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Child Health and Nutrition in Tamil Nadu

C. Gopalan

Tamil Nadu, has, over the years, enjoyed the reputation of being one of the better administered States of the country. The sad fact, however, remains that the current health and nutritional status of children of poor income groups in Tamil Nadu are far from satisfactory by any accepted standards of normalcy; indeed in some respects they are worse than those of some of the other States of the country.

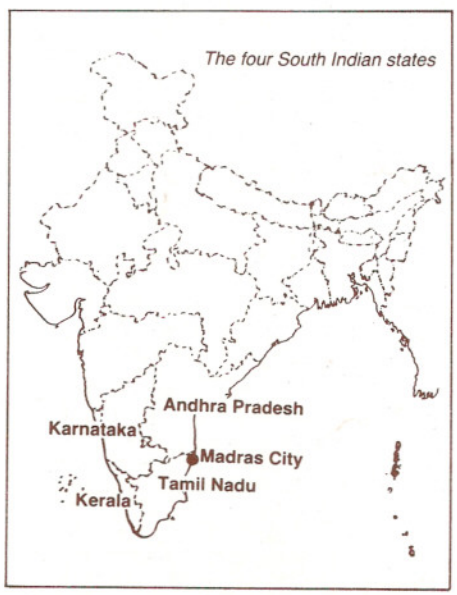
The data provided by the Registrar General of India in his report of 1981 (Survey on Infant and Child Mortality 1979) may help in understanding the situation. Despite their well known limitations these are about the best data we have today.

Infant and child mortality: A scrutiny of IMR and child mortality rates in the four South Indian States of Kerala, Karnataka, Andhra Pradesh and Tamil Nadu (Table 1) will show that Tamil Nadu occupies the third place with respect to IMR and the last place with respect to child mortality. Kerala's IMR and child mortality rate, incidentally the lowest in the country, are less than half of those of Tamil Nadu. Going by the rate of decline in infant and child mortality in Tamil Nadu over the last two decades, it seems unlikely that Tamil Nadu could attain the present low levels of infant and child mortality *now* obtaining in Kerala even by the turn of this century!

It is, no doubt, true that the States of the 'Hindi belt' in the country, generally recognised to be the most backward from the health point of view, have much higher levels of IMR than Tamil Nadu (Madhya Pradesh (135), Uttar Pradesh (167), Bihar (?), and Rajasthan (129)). However, for obvious reasons, the reasonable point of reference as far as Tamil Nadu is concerned is the State in its own immediate neighbourhood with which it shares a common border (Kerala) and not the 'Hindi belt'.

The age-specific death rates (zero to four years) among different groups of population in Kerala and Tamil Nadu, set out in Table 2, indicate the differences within and between the two States.

It will be seen that with respect to each population group, Kerala stands out as far superior; in both States, the scheduled castes are the worst hit as



may well be expected.

The data in the Registrar General's report provide some valuable clues with regard to factors that could possibly underlie the striking differences between the two States.

Major determinants of infant and child mortality: We may recognise three major determinants of infant and child mortality:
(1) level of education of women,
(2) birth rate (spacing of births), and
(3) prompt access to health facilities.

Analysis of infant mortality data in the country for 1978 according to the level of education of women (Table 3) shows that while IMR among infants of illiterate women was 145 and 88 respectively in the rural and urban areas of the country as a whole, among those of women with primary level of education and above in the country, the corresponding rates were just 71 and 47.

It may, however, be argued that differences between the two groups may not be attributable to literacy *per se* but due to other factors associated with better literacy, especially better socio-economic status. Data in Table 4, however, will serve to underscore the important determining role of female literacy with respect to infant mortality. The joint contribution that limitation of births and female literacy could together make towards reduction in IMR is also revealed by data provided in that table.

The contribution that the kind of attention during illness makes to infant and child mortality is revealed by the fact that in rural areas of the country, which have far higher infant and child mortality than urban areas, a much higher percentage of infants and children do not have the benefit of services of trained medical practitioners at the time of their death (Table 5).

How do Kerala and Tamil Nadu compare with respect to these three major determinants of child mortality?

