

POVERTY NUTRITION LINKAGES

Introduction

At the time of Independence, the country faced two major nutritional problems - one was the threat of famine and acute starvation due to low agricultural production and lack of appropriate food distribution system. The other was chronic energy deficiency because of low dietary intake mainly due to poverty and low purchasing power. Poor environmental sanitation and lack of access to safe drinking water led to high prevalence of infection; nutrition toll of infections was high because of poor access to health care. The country initiated multi-sectoral, multi-pronged programmes to combat poverty; simultaneously essential goods and services were provided to people below poverty line at a subsidized cost to improve their nutritional and health status.

After a steady but slow GDP growth in the initial four decades after independence, India has become one of the fastest growing economies in the world; currently GDP growth of over 8%. There has been a steady decline in poverty rates from over 50% in the seventies to



about half that level in 2004-05. Over the last three decades the proportion of household expenditure on food has declined substantially because of the relatively low food grain prices and access to subsidized food grains. There was an improvement in energy intake and access to health care for the lower income group. As a result, poverty and mortality

rates came down by 50% and fertility rate by 40%; however, reduction in under nutrition in children was only 20 %. There is a growing concern that outlays in nutrition sector have not brought about commensurate improvement in outputs such as improvement in quality and coverage under nutrition programmes and outcomes such as improvement in nutritional status.

While the country is yet to overcome under-nutrition and communicable diseases, it is increasingly facing problems over-nutrition and obesity; though obesity rates are higher in urban high-income group, low-income group is not totally free from over-nutrition. Research studies in India have highlighted the possibility that undernutrition in childhood might be one of the predisposing factors for overnutrition and obesity in adult life. Some aspects



Table-1: Disparity in Growth amongst States/Union Territories			
Period	Measure of Disparity in Growth @ (standard deviation)		Relative Measure of Disparity in Growth between Per Capita Income and NSDP @ (Covariance)
	NSDP	Per capita NSDP	
1970-71 to 1979-80	2.22	1.81	3.67
1980-81 to 1990-91	1.71	1.02	0.71
1993-94 to 1998-99	3.13	2.4	5.23

Source: Tenth Five year Plan

of the changing complex relationship between economic growth, poverty

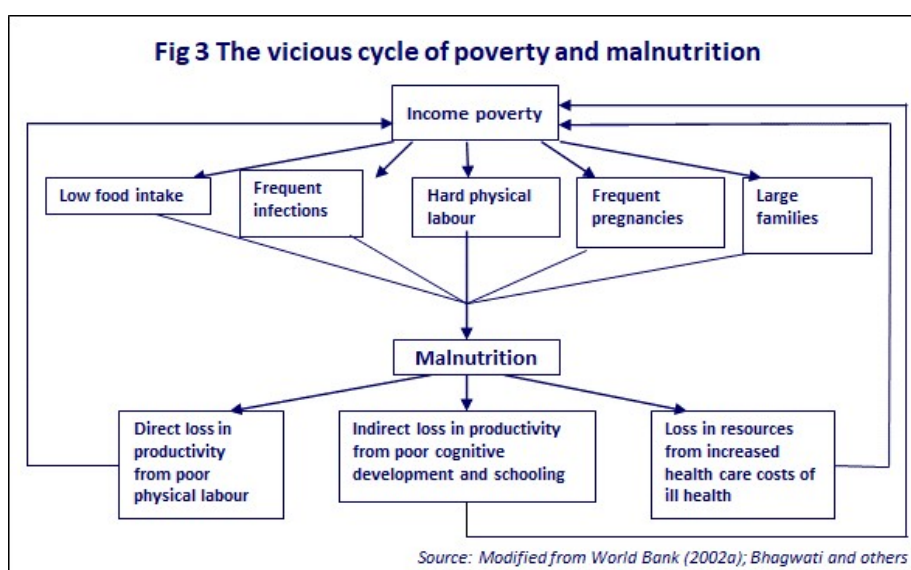
and nutritional status in India is explored in this manuscript.

Economic growth in India

India recognised the importance of planned growth of the economy with emphasis on human resource development and fostered both agricultural and industrial development. GDP growth over the last five decades and the targeted GDP growth and actual growth over the ten plan periods is given in Figs 1 and 2¹.

Initially GDP growth was slow but currently GDP growth of over 8%. The increase in GDP growth is mainly due to service sector and industrial growth. Despite faster growth, jobs in the organised sector have not increased. Agriculture which remains the major sector for rural employment and livelihood has lost its growth momentum. As a result, the pace of decline in unemployment and proportion of population below the poverty line has been modest. There is inequitable distribution of income between groups and different states in the country (Table 1)². The relationship between economic growth and poverty reduction is no longer linear. It is estimated that 40% of the poor households share in income is only 20% while highest 20% households of the have 46% of the national income. There is growing disparity in GDP growth between states². In view of this changing scenario the focus during Eleventh Plan is to achieve faster, more broad-based and inclusive growth which will provide employment, reduce poverty and bridge the disparities in access to essential services³.

Poverty alleviation



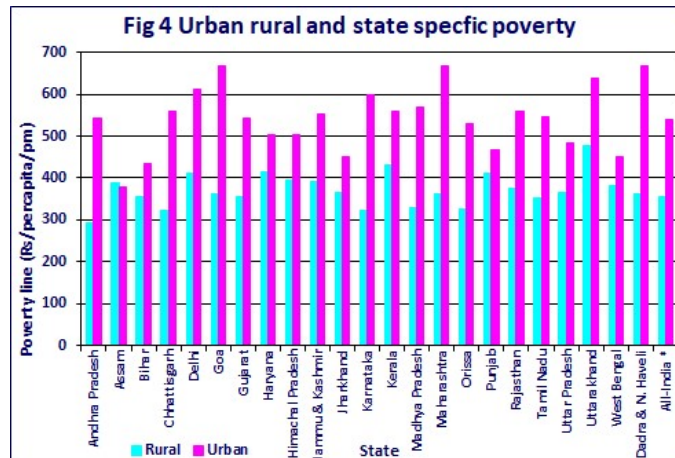
➤ During the fifties, poverty was the major factor responsible under-nutrition in India. The country recognized that the association between income poverty and undernutrition was mediated

through several pathways (Fig 3)⁴. Income poverty might result in food insecurity and low dietary intake due to poor purchasing capacity and poor access to food stuffs;

