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The National Nutrition Monitoring Bureau

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Information on prevailing patterns of dietary intakes and current nutritional status of representative population groups in the country is necessary for the formulation and implementation of meaningful national health and nutrition policies. In order to derive such information, numerous diet and nutrition surveys had been carried out in the country during the last few decades. Most of these surveys had been undertaken in earlier years by the nutrition sections of the Public Health Directorates of different states. The results of these studies were annually compiled and published by the National Institute of Nutrition (and in earlier years its precursor, the Nutrition Research Laboratories). On the basis of the data gathered from these surveys, the National Institute of Nutrition had also published a diet atlas and a nutrition atlas both of which had attracted wide attention on the part of scientists, policy-makers and planners in the country.

However, the major weakness in the above efforts was that the results of surveys carried out in different locations by different agencies were not always strictly comparable. Sampling designs were not strictly standardised. It became obvious that in order to derive scientifically valid and authentic data, which would provide a reliable picture of the national situation with respect to dietary intakes and nutritional status, the accuracy of the data as well as their comparability had to be ensured. It was in recognition of this that in 1972 the then Director of the National Institute of Nutrition (Dr. C. Gopalan) conceived the idea of setting up the National Nutrition Monitoring Bureau as an integral part of

the National Institute of Nutrition.

The Bureau began its activities with nine peripheral units — one in each of the following states — Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh and West Bengal. Five years later, Orissa joined the Bureau as its 10th unit.

The NNMB thus has two clear and major objectives:

- To collect on a continuing basis, analyse and report on dietary intakes and nutritional status of representative segments of the population in each of the states, employing standardised and uniform procedures and techniques, and
- To periodically evaluate on-going national nutrition programmes to identify the strengths and weaknesses and recommend mid-course corrections when called for.

The NNMB has been functioning for well over a decade (now nearly 16 years). An attempt has been made here to evaluate its contributions.

Some Unique Features Of NNMB Data Collection

The representativeness of the sample covered by the study is ensured by a rigorous multistage sampling procedure, by which every village in a state has an even opportunity to be included. Districts are stratified into one of four developmental categories and in each of the four categories, one third to one sixth the number are selected each year for survey. All districts in the state would thus be covered within a three to six year period, depending upon the size of the

state. The selection of households in each district is so made that the percent of rural population covered in each district conforms to the ratio of rural to total population of that district. Selection of villages is made after categorising them into small, medium and large, depending upon the population, and then by using random numbers. Depending upon the village population, 5, 10 or 20 households are included in the study. The selection of households is made by the survey team after it visits the village, so as to ensure that different socio-economic and occupational categories are represented.

This sampling frame was evolved after in-depth discussions with Dr. C.R. Rao — the then Director of the Indian Statistical Institute, Calcutta, and currently National Professor.

In the urban areas, the capital city of the state is included, for reasons of convenience of operation, and apart from the low, middle and high income groups, one slum and one big industrial concern in the city are covered. Clearly, these are not representative samples of either the urban, slum or industrial labour populations (National Nutrition Monitoring Bureau — Plan of Operation, NIN 1971).

Data on food consumption at the household level are obtained through direct weighing of all raw foods used by the family, on three consecutive days. At the individual level information on intakes is obtained by the 24 hour oral recall method. Thus data are collected not only on total family food consumption but also on intra-familial food distribution. This helps in cross-checking the validity of the data generated on total family food consumption.

Since data on socio-economic factors, dietary intakes, and nutritional status — both anthropometric and clinical — are all obtained from the same households, it would be possible to inter-relate them

in terms of cause and effect.

In each state, all data are collected by a team consisting of a medical officer and a nutritionist, who are specially trained at NIN.

Standardised techniques are used both for diet surveys and anthropometric measurements, thus ensuring uniformity of methodology, to the extent possible. It needs to be recognised that despite using the best and most appropriate sampling methods, true representativeness can never be ensured. Similarly, the inherent limitations in the best diet survey methods pose problems of interpretation and a three-day weighment method or a 24-hour recall method cannot be projected as being truly valid for longer periods. Given these limitations, it would be fair to say that the data generated and reported by the NNMB are perhaps the most authentic that are available in our country today. They can be used with confidence not only for inter-regional comparisons, but also for comparisons across time.

Contributions Of The NNMB

Coverage: Since its inception in 1972, till the end of 1984, the Bureau has covered a total of 39,129 households for diet surveys and 243,536 individuals for assessment for nutritional status, in rural areas. In urban areas corresponding figures are 8,207 and 32,500. The Bureau has published its findings in a series of reports brought out annually. Data have been presented not only for the state as a whole, but also separately for each of the districts covered.

Apart from this regular annual data collection, the Bureau has also carried out two special studies. In 1983-84, an NNMB-NSSO linked study, to relate the expenditure-pattern to dietary consumption was done, while in 1985-86 special tribal groups in the Integrated Tribal Development Project Areas were comprehensively studied. The reports of these studies are not as yet available.