The female adult literacy rate in Kerala was 70.8 as against 34.7 for Tamil Nadu according to the 1981 census. The crude birth rate in 1978 in Kerala was 26.6 for rural areas and 25.1 for urban areas as against 30.9 and 27.0 respectively in Tamil Nadu. The comparative position with regard to access to health facilities is indicated in Table 6.

Reduction in child mortality requires not only that better access to health facilities is provided, but also that awareness, motivation and competence of women with respect to the effective utilisation of such services are also developed; the latter can only come about through promotion of female education. With respect to both these basic requirements, there are apparently far greater inadequacies today in Tamil Nadu than in Kerala.

The promotion of formal education for girls and women will necessarily be a relatively slow process. But it should be possible for Tamil Nadu to rapidly achieve a level of health coverage for its rural population currently obtaining in Kerala within the next decade; it should also be possible to intensify nonformal health and nutrition education programmes for rural communities through the health system and through the rural school system. The rural school system, an excellent ready-made infrastructure for community education,is hardly put to effective use for this purpose anywhere in the country. The massive ongoing school-meal programme provides a golden opportunity to Tamil Nadu to show the way in this regard.

Child nutrition: We have so far discussed child mortality. With modern health technology, and the use of crisis-management strategies like oral rehydration, prompt medical attention during illnesses and 'nutrition interventions' in the case of children in extremis, it is now possible to reduce child mortality substantially; and indeed this is being done in many developing countries of the world today. Saving children from the ultimate catastrophe of death is one thing; ensuring adequate nutrition and positive health of surviving children is quite another. The latter calls for sustained inputs of an order and type very different from those involved in death control strategies. If we stop with child-survival measures and do not follow them up

Table 1: Infant and child mortality rates in four South Indian States

State	IMR (1978)	Child mortality (0-4 years) (1978)
Kerala	39	12.6
Karnataka	75	26.6
Tamil Nadu	103	37.8
Andhra Pradesh	112	36.8

Table 2: Age-specific death rates (0-4 years) in different population groups in Kerala and Tamil Nadu

Groups	Rural		Urban	
	Kerala	Tamil Nadu	Kerala	Tamil Nadu
Hindu	14.3	45.5	9.0	20.0
Muslim	13.6	29.7	12.2	33.5
Christian	6.2	—	6.7	—
Scheduled Castes	28.5	69.4	—	—

Table 3: IMR in India by level of education of women — 1978

Educational level	Rural	Urban
Illiterate	145	88
Primary and above	71	47

Table 4: IMR in India expressed as an index of first parity for various groups – 1978.*

Groups	Parity					
	1	2	3	4	5	6+
Illiterate	100	97	95	97	107	121
Primary and above	100	39	43	42	69	90

** i.e. assuming that IMR of first parity is 100. In actual fact, the IMR in first parity in the literate group is of course much lower.*

Table 5: Percent children not attended by medical practitioners during illness preceding death

	Below 1 year	1-5 years
Rural	58.3	41.3
Urban	29.4	22.1

Table 6: Percent population according to access to health facilities

Distance to nearest health facility	Kerala	Tamil Nadu
Within 2 kms	64.2	8.6
Beyond 5 kms	13.2	58.6

with programmes for the improvement and sustenance of the health and nutritional status of children thus saved, we will only be increasing the pool of sub-standard survivors; in short, we will be progressively eroding the quality of our human resources.

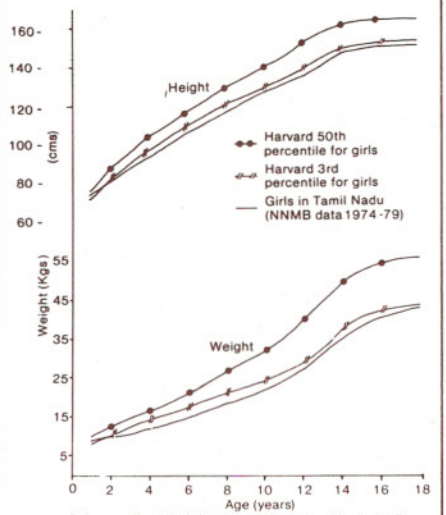
Kerala, which has an excellent record with respect to child survival, has as poor a record with respect to child nutrition as Tamil Nadu. Because of poverty, diets in Kerala are no better—in fact poorer than those of Tamil Nadu; this is reflected in nearly as high a prevalence of malnutrition and growth retardation in her children as in those of Tamil Nadu (Table 7).