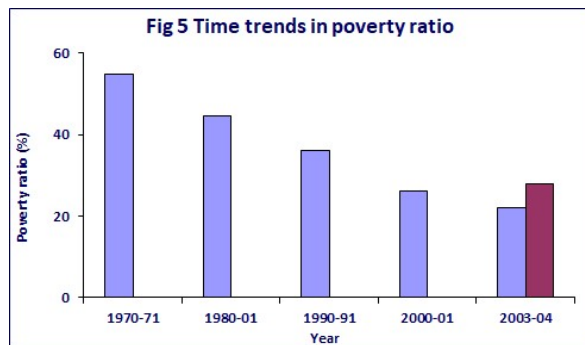
- poor environmental hygiene resulting in repeated infections
- duration and severity of infections was not reduced because of lack of public sector health care for effective treatment of infections and
- low literacy hampering access to available services;

Majority of the low-income group population were unskilled labourers engaged in manual labour. Under-

nutrition had an adverse effect on work capacity and increased susceptibility to infections. Poor work out put and absenteeism due to illness reduced their earning and purchasing



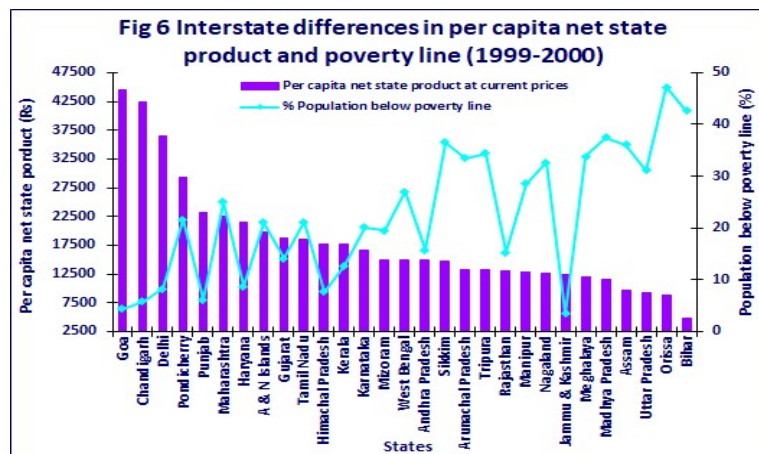
power. Reduction in purchasing power results in low food intake for the entire family which further aggravated under nutrition. Efforts were therefore on cutting this mutually reinforcing linkage between poverty and undernutrition⁴.

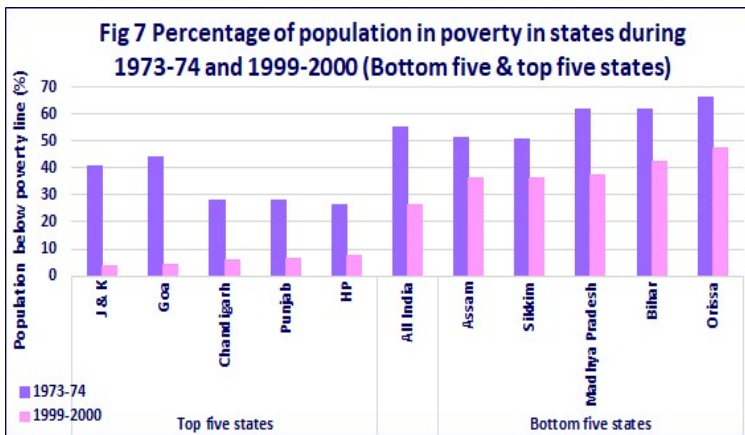


India was the first country in the world to define poverty as the total per capita expenditure of the lowest expenditure class,

which consumed 2400 Kcal/day in rural and 2100 Kcal/day in urban areas and attempt to provide comprehensive package of essential goods and services to people below the poverty line. Initially the poverty line was defined on the basis of NSS Household Consumption Expenditure data for 1973-74. The poverty lines, defined as the basket of goods and services, have not been changed subsequently in order to preserve inter-temporal comparability, but the rupee value of the lines is regularly updated using the large sample consumer expenditure survey of the NSSO in order to reflect price increases that

have taken place over the years. As there are urban rural and inter-state differentials in cost of goods and services efforts were made to ensure that these are reflected in defining the poverty line. The importance of this adjustment can be gauged from the fact that the poverty lines for the states with the highest prices are 43% and 57% higher for rural and urban areas respectively than those of the states with the lowest prices (Fig 4)⁵.



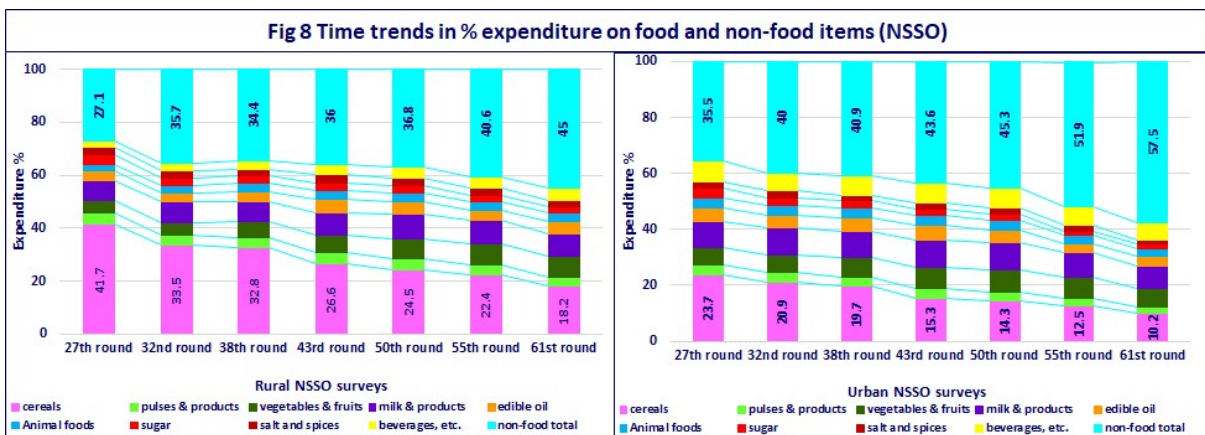


Time trends in poverty ratio computed by the Planning commission on the basis of the quinquennial NSSO large sample survey is given in Fig 5³. During the nineties there was a change in the methodology used for computation of poverty line. In order to eliminate possible differences in reported poverty ratios due to the changed methodology, the Approach

