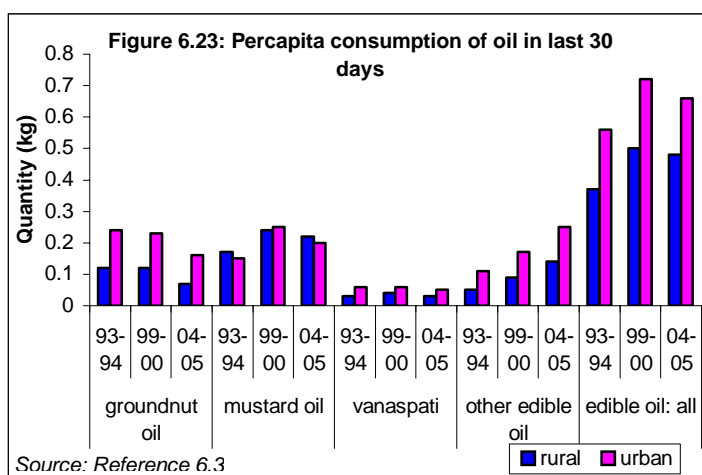
### Edible oil

Globally there has been a progressive increase in the consumption of fat between 1967-69 and 1997-99 and this change has occurred in all countries of the world. North America, Europe and Oceania had high fat consumption right from 1967 till 1999. China, which had low fat intake earlier, has shown a steep increase of 55gms between 1966-1999. In South Asia fat intake was low 29 g/day in 1967 and the increase over the period was only 16g/day. In 1999 South Asia and Sub Saharan Africa are the two regions with lowest fat consumption in the world. Table 6.5

Region	Supply of fat (g/capita/day)				Change between 1967-1969 and 1997-1999
	1967-69	1977-79	1987-89	1997-99	
World	53	57	67	73	20
North Africa	44	58	65	64	20
Sub-Saharan Africa	41	43	41	45	4
North America	117	125	138	143	26
Latin America and the Caribbean	54	65	73	79	25
China	24	27	48	79	55
East and South East Asia	28	32	44	52	24
South Asia	29	32	39	45	16
European Community	117	128	143	148	31
Eastern Europe	90	111	116	104	14
Near East	51	62	73	70	19
Oceania	102	102	113	113	11

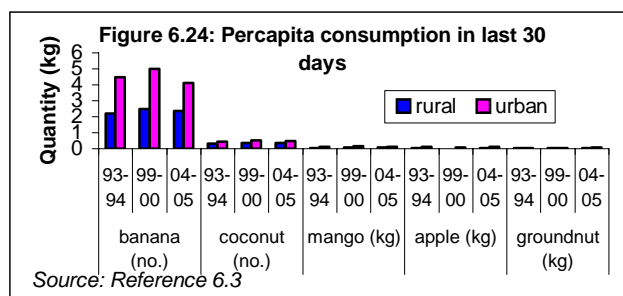
Source: Reference 6.4

India has shared the rise in oil consumption. Per capita consumption of edible oil has risen over the last eleven years by as much as 30% in rural India and about 18% in urban India. In both rural and urban India, per capita consumption of oil other than groundnut oil, mustard oil, *vanaspati* and coconut oil has more than doubled. The newer oils such as sunflower oil, soybean oil, other vegetable oil and rice bran oil are used along with traditionally used sesame, mustard, groundnut and coconut oil. The percentage of urban households using groundnut oil dropped in 2004-05 to 21%, one-half of what it was in 1993-94 (40%). Among rural households the percentage in 2004-05 fell to 14% from a 1993-94 level of 30% (Figure 6.23).



### Fruits and nuts

There is no change in consumption of fruits in last 10 years in both urban and rural areas. The consumption of fruits is



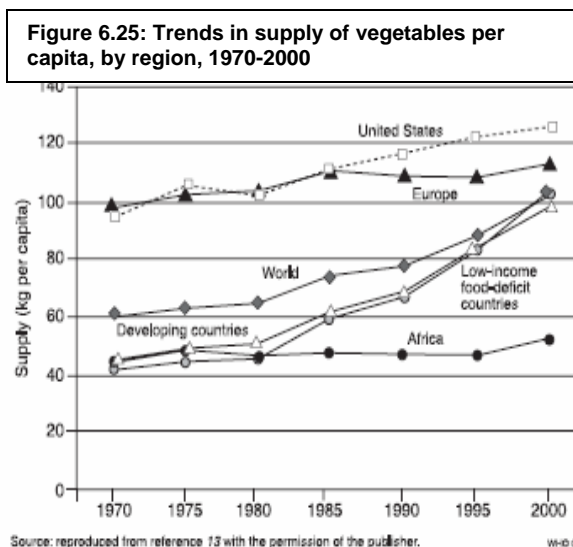
much higher in urban areas as compared to rural areas (Figure 6.24).