The growth curve based on the cross-sectional data on average heights and weights of children of different ages (drawn predominantly from poor income groups) in Tamil Nadu, as gathered during the NNMB survey (1975-79) is presented in Figures 1 and 2 alongside the growth curve based on the Harvard standard for normal children.

This will show the current poor state of nutrition of our children. It will be seen that mean heights and weights of children of Tamil Nadu fall well below the third percentile of international standards of normal growth; they correspond roughly to 73 percent to 75 percent of the 50th percentile of the international standard in the case of children three to five years old and 66 percent to 73 percent in the case of children five to 12 years old ("moderate malnutrition" in the Gomez scale). It has been shown earlier that the growth of Indian children of affluent communities conforms to international standards. The growth curve of Kerala children, also based on the same NNMB data, is almost similar to that of children of Tamil Nadu.

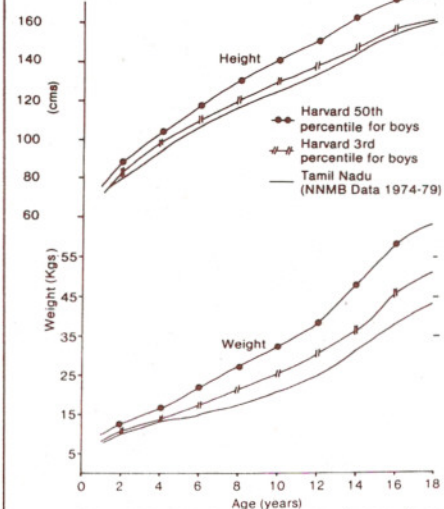
Thus while Kerala has achieved better child survival through better female literacy, lower birth rates and better access to health services, it has not achieved better child nutrition because diets there are actually even poorer than those of Tamil Nadu.

Figure 1



Reference: Tamil Nadu Data: National Nutrition Monitoring Bureau. Report for the year 1979. NIN Hyderabad.

Figure 2



Reference: Tamil Nadu Data: National Nutrition Monitoring Bureau. Report for the year 1979. NIN Hyderabad.

Infant Nutrition: The growing menace related to the unhygienic use of commercial baby foods in infant feeding among the poor slum dwellers of Madras has not been adequately recognised.

The Nutrition Foundation of India had recently completed an intensive study of this problem in three major cities of India, Madras, Bombay and Calcutta and their periurban and rural environs (Infant Feeding Practices with Special Reference to the Use of Commercial Infant Foods: *Sc. Rep. 4, N.F.I.,* 1984).

The figures presented in Table 8 will reveal the extent of usage of commercial milk foods in the city of Madras and suburban areas and the socio-economic status of families who are giving such foods to their infants. A very high proportion of families with monthly incomes less than Rs. 500 and with totally illiterate mothers are today using these foods. A good part of their income is currently being spent on these foods.

Because of their poverty, poor families using commercial milk foods, unlike the rich, cannot afford to buy these foods in the amounts they are needed. Quantities which are much smaller than necessary for adequate feeding are fed in highly overdiluted form; the dilution is also done in most unhygienic ways and, of course, there is no question of sterlisation of bottles, etc. The NFI study shows that among the poor income groups in Madras city, the prevalence of severe (grade 3) growth retardation was as high as 10.2 percent in infants who were receiving commercial milk foods as against 2.7 percent in those who were being exclusively breast-fed.

Fortunately, while this menace is apparently growing in the urban slums, it has not caught on as yet in the rural areas. This is the time to act. Mothers must be educated and encouraged to breast-feed their infants exclusively at breast for *at least* four months and ideally for even six months; thereafter they could use inexpensive locally available foods and boiled animal milk as supplements. Health workers should educate mothers on the type of foods that they could use for weaning their infants.