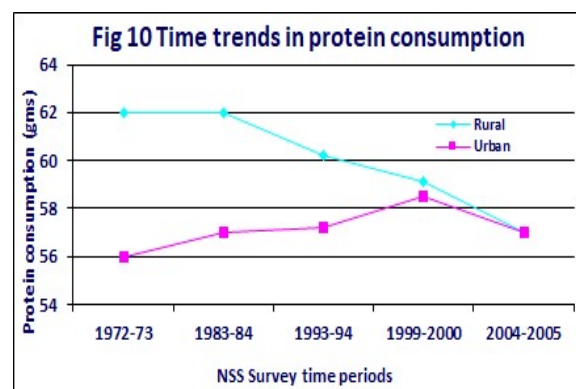
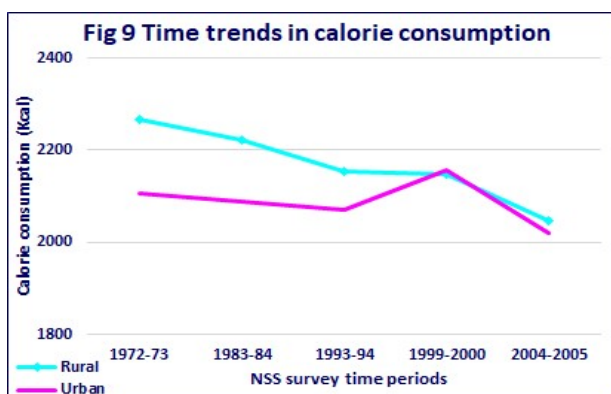
Paper to the Eleventh Plan has computed and presented the poverty ratios for 2004-05 according to both the methodologies. These revised data suggest that the decline in poverty in the nineties is not as high as reported earlier³. These data indicate that acceleration in economic growth rate has not resulted in an acceleration in decline in poverty.

Interstate differences in per capita net state product and poverty ratios are shown in Fig 6⁶. In most of the states with high net state product, poverty ratio is low and vice versa. However, there are exceptions like J & K and Himachal Pradesh where poverty ratios are low in spite of low per capita net state product. Maharashtra has relatively high poverty ratios in spite of high per capita net state product. Thus state per capita income is an important but not the only determinant of poverty rates in the state.

There are wide inter-state differences in terms of increase in per capita income and in terms of poverty reduction. In 1983 more than 50% of the population in Orissa, Bihar, West Bengal and Tamil Nadu were living below the poverty line. By 2000 In West Bengal and Tamil Nadu the poverty ratios declined by half but Orissa and Bihar continue to be the poorest states with nearly half of their population being below poverty line. J & K, Himachal, Haryana, Andhra, Punjab and Maharashtra are the other states which have achieved significant decline in prevalence of poverty (Fig 7)². The difference in rates of decline in poverty has resulted in widening of the gap between states; for instance, poverty ratio in Orissa is eight time higher than the poverty ratio in Punjab². The differences in per capita income and poverty ratios between states may have to be considered while assessing factors



responsible for the interstate differences in nutritional status of children.

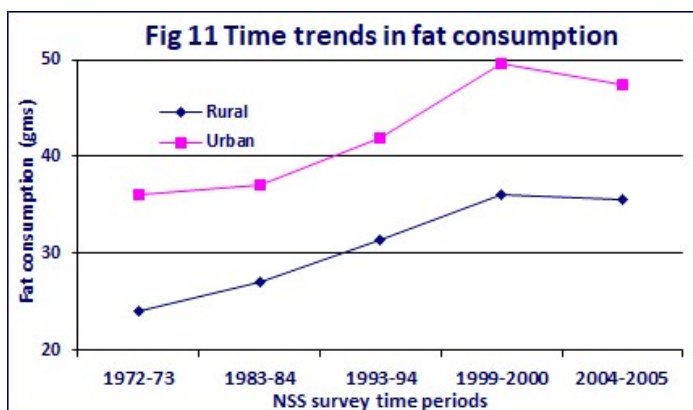


Consumption expenditure on food

Focus on development of agriculture in the first five plan periods and the technological inputs during green revolution enabled the country to become self-sufficient in food production during the seventies. Adequate buffer stock of food grains and the PDS system ensured access to food grains at a subsidised cost. These measures had a beneficial impact on consumption expenditure on food. Time-series data of expenditure on food and non-food items from NSSO surveys is given in Fig 8⁷. 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 decline in expenditure on food is mainly due to low cost of cereals (especially those provided to the poor under PDS) which are the major source of energy in Indian diets. The share of cereals has fallen from 41% of consumer expenditure to 18% in rural India and from 23% to 10% in urban India⁵

NSSO computes the quantity of cereal, pulse, vegetable and other food items purchased by households and per capita energy consumption from the consumer expenditure survey. Over years there has been a reduction in cereal intake among the middle and high-income group, reduction in pulse consumption and increase in oil consumption in all income groups.

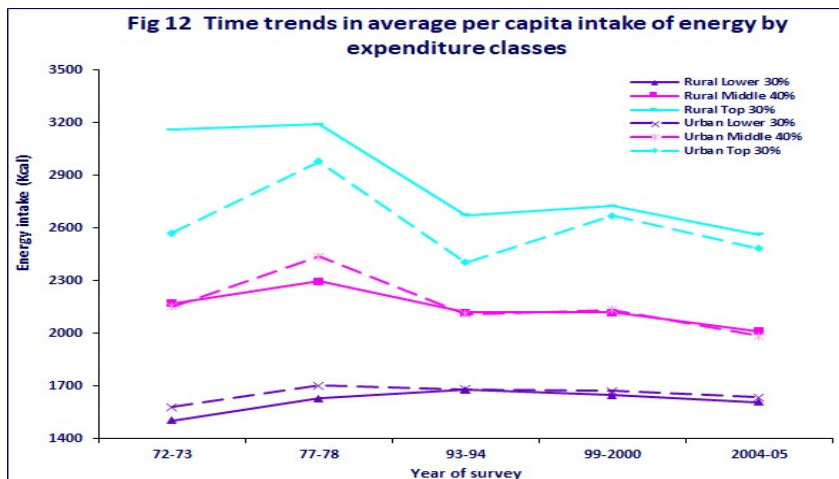
Data from NSSO surveys indicate that over the last four decades the overall calorie and protein intake in rural areas has shown a small decline; dietary intake in urban areas has remained unaltered. Fat intake has gone up both in urban and rural areas (Figs 9-11)⁵.