### Vegetables

Region	1979	2000
World	68.1	101.9
Developed countries	107.4	112.8
Developing countries	51.1	98.8
Africa	45.4	52.1
North and Central America	88.7	98.3
South America	43.2	47.8
Asia	56.6	116.2
Europe	110.9	112.5
Oceania	71.8	98.7

*Source: Reference 6.4*

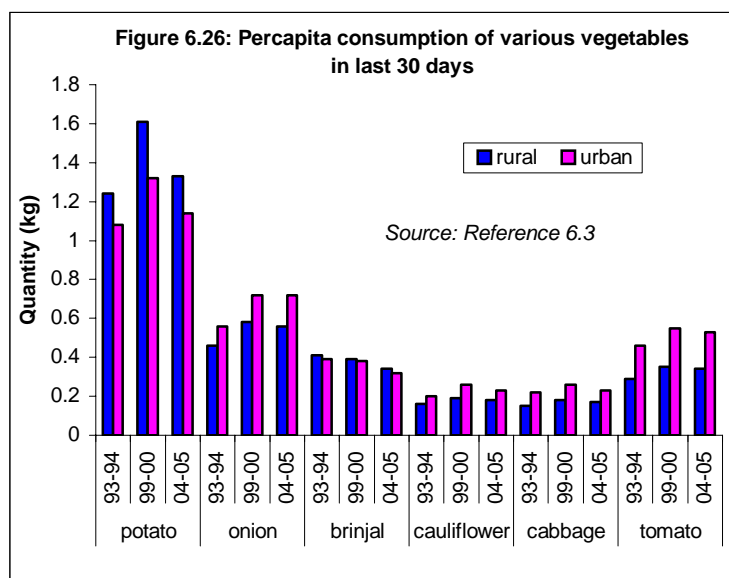
Table 6.6: There has not been any change in the supply of vegetables between 1979 and 2000 in



*Source: Reference 6.4*

developed countries. However the vegetable consumption has nearly doubled in developing countries- especially Asia.

Trends in vegetable supply per capita are shown in Figure 6.25. There has been an increase in vegetable intake in US from mid eighties. All developing countries except African countries have shown a steep increase in vegetable intake in the last four decades. Vegetable consumption in India has shown some improvement over the last decade. The consumption of potatoes is much higher than any other vegetables;



consumption of potato is higher in rural areas. Potato consumption in urban and rural areas declined in 2004-05 as compared to 1999-2000. All other vegetables are consumed more in urban areas; there is not much change in the vegetable consumption in last 10 years. The percentage of households consuming a particular vegetable in a 30-day period has however improved in the eleven years after 1993-94 by 3-6 percentage points for potatoes, onions and brinjal, 8-10 percentage points for cabbages

and nearly 12 percentage points for cauliflowers and tomatoes in urban areas, and 15 percentage points for tomatoes in rural areas (Figure 6.26).

### Time trends in energy intake

Region	1967-1969			1977-1979			1987-1989			1997-1999		
	T	V	A	T	V	A	T	V	A	T	V	A
Developing countries	2059	1898	161	2254	2070	184	2490	2248	242	2681	2344	337
Transition countries	3287	2507	780	3400	2507	893	3396	2455	941	2906	2235	671
Industrialized countries	3003	2132	871	3112	2206	906	3283	2333	950	3380	2437	943