The noon-meal programme: The noon-meal programme in the State does not address the crucial and vulnerable age group (zero to two years). Even so, it must rank as perhaps the most extensive nutrition intervention programme, covering as it does lakhs of poor children from two to 14 years of age,involving an expenditure of nearly 150 crores of rupees annually. There have been criticisms that such huge investments on

Table 7: Percent distribution of underfives according to severity of undernutrition (Gomez Scale) (1975-79 pooled NNMB data)

State	No. of children surveyed	Normal 90%	Mild 75%-90%	Moderate 60%-75%	Severe below 60%
Kerala	1014	16.4	45.3	33.5	4.8
Tamil Nadu	1545	14.6	43.6	35.3	6.5

Table 8 : Use of commercial milk foods (CM) in urban slums

Category	Percentage of infants receiving CM		
	Bombay	Calcutta	Madras
Per caput income per month:			
Less than Rs. 50	8.9	24.5	37.4
Rs. 51-100	21.1	48.2	60.8
Rs. 101-150	24.1	66.4	65.9
Rs. 151-200	25.7	77.2	80.0
Rs. 201 +	30.5	92.9	75.0
Mothers' education			
No education	19.4	26.1	33.6
Low	19.5	46.7	51.3
High	27.2	77.5	70.9

Source: Scientific Report 4, Nutrition Foundation of India, 1984, p. 60.

give-away feeding operations, which are not "economically productive", will deplete scarce resources sorely needed for other developmental programmes.

Most of the criticism of the present noon-meal programme in Tamil Nadu would be met if the programme is conceived and implemented not just as a permanent state-sponsored charity feeding operation with the narrow purpose of mitigating hunger in its beneficiaries but as part of a comprehensive strategy for Human Resources Development in the State.

In a comprehensive Human Resources Development Strategy, the noon-meal will serve as just the 'entry-point' — the peg on which other services and programmes would piggy-back. The opportunity afforded by the improved school enrolment following on the introduction of noon-meal could be used for an imaginative programme for:

- upgrading the standard and for introducing reforms in primary education;
- using the rural school system as a major channel for promoting the outreach of health care to rural children by organising an efficient School Health Service (C. Gopalan: School Health Service: *Bull. NFI, 2, 4,* 1981) which will ensure not merely periodic medical examination of pupils at regular intervals (not just once a year) followed by referrals where necessary, but also improvement of environmental sanitation around schools (the rural schools could thus become the second front in the war against disease and ill-health in the countryside);
- using the rural school system for an imaginative programme of community health/nutrition education, not just for the school children alone but for the rural community as a whole on the lines recommended by the Nutrition Foundation of India in its report to NCERT (Nutrition and Health Education through the Rural School System: *Scientific Report 3, NFI,* 1983);
- organising programmes for "education for better living" and vocational training for adolescent girls in the village—the mothers-to-be (C. Gopalan, *Bull. NFI. 5. 1.* 1984).

Indeed by not piggy-backing these latter programmes on the noon-meal, we will not be getting the possible full returns on the massive investment. Thus, for example, the noon-meal would do far more to the child's nutrition if infections preventing absorption and utilisation of food are simultaneously tackled; and better school enrolment will mean a lot more if parallel efforts at improving education are instituted simultaneously. The financial resources that will be needed for these programmes will be a fraction of the current outlay on the feeding operation.

In short, the noon-meal could be imaginatively used to trigger a whole process of social development that could transform the village with the rural school system acting as a powerful instrument of change.

Indeed the objective of this entire strategy must be the attainment of a level of socio-economic development in which a feeding operation on the present scale will become increasingly unnecessary and could therefore be progressively tapered off. It should be our effort to see that at least, the children of the next generation in Tamil Nadu, should not have to depend on a free-meal programme for sustaining their nutritional status.

Extracts from the address delivered at the inauguration of the Madras Chapter of the Nutrition Society of India at the Institute of Child Health, Madras, on July 20, 1985.

NUTRITION NEWS

The XIII International Congress of Nutrition held in Brighton, U.K., from August 18 to 23,1985 was attended by over 2500 delegates. The scientific programme included six key-note lectures, 16 symposia, 33 colloquia, 48 workshops, and 49 poster sessions, covering a very wide array of subjects ranging from basic to applied aspects of human nutrition, and including animal nutrition. The plenary sessions were held in the Brighton Centre and the others at the University of Sussex with a coach service on a shuttle basis helping in the transport of delegates. There was a Trade Exhibition and a Publishers' Exhibition. Nearly 40 Indian scientists participated in the Congress. There was a fair representation of delegates from the developing countries.