When the data was analysed by income (Fig 12)⁵, the calorie intake has shown a small increase in both urban and rural poor and a decline among the urban and rural rich. In urban areas, the variation in consumption over the years is much smaller. The food grains and other food stuffs are readily available, accessible and affordable (often at subsidised cost to the poor);

therefore, reduction in cereal and energy intake cannot be due to poverty. It is likely that

the reduction in energy intake especially among the middle- and high-income group is due to changes in life style and reduction in physical activity and consequent reduction in energy requirement;



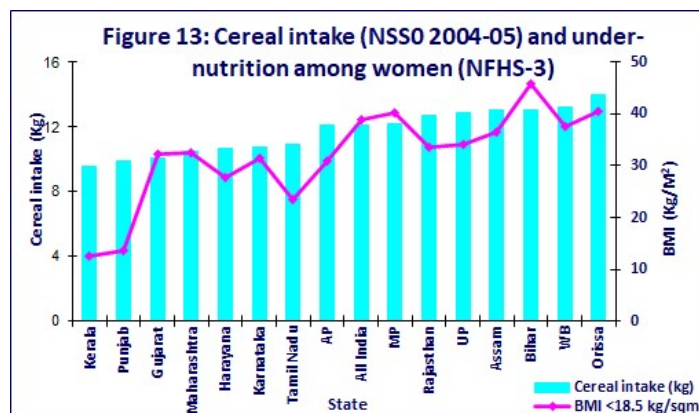
to changes in life style and reduction in physical activity and consequent reduction in energy requirement; this hypothesis is supported by the rise in overnutrition rates in the last fifteen years in these segments of population.

Inter-state differences in cereal (the major source of energy in Indian

dieteries) intake (NSSO 2004-05) and under-nutrition rates (NFHS-3)⁸ provides some important insights into the current relationship between energy intake and nutritional status (Fig 13).

In some states such as Orissa Assam and Rajasthan in spite of high cereal intake under-nutrition rates among women are high. This is might perhaps due higher level of physical activity during occupational or household activities in women. In spite of low cereal intake under-nutrition rates in women in low in states like Kerala perhaps because physical activity levels in these women are lower due to ready access to water fuel and transport. These data suggest that in addition to dietary intake, physical activity pattern is becoming one of the major determinants of the nutritional status.

The NSS Household Consumption Expenditure data for 1999-2000 indicates that the actual calorie intake of the poverty-line class in every state and in both rural and urban areas is significantly below the calorie norm (except in urban Orissa). However, data from NSSO clearly shows that the actual cost per calorie consumed varies widely between different income groups in every state and in both the rural and urban areas. NSSO data suggest that in each state there does exist a food basket which is actually consumed by a large proportion of people and which yields much higher calories per rupee spent on food and that if the poverty-line class were to consume this particular basket, it would be able to meet the calorie norms with its actual expenditure on food (Table 2)⁹. These data suggest that apparent low energy consumption is not so much the result of a lack of income or purchasing power, but of the choice of a food basket by the BPL population.



STATE	RURAL		URBAN	
	Calories/day	Percentage of Norm (2400)	Calories/day	Percentage of Norm (2100)
Andhra Pradesh	2424	101%	2457	117%
Assam	2258	94%	1481	71%
Bihar	2252	94%	2605	124%
Gujarat	2197	92%	2069	99%
Haryana	2311	96%	1526	73%
Himachal Pradesh	2714	113%	2277	108%
Karnataka	2304	96%	2682	128%
Kerala	1456	61%	2004	95%
Madhya Pradesh	2584	108%	2360	112%
Maharashtra	2326	97%	2451	117%
Orissa	2507	104%	2720	130%
Punjab	2266	94%	2183	104%
Rajasthan	3016	126%	2561	122%
Tamil Nadu	2215	92%	2050	98%
Uttar Pradesh	2266	94%	2027	97%
West Bengal	2633	110%	2089	99%

Reference: Pronab Sen, 2005

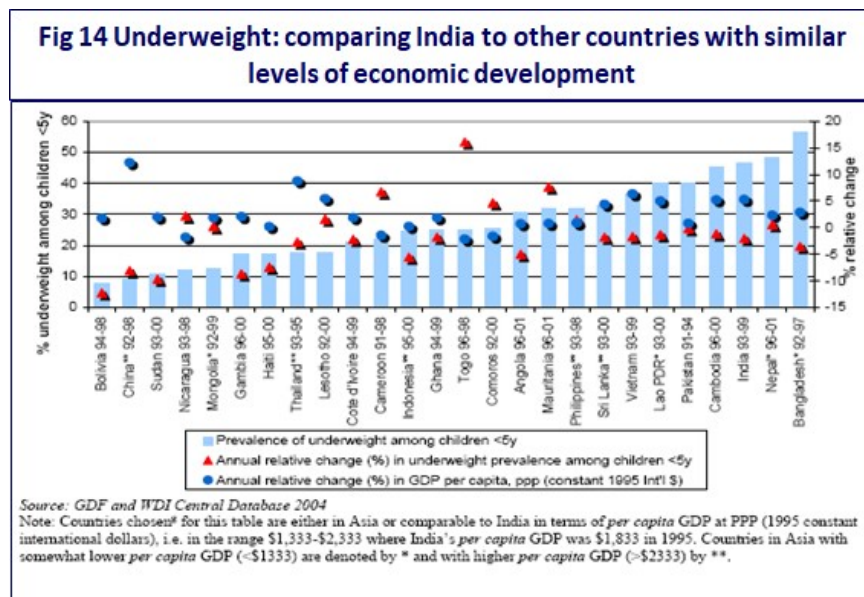
Nutrition status of pre-school children

India recognised that preschool children are one of the most nutritionally vulnerable segments of the population and invested in the Integrated Child Development Services (ICDS) aimed at prevention, early detection, prompt and effective treatment of under-nutrition in preschool children. ICDS is perhaps the world's largest and most sustained food supplementation programme in the

world. In spite of these efforts nearly half Indian children are underweight; underweight rates in Indian children are far higher not only as compared to countries with similar level of economic development but also those with far lower economic development such as sub-Saharan Africa (Fig 14)⁴. Though underweight rates in India are higher than that of Sub-Saharan Africa, under five mortality rates and morbidity rates in children in India are much lower - the so called