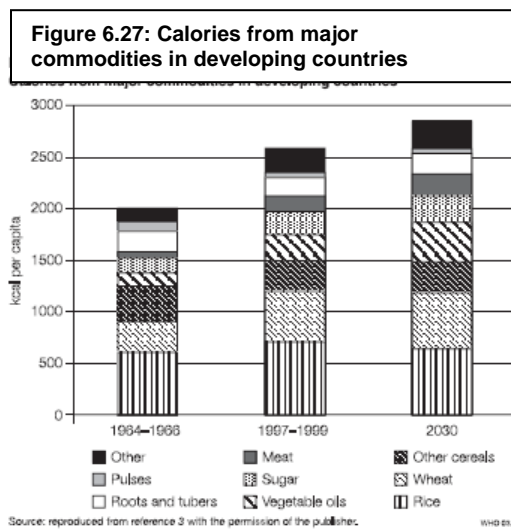
T-total kcal; V-kcal of vegetable origin; A- kcal of animal origin (including fish products)

Source: Reference 6.4

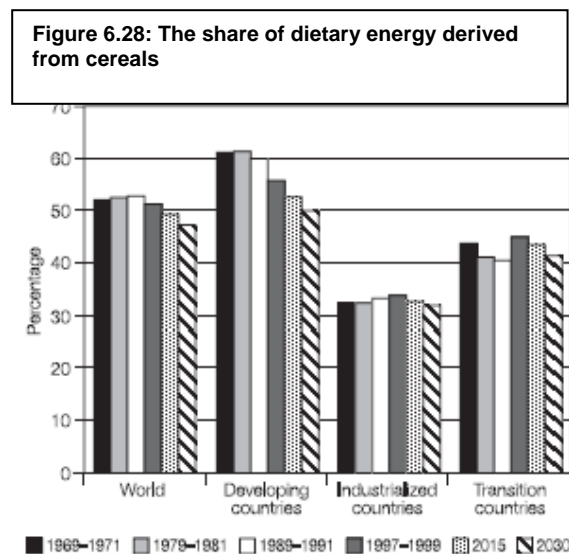
Total energy intake is higher in industrialized countries. Dietary energy from animal sources is high where it forms nearly a third of the total intake. Animal sources of energy in transition economies are also high though there has been a decline in energy from animal in 1997-99. In contrast energy from both total energy intake and energy intake from animal sources have remained low in developing countries.

In developing countries energy consumption from major foodstuffs has increased from 2000 k cal in 1964-65 to 2500 k cal in 1997-99. According to FAO projections by 2030 there will be a further increase to about 2750 k cal.

In industrialized countries less than a third of the energy comes from cereals. In



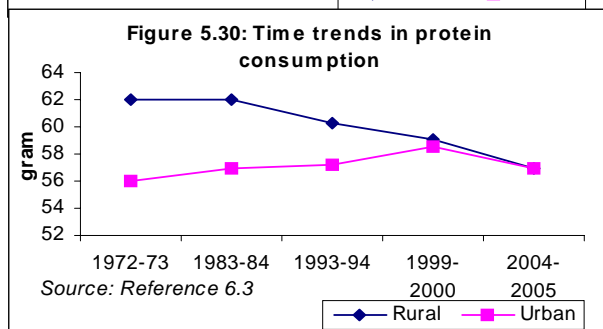
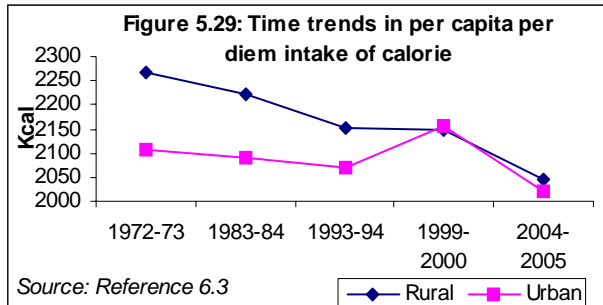
Source: Reference 6.4



Source: Reference 6.4

contrast, in the developing countries cereals provide 50-60% of the energy intake. Over the last four decades there has been a decline in the energy from cereal intake in developing countries from over 60% to about 55% 1998-99. FAO projections indicate that by 2030, they will come down to 50%.