Programme evaluation: The NNMB has evaluated the following nutrition programmes and published the findings as special reports.

- Vitamin A prophylaxis programme 1977-78
- Applied Nutrition Programme 1977-78
- India Population Project, Karnataka 1979

- Special Nutrition Programme 1979-80
- World Food-assisted Feeding Programme 1981-82
- National Anaemia Prophylaxis Programme (Report not yet published) 1986-87

The coverage of both households and individuals in the Survey looks large and impressive, as does the fact that every major nutrition programme, except the National Goitre Programme has been systematically and objectively evaluated for its impact, on at least one occasion. The numbers when viewed in the context of the country's vast population may look small and may give one the impression that the larger numbers should have been covered – particularly in the small villages. But considering the meticulous sampling system employed, the figures are not inadequate to draw valid conclusions.

The original plan of completing data collection from each state within a period of three to six years has not been achieved; nor has the NNMB been able to revisit a single area which it had earlier covered, to examine directly, the changes which might have taken place as a result of the various developmental and nutrition inputs. Though this activity had been originally envisaged, it would appear that several factors, including some administrative difficulties, had contributed to this situation.

Scientific Data Generated

It is not the intention here to go into all the data generated by the NNMB, but to highlight some of these, which are of practical importance. Detailed information may be obtained from the Bureau's Annual Reports, published by the NIN.

Intake of food and nutrients and magnitude of adequacy/inadequacy:

(i) Because of the data generated by the NNMB, it is now possible to provide information on the mean intakes of food and nutrients of households and individuals and also to provide quantitative estimates of the proportion of families and subjects in rural India, whose nutrient needs are not met (mean – 2SD of the recommended allowances are used as cut-off levels). The wide variations between states have become clearer than before as a result of valid comparisons which can be made, between regions.

(ii) Data on nutrient intakes have helped to place on a very firm scientific footing the observation that the primary

limiting nutrient in the diets of even the poorest segments of rural India is energy and not protein – a finding of enormous practical importance first made by Gopalan and co-workers several years ago. This situation is true of all the states in the country.

(iii) Data on the intrafamilial distribution of food has shown that a higher proportion of preschool children get less than their physiological needs, as compared to adults – again a finding common to all the states studied.

(iv) Contrary to the widely prevalent belief that in situations where a household has insufficient food, the man gets a higher share than does the woman, the NNMB data show that there is no such discrimination. Proportion of men and women who have calorie inadequacy is similar. Similarly, contrary to popular belief, there is no gender bias against girls (Kamala S. Jaya Rao: *NFI Bulletin* Vol. 5, No. 3, 1984).

(v) The NNMB data have made it possible to relate factors such as land holding status, occupation, income and family status (whether joint or nuclear) to adequacy of food and nutrient intake (*Nutrition News*, NIN Vol. 3, No. 2, 1982).

(vi) The data have also indicated that the measurement of the consumption of just one food item – cereals – can be used as a proxy for total energy intake to make rapid, approximate estimates of changing trends in calorie consumption.

Nutritional status: (i) As with food and nutrient intakes, the NNMB data have made it possible to provide quantitative estimates of the growth status of preschool children – a measure widely used as a proxy for nutritional status. The types of anthropometric measurements recorded have made it possible to classify children according to grades and types of malnutrition, as also to make inter-state comparisons.

(ii) The simultaneous recording of specific clinical nutritional deficiency signs, has not only provided information on the prevalence rates of deficiency diseases, but also to relate growth status to clinical deficiency signs.

(iii) Anthropometric measurements of adult men and women in rural India was scanty. The NNMB has provided this much needed data. The widely held impression that rural women are more undernourished than are men is not borne out by these data (Kamala S. Jaya Rao, *NFI Bulletin* Vol. 5, No. 3, 1984).

(iv) The expected socio-economic

gradient in nutrient intake has been confirmed. The energy and protein intakes of urban slum dwellers are no way different from those of the rural landless labourers (Kamala S. Jaya Rao, *NFI Bulletin* Vol. 6 No. 4, 1985). The nutritional status of even the urban middle income groups is far from satisfactory (Kamala S. Jaya Rao, *NFI Bulletin* Vol. 7, No. 1, 1986).

(v) The nutritional status of rural girls of preschool age has been found to be essentially similar to that of corresponding boys, indicating that there is no gender bias in nutrition care (Gopalan, *NFI Bulletin* Vol. 8 No. 4, 1987).

(vi) Data generated by the NNMB have raised a host of issues related to the interrelationship between nutrient intake on the one hand and body size on the other, as well as the importance of non-nutritional factors in determining nutritional status (Gopalan, *NFI Bulletin* Vol. 5, No. 1, 1984; Vol. 6, No. 4, 1985).