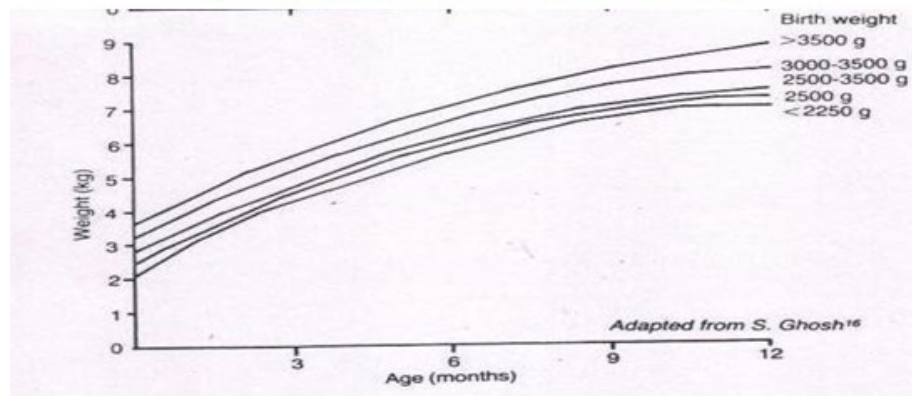
South Asian enigma. Simultaneously efforts should be made to solve the South Asian enigma. It is necessary to assess functional decompensation associated with varying degrees of under-nutrition as assessed by weight-for-age, height-for-age and BMI-for-age to identify the indicator which

clearly defines functional decompensation. Emergence of dual nutrition burden in India and other developing countries adds an urgency for this task. Several factors are responsible for



high under nutrition in India. Some of these are related to poverty and poor access to nutrition and health care and could be remedied within a short period. There are others which are unrelated to current

Figure 15: Growth in relation to birth weight



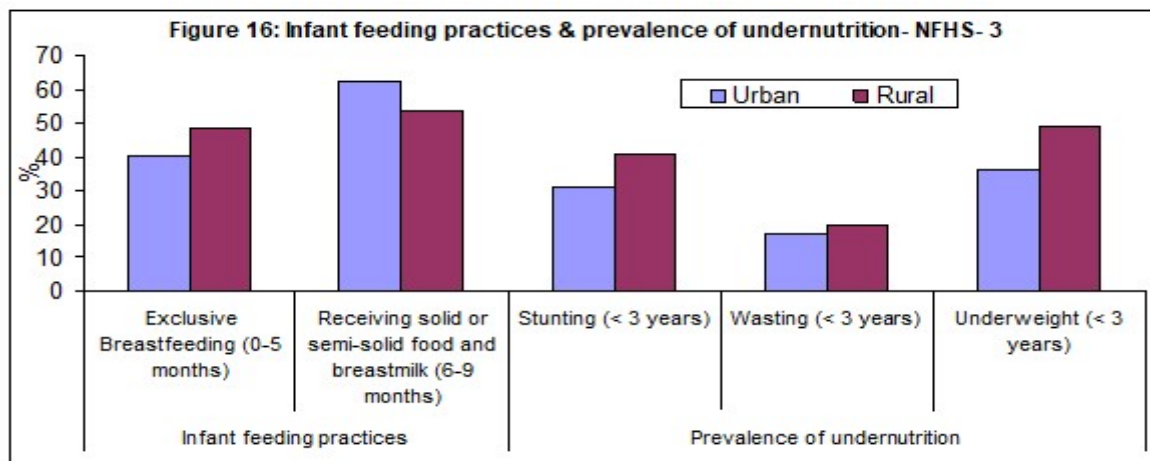
deprivations and could not be readily corrected. The factors amenable for correction should be identified, interventions against them initiated and achievable goals for improvement in nutritional status laid down.

Factors associated with under-nutrition in children

India has the dubious distinction of having a very high prevalence of low birth weight. Estimates based on available data from institutional deliveries and smaller community-based studies suggest that even now nearly one-third of all Indian infants weigh less than 2.5 kg at birth. Studies carried out by Ghosh and co-workers in the seventies¹⁰ and later confirmed by other investigators have shown that LBW children have a low trajectory for growth in infancy and childhood (Fig 15)¹⁰.

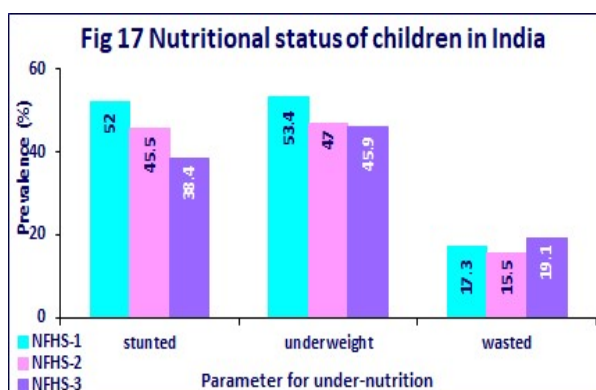
Other major factors that influence infant growth are adequacy of infant feeding and absence of infection. National surveys (NNMB, NFHS and DLHS) have shown that in India, steps taken for the protection and promotion of the practice of breast-feeding have been effective and breast-feeding is almost universal. However, the message that exclusive breast feeding up to six months and gradual introduction of semisolids from six months are critical for the prevention of under-nutrition in infancy has not been as effectively communicated. Data from NFHS-3⁸ indicate that though breastfeeding was nearly universal and mean duration of lactation is over 2 years, exclusive breast-feeding among infants in the age group of 0-6 months continues to be low. In spite of all the IEC efforts on the need for timely introduction of complementary food, only about half the children in the age group of 6-9 months receive semisolid food. The inappropriate feeding practices are seen in all income

Figure 16: Infant feeding practices & prevalence of undernutrition- NFHS- 3



groups and is not related to poverty.