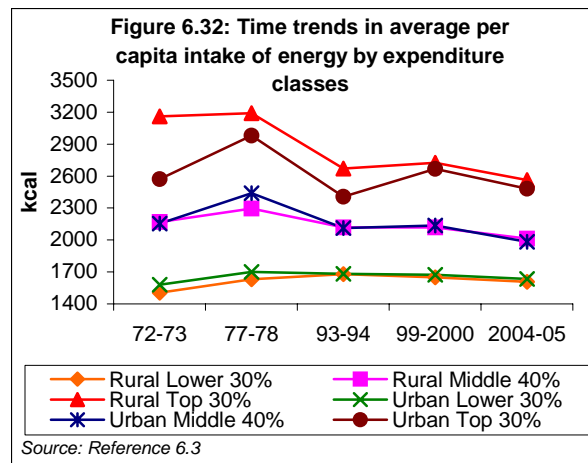
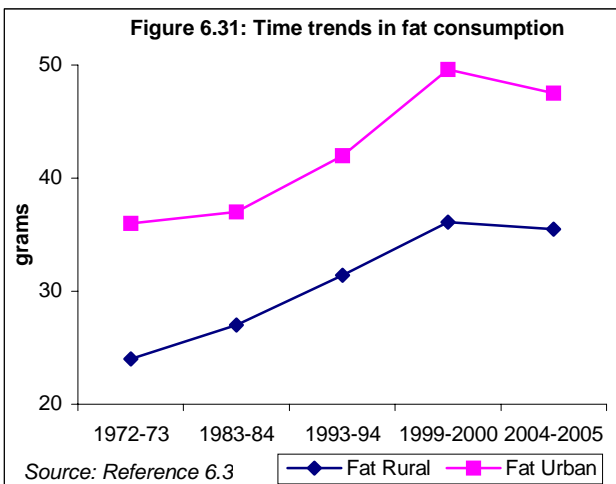
### Nutrient intake computed from NSSO surveys



Poverty and lack of purchasing power have been identified as the two major factors responsible for the low dietary intake in India. The concern over the economic factors resulting in chronic under-nutrition led to the use of calorie intake as the basis of estimating poverty. Data from NSSO surveys (Figure 6.29, 6.30 and 6.31) indicate that over the last three decades the overall calorie and protein intake in rural areas has shown a small decline; dietary intake in urban areas has remained unaltered. However, when the data is analysed by income (Figure 6.32), the calorie intake has shown a small increase in both urban and rural poor and a decline among the urban and rural rich.

In the urban areas, the variation in intake over the years is much smaller.

Interstate and urban rural differences in percapita calorie, protein and fat intake is given in Annexure 6.7 – 6.10. In spite of the fact that calorie intake has not increased, there is a rise in overnutrition; this is mainly because of changes in life style and consequent reduction in energy expenditure. Over the last three decades, there has been a substantial increase in the fat intake in both rural and urban areas. In view of adverse nutrition (obesity) and health (non communicable diseases) implications of increased fat intake especially among the affluent group, this has to be curtailed through appropriate nutrition education. In view of the known massive interstate differences in the dietary intake and nutritional status, it is important to analyze the state-wise data on intake and



nutritional status and modify the interventions programmes to cope with the problems.

Dietary factor	Goal (% of total energy, unless otherwise stated)
Total fat	15-30%
Saturated fatty acids	<10%
Polyunsaturated fatty acids (PUFAs)	6-10%
n-6 polyunsaturated fatty acids (PUFAs)	5-8%
n-3 polyunsaturated fatty acids (PUFAs)	1-2%
Trans fatty acids	<1%
Monounsaturated fatty acids (MUFAs)	By difference
Total carbohydrate	55-75%
Free sugars	<10%
Protein	10-15%
Cholesterol	<300 mg per day
Sodium chloride (sodium)	<5 g per day (<2g per day)
Fruits and vegetables	≥400 g per day
Total dietary fibre	From foods
Non-starch polysaccharides (NSP)	From foods

*Source: Reference 6.4*

Ample data exist to indicate that positive energy balance (energy intake over and above energy expenditure) is the major factor responsible for emerging problem of over-nutrition and associated risk of non-communicable diseases in developing countries like India. Apart from positive energy balance, the source of energy may also have some impact on the risk of noncommunicable disease risk. Over years there has been a growing concern about potential adverse consequences of high fat and even high protein intake and low vegetable and fruit intake on health status of the population. The current recommendations regarding consumption of different nutrients as percentage of total energy intake is given in Table 6.8.

## References

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- 6.2 National Family Health Survey (NFHS-3): <http://mohfw.nic.in/nfhsfactsheet.htm>; last accessed on 24/09/07
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- 6.4 FAO State of World Food Security, FAO Rome -2007