The Scientific Programme was quite comprehensive with every major aspect of nutrition finding a place. However, the fact that there were too many parallel sessions running simultaneously and the fair distance between meeting venues could have prevented many delegates from deriving full benefit from the rich scientific fare. Individual sessions, however, had been carefully planned, and such sessions as one could possibly attend proved highly informative and useful.

The informal discussions and get-togethers in the lobbies were a highly rewarding experience and provided valuable opportunities for scientists with similar interests from many parts of the world to exchange and compare notes. The Congress dinners, social engagements and tours provided opportunities for social contact. The weather in Brighton was fortunately pleasant for most of the time.

It was decided at the IUNS Assembly meet that the next Congress XIV will be held in Seoul (South Korea) in 1989 and the XV in Australia, four years thereafter (1993).

Urban Nutrition in India – I

Kamala S. Jaya Rao

With the rapid growth of big cities, the problems of poverty, ill-health and undernutrition in urban slums are steadily acquiring increasing dimensions and urgency. This is especially so in most developing countries of the world, though the developed countries are by no means wholly exempt. Of the 200 million people estimated to be living in urban areas in abject poverty nearly 10 years ago, a little more than half are said to be in Asia; the other half are divided roughly equally between Latin America and Africa. In the intervening years, the absolute numbers of the urban poor must have swelled considerably.

About 30 percent of the population of the metropolitan cities of India live in slums (B.S. Padmanabhan: *Planning for Urban Growth, The Hindu*, July 12, 1985). The total slum population of India was around 25 million in 1981 and is expected to be about 33 million in 1985. While the total population growth rate in developing countries was 2.2 percent p.a. between 1970 and 1975, the urban population growth rate was 4.3 percent p.a. (M. Cepede, *Food & Nutrition* 10: 43, 1984). In India, the rural population growth rate was 1.75 percent in 1981, while the urban rate was 3.26 percent (B.S. Padmanabhan, *Planning for Urban Growth*).

In India till very recently the problem of slums was sought to be tackled by "slum clearance" programmes. However, there is fresh thinking at least in some quarters, and one hears now of slum *improvement* programmes. The idea of slum clearance was a corollary to the thinking that the problem of slums was basically a housing problem, a problem of insanitary environment and of crime—problems of immediate and growing concern to the rich and the middle class co-inhabitants in the cities. Health, nutrition and education had hitherto not received due attention.

Official urban health statistics hide the appalling health and nutrition conditions of urban slum dwellers, most of whom are not 'official' residents of the cities, and therefore do not get included in urban statistics. It is, therefore, not surprising that the nutritional status of city dwellers has never been adequately looked into in India. Except for stray and small studies, no concerted efforts were made in studying urban nutrition. One such study from the National Institute of Nutrition on a very small sample showed that the nutritional status and dietary intakes of preschool children in urban slums were no better than those of rural preschoolers (T.M.V. Prasada Rao, J.G. Sastry and K. Vijaya Raghavan, *IJMR*, 62: 1492, 1974). The study showed that 81 percent of rural children and 92 percent of slum dwellers in Hyderabad suffered from current long duration malnutrition. A USAID study in Calcutta showed that the average energy intake of slum preschoolers was lower by about 170 Kcals compared to the city average of 960 Kcals (quoted by S.S. Basta, *Ecol. Fd. Nutr. 6:* 113, 1977). An intensive study of infant feeding practices in three major cities of India—Calcutta, Madras and Bombay—and their immediate environs by the Nutrition Foundation of India has revealed the growing dimension of the problem of use of commercial infant foods by the urban poor, and the deleterious impact thereof on infant nutrition (Gopujkar P.V. *et al: Scientific Report 4. Nutr. Found. of India,* 1984).

The NNMB Studies

The National Nutrition Monitoring Bureau (NNMB) at the National Institute of Nutrition, which came into being around 1970, fortunately included studies of the urban population as part of its country-wide surveys. Although the coverage has been small, an important step has thus been initiated, and as the cities and their population begin to swell in size this monitoring should yield very valuable data.