As a result of poor infant feeding and caring practices under-nutrition rates continue to be

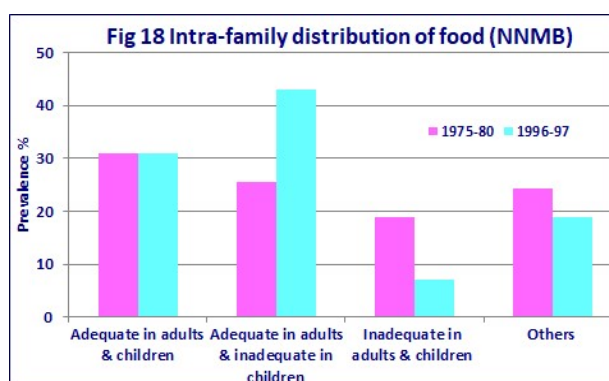


high in the 0-3 year age group (Fig 16). There has been some reduction in underweight rates between NFHS 1¹¹ and 2¹² but not much change between NFHS 2 and 3. There were small but inconsistent differences in the stunting and wasting rates between the three surveys (Fig 17). The continued inappropriate infant and young child feeding and poor access to appropriate health care rather than poverty appear

to be responsible for the relatively slow reduction in under-nutrition rates between the three NFHS surveys.

Dietary intake and nutritional status of pre-school children

Pre-school children constitute one of the most nutritionally vulnerable segments of the population and their nutritional status is considered to be a sensitive indicator of community health and nutrition. Data from surveys carried out by National Nutrition



Monitoring Bureau (NNMB) on dietary intake in preschool children between 1975 and 1996 is given in Table 3¹². There has not been a substantial improvement in their dietary intake over the last two decades.

Data on energy intake in children, adolescents and adults from NNMB survey (2000) is shown in Table 4¹². Mean energy intake, as percentage of RDA is the least among the preschool children, in spite of the fact that their requirement is the lowest. Young children have small stomach capacity; they have to be fed 5-6 times a day if adult food with low

	1-3 years			4-6 years		
	75-79	88-90	96-97	75-79	88-90	96-97
Protein (g)	22.8	23.7	20.9	30.2	33.9	31.2
Energy (Kcal)	834	908	807	1118	1260	1213
Vitamin A (µg)	136	117	133	159	153	205
Thiamine (mg)	0.50	0.52	0.40	0.76	0.83	0.70
Riboflavin (mg)	0.38	0.37	0.40	0.48	0.52	0.60
Niacin (mg)	5.08	5.56	4.60	7.09	8.40	7.40
Vitamin C (mg)	15	14	15	20	23	25

Source: Reference 12

energy density is given to them. It would appear that the problems in feeding a young child with predominantly adult food rather than poverty is the major factor responsible for low dietary intake in preschool children. Time trends in intra familial distribution of food (Fig 18) indicate that while the

proportion of families where both the adults and preschool children have adequate food has remained at about 30% over the last 20 years, the proportion of families with inadequate intake has come down substantially. However, the proportion of families where the pre-school children receive inadequate intake while adults have adequate intake has

nearly doubled. This is in spite of the fact that the RDA for preschool children forms a very small proportion (on an average 1300 Kcal/day) of the family's total

Age Group	Males			Females		
	Kcals	RDA	% RDA	Kcals	RDA	% RDI
Pre-school	889	1357	65.5	897	1351	66.4
School Age	1464	1929	75.9	1409	1876	75.1
Adolescents	2065	2441	84.6	1670	1823	91.6
Adults	2226	2425	91.8	1923	1874	102.6

Source: Reference 12

intake of around 11000 Kcal/day (assuming a family size of 5). These data confirm that in the last decade more than poverty, poor young child feeding and caring practices are responsible for inadequate dietary intake in preschool children¹².

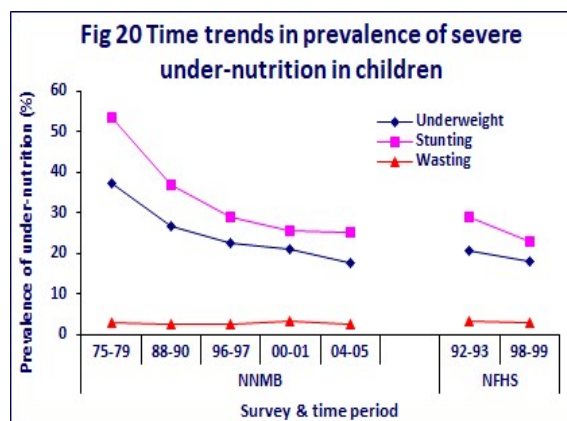
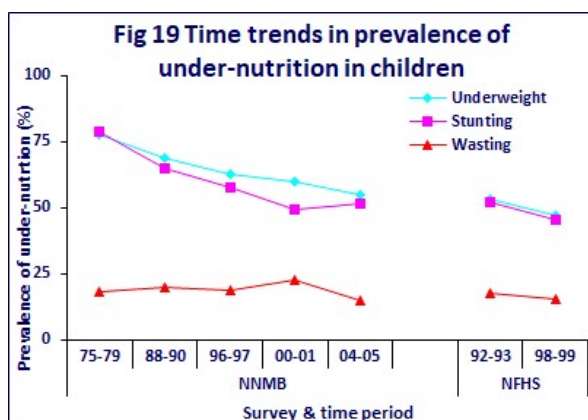
Time trends in nutritional status of pre-school children from surveys carried out by the NNMB

is given in Figs 19 and 20. In spite of the fact that there is no increase in the dietary intake there has been a decline especially in severe undernutrition as assessed by weight for age and height for age. However, over the same period there has not been any decline in wasting rates. One of the major problems facing nutritionists is choosing the index best suited for assessment of nutritional status in children. With the emergence of dual nutrition burden there has been increasing emphasis on use of wasting /BMI for age as the preferred index to be used for assessment of nutritional status in children.

DLHS data on prevalence of under-nutrition (NCHS/WHO<-2SD weight for age) in relation to standard of living index is given in Fig 21¹⁴. Over half of the children from the low-income group are under nourished. This could be related to poor feeding and caring practices. But the fact that over a third of preschool children from households

with high standard of living are under-nourished suggests that factors other than poverty and poor access to services play an important role as determinants of under-nutrition in preschool children. Analysis of data using WHO (2006) standards indicate that over-nutrition is seen in a very small proportion of children in all income groups. These data indicate that the association between under-nutrition in pre-school children and poverty is no longer as pronounced as it was five decades ago.