Programme evaluation: The evaluation reports published by the NNMB have helped in identifying the corrective steps which need to be taken, with respect to the Vitamin A Prophylaxes Programme, the SNP and the World Food-assisted Feeding Programme. It also identified the basic weaknesses in the Applied Nutrition Programme – the ineffective education component.

Changes in the food and nutrition — situation over time: (i) The Bureau has found that there is a changing pattern in the types of food grains being consumed. The consumption of cereals – wheat and rice – show an upward trend, while that of millets, jowar, bajra, ragi, and maize show a downward trend. The mean consumption of vegetables, fruits, milk, oils and fats and sugar have remained essentially unchanged.

(ii) According to the NNMB, over the last decade there have been changes both in the mean calorie intake of rural Indian households and in the prevalence of severe forms of growth retardation among preschool children, at the macrolevel (aggregated data). The Bureau's conclusion that "during the period from 1975 to 1980, there has been an increase in average calorie consumption levels of rural populations at the household level" and that "the average intake of calories in the lowest income groups (less than Re. 1 per person per day) show a definite increasing trend" (*Nutrition News*, Vol. 7, Nos. 2 and 5, 1986) have come in for sharp criticism (K.

Ramachandran, *NFI Bulletin*, Vol. 8, No. 1, 1987) This criticism has been based on consideration of both the statistical methodology employed and on the observation that the pattern of coverage of households according to income over time had changed – in favour of higher income. (The mean increment in calorie intake between 1975 and 1980 has been around 100 calories per consumption unit.)

The NNMB, however, argues that the validity of some of the statistical points made by Ramachandran is debatable. It also points out that the per capita data are derived depending mainly on occupation and that when intakes of separate occupational groups are looked at, the trend of increasing calorie consumption would be evident, the largest increase being in the landless labour group. However, NNMB's data in the years subsequent to 1980 indicate that the earlier trend of increasing calorie consumption claimed by it had been reversed. This significance which the NNMB has attached to marginal variations perhaps needs to be reassessed.

(iii) The NNMB has indicated that their data on the nutritional status of rural Indian preschool children show a general tendency to improve from 1976 to 1980, based on the observation that the proportion of children with severe grades of malnutrition has fallen from 8.5 percent in 1976 to around five percent in later years. A look at the earlier NNMB reports shows that there was a sudden drop in this value from over 21 percent in 1975 to 8.5 percent in 1976. It needs to be emphasised that this sensational decline was due to the switching over to a different standard of normalcy – from the Harvard to the Hyderabad standard. The latter was evolved on the basis of investigation of a relatively small sample of children belonging to well-to-do families in Hyderabad. The validity of the use of this standard has been questioned on the basis of the finding that when this standard is used, more boys than girls in rural India show greater degrees of growth retardation! This may lead one to an erroneous conclusion that boys, rather than girls are discriminated against (C. Gopalan, *NFI Bull.* Vol. 8, No. 4, 1987). It has also been pointed out that despite the NNMB's finding about the lower prevalence of severe growth retardation, the mean values for heights and weights of rural Indian children had changed little over the years (Gopalan, *NFI Bull.* Vol. 7, No. 1, 1986).

The need for caution and circumspec-

tion in the interpretation of valuable data hardly needs emphasis. It may indeed be prudent on the part of NNMB in future to have in-depth in-house discussions on tentative conclusions and have them critically examined by its own expert group before such conclusions, which could carry wide practical implications, are publicised. This will avoid unnecessary confusion and criticism.

It needs to be emphasised here that the criticisms considered above pertain to *interpretations* of some data; the reliability of the data themselves gathered by NNMB meticulously has not been questioned. The criticism of interpretations should not be allowed to obscure or belittle the solid achievements. The point to remember is that the data being generated by NNMB are about the only reliable and authentic data available in the country today regarding dietary intakes and nutritional status of representative population groups in some parts of the country. There can also be no doubt about the great potential value of these data.

Some Limitations Of The NNMB And Suggestions To Remedy Them

The contributions of the NNMB are quite impressive. But for it to express its full potential and play the important role expected of it, it is necessary to correct some deficiencies.

- An obvious and serious weakness of the Bureau relates to its incomplete coverage of the country. Its activities are limited to just 10 states. Some of the most prosperous and developed states – Punjab and Haryana – and none of the North-Eastern states are covered thus raising the valid objection that current data are not applicable to the country as a whole. This situation needs to be quickly corrected.

- The Bureau's inability to complete data collection within the time frame originally conceived is also a serious limitation. Apart from the data becoming 'outdated' to some extent, the validity of pooling of yearly data to arrive at the state position may become questionable. The category into which a district was placed may change since development is a dynamic process and the Bureau may do well to look into whether the original indices employed should continue. To achieve time-bound coverage, expansion of staff and associated facilities must be seriously considered.

- Most data-collecting bodies make use of but a small fraction of what is col-