The NNMB had initiated its surveys in the nine states of Andhra Pradesh, Bengal, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and Uttar Pradesh since its inception and Orissa was added in 1978. Though nearly a decade and a half have elapsed since the inception of NNMB, other states, at least major ones like Assam, Bihar, Haryana, Punjab and Rajasthan, have not as yet been included in its studies. Haryana and Punjab are of strategic importance in view of the admirable progress in agricultural output due to the successful Green Revolution and the consequent economic improvement of these states; their exclusion from the NNMB surveys is therefore particularly unfortunate. Valuable as the NNMB studies are, the fact that a major part of North India still remains uncovered is a serious limitation.

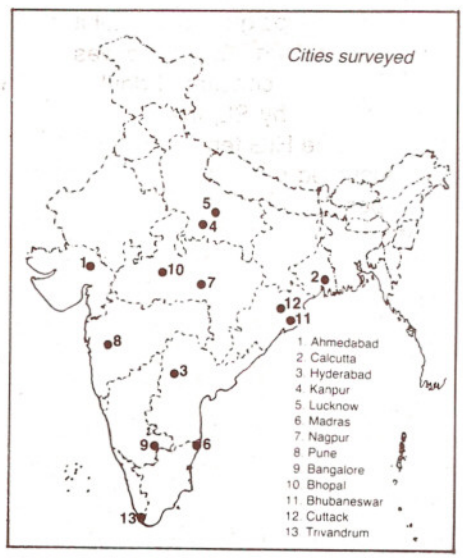
A review of the NNMB data with respect to urban populations is being attempted in the following pages.

The Study Population

The cities now being covered by NNMB are Ahmedabad, Calcutta, Hyderabad, Kanpur, Lucknow, Madras, Nagpur, Pune, Bangalore, Mysore, Bhopal, Bhubaneswar, Cuttack, Cochin and Trivandrum (see map). Of these, the first nine are metropolitan cities each with a population of over a million, and along with Greater Bombay, Delhi and Jaipur (which were not covered by the NNMB) account for a quarter of the country's total urban population (B.S. Padmanabhan, *Planning for Urban Growth*).

The main objective of the NNMB was to study the pattern of food and nutrient consumption, and the nutritional status of the different socio-economic and occupational groups. The sample households were therefore classified as High Income (HIG), Middle Income (MIG), Low Income (LIG), Industrial Labour (IL) and Slums (SL).

The first three categories were taken from the white collar worker population,



mainly civil servants. The HIG included senior civil servants, directors of academic institutes, professors, etc. The MIG consisted of junior civil servants, office superintendents, readers, lecturers, etc. It is obvious that attention was thus directed only to a relatively narrow section of the "high income" earners (the so-called "fixed-income" earners); businessmen, professionals, etc, had been totally excluded. The LIG included office peons, car drivers, etc.

It was planned to study only 50 households per year from each group (the main focus of NNMB being the rural population) and as such the sample size was very small. Hence, data for the five-year period between 1974 and 1979 were pooled and published (NNMB Report on Urban Population, 1984, NIN, Hyderabad). At times, in fact many a time, data for all the cities were pooled to study inter-group differences. There should be no major criticism against this.

Food Consumption

Cereals: As expected, the consumption of cereals and millets increased with decreasing socio-economic (SE) status, while pulses, vegetables, fats and milk showed the reverse trend. Within the HIG groups, the southern states had a higher consumption of cereals; in the other states the deficit was made up either by a higher intake of tubers, or by fats and oils (Ahmedabad and Bhopal). Surprisingly, in the other four SE orders such inter-state differences were not seen. The SL in Trivandrum consumed very low amounts of cereals and very high amount of tubers (tapioca). Except for milk and meat, the HIG and MIG groups behaved similarly.

Milk: One of the food groups to exhibit stark disparities among SE groups was milk. The IL and LIG consumed double the quantities taken by SL, the MIG six times more and the HIG ten-fold higher. The HIG consumed on an average 425 ml. per CU per day. Compared to HIG, even the MIG was poorly off and in many cities the intake was only 25-30 percent of that of the HIG. If Gujarat, with a traditionally high intake of milk is excluded from the analysis, the mean values for HIG show no change but the disparity between it and SL widens still further.

These extremely large disparities in milk consumption confirm the impression that under the prevailing economic conditions in the country "only the rich consume milk". Should current income disparities continue, programmes for augmentation of milk production will be catering almost totally to the needs of the urban rich.