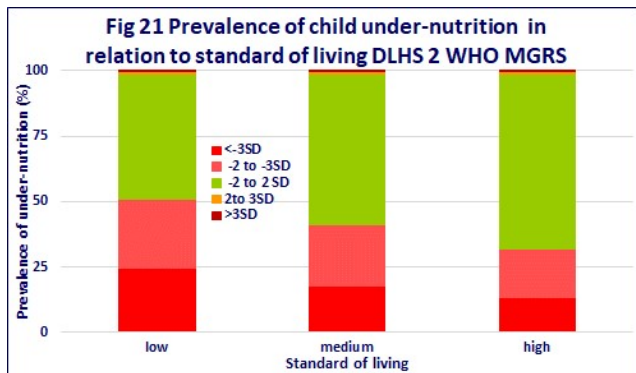
Recognising the potential linkages between



child under-nutrition and human

development UN have included child under-nutrition as one of the indices for computation of Human poverty index for measuring deprivation in developing countries. Human poverty index is a composite index which takes into account the probability at birth of not of not surviving to age of 40, adult literacy rates, and population without sustained access to improved water source and children under weight for age. Data presented above indicates

that in India under-nutrition exists even in the absence of socio-economic deprivation. It is essential to undertake in depth investigation in depth on the relationship between under-



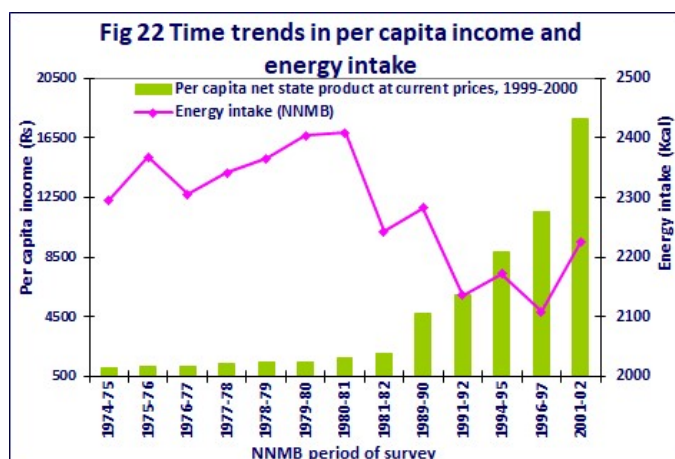
nutrition in children (<2SD of weight-for-age, height-for-age and BMI-for-age) and poverty and deprivation in India.

Dietary intake and nutritional status of adults

Time trends in national per capita income (CSO) and energy intake

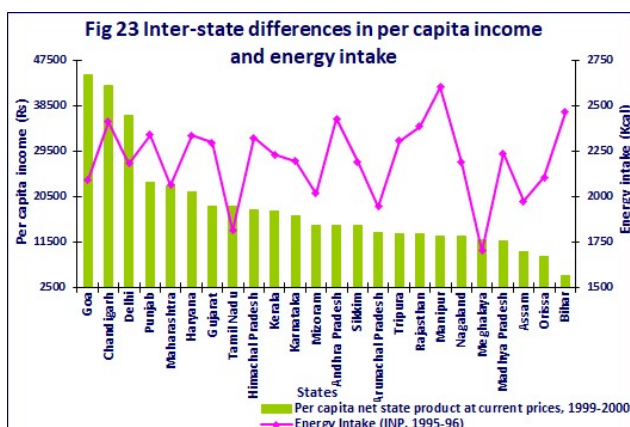
from NNMB surveys is indicated in Fig 22⁶. In the fifties poverty and lack of purchasing power was the major determinant of energy intake. The substantial increase in per capita income in the nineties has in fact been associated with a small reduction in energy intake (Fig 22); changed life style and reduction in energy requirement rather than lack of purchasing power appears to be responsible for this decline in energy intake.

Data on inter-state differences in per capita net state product (CSO) and energy intake from diet surveys conducted through NNMB/INP¹⁵ is given in Fig 23. Some states like Delhi and Punjab have high per capita income and high-energy intake. However, energy intake is quite high in states like Bihar and Orissa with low income.



Data on energy intake in adults for the NNMB and INP surveys carried out in the mid-nineties and prevalence of

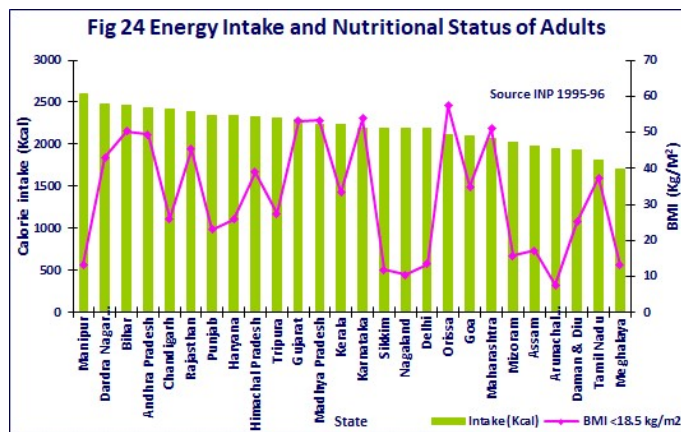
under-nutrition in adult women in different states is shown in Fig 24. In spite of high energy intake under-nutrition in adult women is high in states like Bihar, MP, and Rajasthan. This is perhaps because in these states occupational or house hold chores related physical activity is high and the energy intake is insufficient to meet the needs among poor segments of



population. Under-nutrition rates in adult women are low in spite of low energy intake in Tamil Nadu where physical activity levels in women might be lower because ready access to public transport water and fuel. It is obvious that in addition to energy intake, physical activity is emerging as a major determinant of nutritional status in adults.