Sugar and jaggery: With the exception of SL, the other SE groups did not show much variation in sugar intake. The SL got a fair share of the foodstuff. In the rural surveys, Gujarat always showed a high consumption of sugar and jaggery. However, with respect to the urban population in Gujarat, while this trend was evident in IL and SL, such a difference was not seen in the other three groups. Even the HIG had an average daily consumption of 30-40 G, which works out roughly to only 10-14 G Kg. per CU per annum.

Fats and oils: As expected, the consumption of visible fats decreased with income levels. However, the differences were not as marked as in the case of milk, due to the reason that the intakes of fat even among the HIG were not high. The comparatively low intake in HIG may be partly due to the well-publicised possible role of excessive fat intake in the genesis of degenerative heart diseases.

Non-milk animal foods: The consumption of non-fish flesh foods was highest in HIG, being 20 G per CU per day. This however was less than the recommended 30 G per CU; however in cities with a high fish consumption, this deficit was more than made up. The other four groups consumed similar amounts. It is important to know to what extent the low intakes in HIG and MIG are attributable to vegetarianism. It is not unreasonable to assume that the percentage of vegetarians will be higher in these two higher economic groups. If this variable is removed, perhaps the same order of disparity in intakes between different income groups—as was observed with respect to milk—would be evident in the case of these foods as well.

The average fish intake looks similar in all SE groups, but these averages could be highly misleading. Almost all the fish consumption was accounted for by Trivandrum, Calcutta and Bhubaneswar. When these cities are excluded, the consumption even in HIG was negligible. The food was also not favoured in other SE groups, except in Madras. The reason for exclusion of fish by HIG in Madras cannot be explained by vegetarianism, since the consumption of other flesh foods is on par with the peer groups in other cities.

Interestingly in Trivandrum fish consumption was similar in all the SE groups. So was the case in the four fish-eating groups of Madras. Fish being a perishable commodity, if adequate and proper cold storage and transport facilities are not available, it would naturally be easily available to the poor. Added to this was the fact that HIG in the neighbouring states appeared not to favour fish. While from the nutritional angle, the lack of SE differences is a welcome feature, this is also an indication that the economy of the fish industry needs closer scrutiny.

In Calcutta and Bhubaneswar, on the other hand, there were clearly discernible SE differences. While MIG consumption was about half and the LIG about one-fourth to one-third that of the HIG, the consumption in SL was virtually nil. Unlike Trivandrum which depends on its own state for its needs, Calcutta imports a large share from Andhra Pradesh. This may explain why, unlike as in Trivandrum, fish was out of reach of the slum dwellers.

Pulses: Pulse intake showed a direct relationship with SE status. There were no striking regional differences in this regard.

Nutrient Consumption

Energy: Energy intakes showed a direct relationship with SE status, being the highest in HIG. Values were similar in MIG, LIG and IL. Whereas SL had the lowest intake, values in IL and LIG fell short of RDA; the MIG too in many cities exhibited this trend. Although the mean intake in HIG was 2600 Kcals, if Trivandrum and Bangalore with values of 3000 each are excluded, the average works out to only 2400, which is equal to the RDA. The mean values for the other four groups are 2365, 2230, 2240 and 2010.

Between the cities, there were very wide variations. However, no city showed a similar trend in all SE groups. Thus while HIG in Trivandrum had the highest intake, the city's SL took the seventh place; on the other hand, in Lucknow whose HIG had the lowest consumption of 2000 Kcals, the IL had an intake of 2400 Kcals.

The energy intake of SL varied from 1760 (Bhopal and Madras) to 2200

Mean Energy Intakes (per CU per day)

Urban	1	2	Rural	
HIG	a) 2000-3085	2600	10 acre Land Holding	2375-3100
	b) 2000-2675	2420	5-10 acre Land Holding	2100-2860
			Landless	1865-2310
MIG	1880-2715	2365		
LIG	1760-2665	2230		
IL	1900-2510	2245		
SL	1760-2290	2010	Harijans	1600-2460

1. Range of means for various cities.
2. Pooled average for the group.
a. Means of various cities.
b. Trivandrum, Bangalore excluded.

(Ahmedabad and Bangalore) Kcals per CU per day. The NNMB report does not mention whether the adult males in this group were considered as sedentary workers, moderate or heavy labour. This is extremely important since a fair number among them may work as rickshaw-pullers, manual labour, etc., which cannot be considered sedentary. Under the circumstances, the mean intakes would work out to be less than those presently calculated.

The accompanying table attempts to compare the energy intakes of urban dwellers with those of the rural population (NNMB Report—pooled data for 1974-1979). The comparison is being made with published *averages* with their obvious limitations; as such the data should be considered to indicate no more than the general *trend*. The important message that emerges from the comparison is that the diets of urban groups were apparently no better than those of their rural counterparts.

Thus the energy intakes in SL were no better than those of the rural landless poor and the Harijans. The rural rich, with a land holding of 10 acres or more, appeared to have higher energy intakes than urban HIG. This may, however, be due to a higher 'calorie-consciousness' among the urban HIG, due to easier accessibility to food for the rural rich, or due to different age compositions of the two types of households. The HIG and MIG were closer to the middle level landholders (five to 10 acres) in energy intake.

It is generally believed that alcohol consumption among the rural poor is high and that it is much more so among industrial labour and urban slum dwellers. However, its contribution to the total energy intake is not known and no good conjectures have been made either.

The observation that the rural rich have higher energy intakes than urban HIG raises the question as to whether the HIG selected here were really the high-income groups. Many among them belonged to MIG in the earlier years of their careers and moved into the HIG bracket only in their 40s or, sometimes, just a few years prior to retirement. The HIG could be more correctly classified as the 'upper middle' group, which is not really very different socio-culturally from the MIG of the present analysis. The true HIG are the businessmen, company executives, practising professionals, etc. This group had not been touched in the NNMB study. A difficulty with these latter categories would be that correct information regarding income would not be forthcoming—non-cooperation would be of a greater degree.

No such excuse can, however, be offered for the exclusion of another important urban group, namely clerks, typists, technicians, teachers, nurses and the like, who form the base for the entire bureaucratic set-up and who have to bear a large part of the pressures of urban life. They fall between two stools, being closer economically to the LIG and socially to the MIG. One may call these the 'lower middle class' and exclusion of this group is the exclusion of a big important chunk of the urban population.

In its rural surveys, the NNMB had also studied the intra-familial food distribution pattern. This showed that the preschoolers were highly discriminated against and that as far as energy intakes were concerned adult females were not worse off than adult males. Such an exercise, if undertaken in the urban sample, would throw light on any cultural changes and the effect of literacy and improved economic status on child nutrition.

Other nutrients: The intakes of all other nutrients show the expected SE gradient and there were no significant regional variations. The intakes of protein were adequate in all groups, though in SL in some cities—particularly those of the South—they were low. Calcium and Vitamin A showed a steep gradient, largely a reflection of the milk intake of the groups. In HIG and MIG calcium intake was well above RDA. Thiamine intake was adequate or marginally higher. Riboflavin intake was below RDA in all groups except HIG. Niacin intakes varied within a narrow range of 15-16 mg. and were generally poor. Iron intakes varied between 25-27 mg. and were adequate in all groups; however, in three of the southern states the SL did not meet their RDA.

In the rural surveys, Vitamin A intakes in the various states varied between 134-448 μg (in the adult male sedentary worker). In the urban slums it varied between 120-434 and in IL and LIG it varied between 120-480 μg.

Thus the survey data show an expected socio-economic gradient in food and nutrient intakes among the various income groups. The diets of HIG are adequate with respect to energy and more than adequate with respect to Vitamin A, calcium and protein. The MIG, however, need to improve their intakes of B-vitamins and Vitamin A, and also show a marginal energy deficit.

The LIG, IL and SL have low energy intakes, despite which iron and protein intakes are not poor. The diets of these groups too need improvement in B-vitamins and Vitamin A.

The data also show that the slum dwellers are no better off than the rural landless labour, as far as their energy intakes are concerned. Urban migration has apparently not helped them to achieve a better food intake.

In the second and concluding part of this paper to be published in the next issue of this Bulletin, the nutritional and anthropometric status of the different urban population groups will be discussed.

Dr. Kamala S. Jaya Rao, M.D., Ph. D., is the former Deputy Director of the National Institute of Nutrition Hyderabad, India.