Time trends in nutritional status of adults from NNMB surveys are shown in Figs 26

and 27. In spite of the fact that there has not been any increase in dietary intake there has



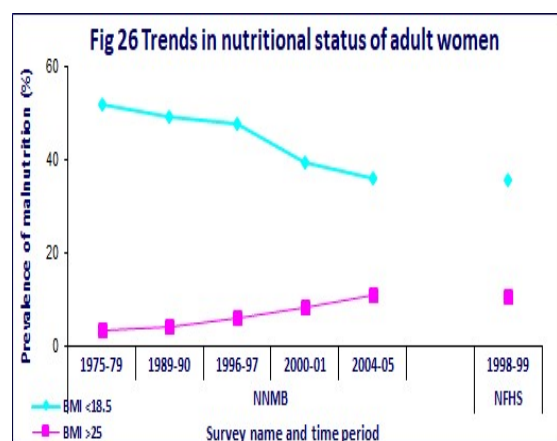
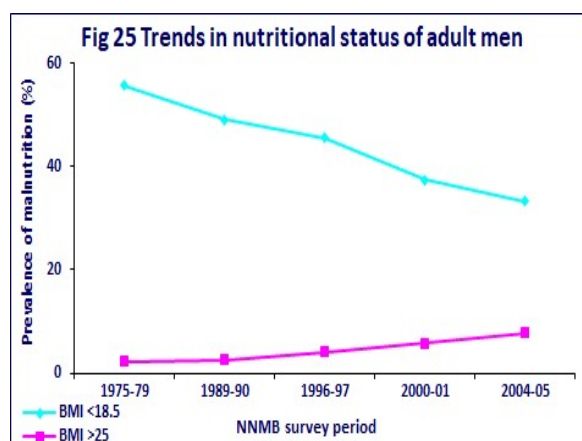
been some reduction in under-nutrition rates and some increase in over-nutrition rates. These changes might be due to reduction in physical activity over the last three decades.

Data from NFHS 3 on under- and over-nutrition rates in men and women in different states bring out some interesting findings on nutritional status of adults in 2005.

Under-nutrition rates are high and over nutrition rates are low in states like MP, Orissa, UP and Bihar. Undernutrition rates are low and overnutrition rates are high in states like Delhi, Punjab and Kerala. However, in this survey a new category is emerging in Tamil Nadu, Karnataka, Andhra, Gujarat and Maharashtra states in both under and over nutrition are common. It is noteworthy that in all states both under and over-nutrition is more common in women. Increasing disparity in dietary intake and physical activity between different segments of population rather than poverty and affluence appears to be responsible for the emergence of this dual nutrition burden.

Policy and programme implications

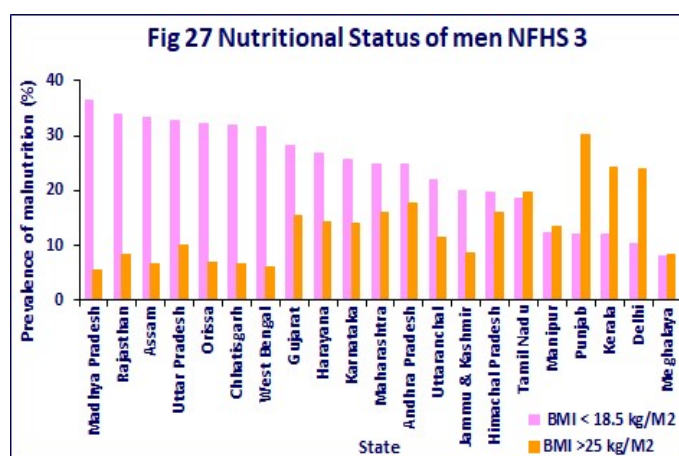
Three major groups economists, nutritionists and health professionals have been closely involved in exploring the inter-linkages between poverty, food intake and nutritional status and have contributed enormously to understanding of these complex interrelationships. In the last decade new scenario is emerging in which the past associations may get altered. There is rapid economic growth but no steep decline in poverty rates. Consumer expenditure on food has declined due to low cost of cereals. Adequate food availability at affordable cost has not resulted in increased food/ energy intake. Sustained interventions to



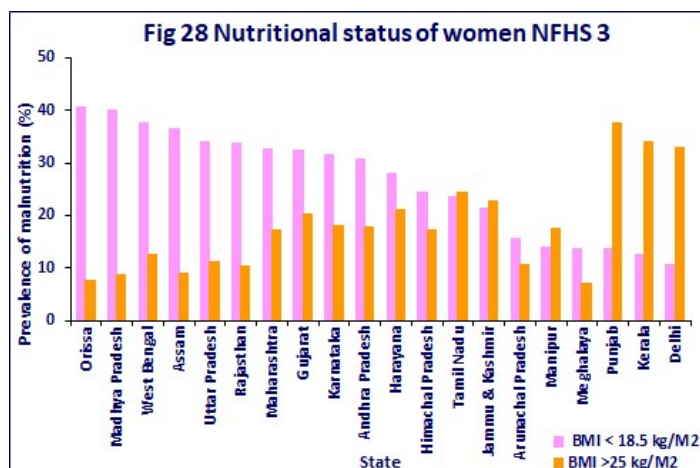
prevent and combat child undernutrition have not resulted in substantial reduction in child under-nutrition rates; a third of preschool children even in high income families are underweight. There has been substantial reduction in physical activity in all segments of population. As a result, over-nutrition is emerging as a public health problem in all age groups.

The economists are concerned that over years there has been changes in consumption expenditure patterns; the current value of the poverty line based on 1973 consumption expenditure may not permit the poverty-line class to consume food according to the calorific norm after other essential expenditures are taken into account. It is true that there has been changes but all the preferences consumer may not be appropriate or desirable. For example, the increase in consumption of fats and oil, beverages and tobacco are certainly not desirable from health and nutrition point of view.

The nutritionists worry that the Tenth Plan paradigm shift from mere food security to nutrition security has not got reflected in the definition of poverty line as providing access to basket of food which can provide the balanced diet with adequate macro and micronutrients. They would prefer the consumer expenditure of poverty line class who consume balanced meal containing adequate pulses and vegetable used to define poverty line as this would result in substantial reduction in micronutrient deficiencies and also have some protective effect on emerging non-communicable disease burden. The nutritionists are also concerned about the appropriateness of the currently used indices for assessment of nutritional status in children in the era of dual nutrition burden; many favour increasing use of BMI as the most appropriate indicator.



The health professionals are concerned that the existing calorie norm does not take into account the alterations in life style and physical activity pattern over the last three decades. The FAO has reduced their recommendations regarding energy requirements based on data



on actual energy expenditure. India has already entered the dual nutrition burden era; unless the reduction in energy requirement is taken into account while ICMR recommendations of RDA are made the country may face increase overnutrition and non-communicable disease risk. They would prefer to see reduction in consumption of oils, fats, beverages and tobacco.

All these clearly bring out the need for reviewing relationship between poverty, food consumption and nutritional status taking all the above factors into account; on the basis of the review, recommendations for appropriate policy and programme modifications can be made.

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