

Tamil Nadu Nutrition Project

**Short-Term and Long-Term policy Implications
of Studies**

**A study sponsored by :
The Department of Food, Union Ministry of
Agriculture and Irrigation, New Delhi**

**ADMINISTRATIVE STAFF COLLEGE OF INDIA
HYDERABAD - 500 475**

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Preface

A number of studies have been organised and conducted by the Administrative Staff College of India, Hyderabad, under different phases of Tamil Nadu Nutrition Project sponsored by the Department of Food, Government of India, New Delhi.

The main objective of this monograph is to enable the administrators and policy-makers at different levels in various States and Central Departments to appreciate some of the technical and non-technical findings of the studies in the form of their implications for policy and implementation. We are grateful to the Department of Food, Government of India, for its financial support for organising the studies and their publications.

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(P.T.O.)

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1. Background

The Tamil Nadu Nutrition Project (TNNP) study is composed of a series of studies, handled by the TNNP Office, Madras, the Administrative Staff College of India, Hyderabad, the Indian Institute of Management, Ahmedabad, and the Indian Institute of Technology, Madras, during the last few years. Our study is primarily a continuation of a previous empirical investigation under USAID support, carried out by Sydney Cantor Associates, USA. Many of the investigations carried out by the aforesaid institutions are based on the data bank created by the Sydney Cantor study using a detailed questionnaire canvassed for 5,000 households in Tamil Nadu during the year 1971. These data located at IIT, Madras Computer Centre, are particularly used in the analysis of consumption of nutrients and various relationships having a bearing on behaviour. The additional data-base for the various studies is mainly based on secondary sources of data from various offices of the Govt. of Tamil Nadu along with data available from the Bureau of Economics and Statistics, Government of Tamil Nadu. A part of the data was collected from sources available at the Tamil Nadu Nutrition Project Office, Madras.

A main attempt of the exercise is on evolving an integrated approach to nutrition planning—wherein the demand and supply of nutrients are recognised within an inter-linked system—containing proper intervention strategies (including price and other mechanisms of intervention) so that the nutrition gap is bridged to a reasonable limit and in reasonable time. For this, evolving the necessary methodology and its calibration form a part of this exercise. The operationalisation of working out a quantitative solution using systems models, to suggest broad nutritional interven-

tion planning strategy is, however, restrained due to limitations of data. It may appear that models themselves could be evolved pragmatically so as to take note of limitations of data, but at the present stage, the formal optimising exercise is of limited use as fundamental data like the impact of different nutrition programmes are lacking on a representative sampling basis for different nutrition programmes. Accordingly, part of the study is necessarily oriented towards evolving an approach for future usage as and when the additional requisite data are available. The fulfilment of this particular requisite has a lot to do with effective concurrent and ex-post evaluation of nutrition programmes on a scientific basis for all the programmes in different regions. With this in view, a separate supplementary report has been prepared dealing with co-ordination, monitoring, and evaluation aspects.

Separate investigations have been conducted to examine the nutritional aspects of food policy with a view to analysing the nutrition dimensions of major components of food policy, and historical evolution of changes in policies.

The above studies are fairly general in so far as they make no special reference to Tamil Nadu and are reflective of macro-policies and approaches for planning. In the later efforts, specific studies were carried out with reference to food and nutrition aspects for Tamil Nadu. Under this series, the empirical exercises taken up include (i) analysis for about a decade of net availability of food and nutrients so as to examine the trends in the availability and gaps in food and nutrition, (ii) projections of nutrition requirements, food equivalents and food gaps for the period 1981-82 to 1986-87, and (iii) analysis of determinants of consumption of nutrients based on the sample data collected in the earlier phase of the project led by the Sydney Cantor Associates.

Since child nutrition is an area of top-most priority, an in-depth analysis of determinants of illness in children and also determinants of intake of nutrients by children based on the same sample data was carried out. Hereagain, certain data limitations restricted the coverage of some of the exercises.

Apart from the general approach advocated for an integrated nutrition planning, the investigation lead to scenarios of nutrition situation in Tamil Nadu until 1986-87. The other types of outputs from the studies are in the form of findings: some of the findings confirm common understanding about the role of some of the economic and non-economic parameters governing nutrition situation, and other findings lead to recommendations regarding the possible programmes for action. The subsequent sections deal with these aspects.

2. Nutrition Situation in India and in Tamil Nadu

The estimates of poverty for the Sixth Plan using the all-India poverty line of Rs. 65 per capita per month at 1977-78 prices roughly correspond to a minimum daily calorie requirement of 2,400 K calories per person in rural areas, and the poverty line of Rs. 75 per month correspond to a daily calorie requirement of 2,100 K in urban areas. Statewise percentage population below these norms (rural/urban) is given in Table 1. These results are based on the provisional and quick tabulation of the National Sample Survey (NSSO) on household consumer expenditure of 32nd round (July 1977 to June 1978).

TABLE 1 :

Percentage of Population Below the Poverty Line by States : Rural and Urban Areas in 1977-78

Sl. No.	State/U.T	Rural	Urban	Combined
1.	Andhra Pradesh	43.89	35.68	42.18
2.	Assam	52.65	37.37	51.10
3.	Bihar	58.91	46.07	57.49
4.	Gujarat	43.20	29.02	36.04
5.	Haryana	23.25	31.74	24.64
6.	Himachal Pradesh	28.12	16.56	27.25
7.	Jammu & Kashmir	32.75	39.33	34.06
8.	Karnataka	49.88	43.97	48.34
9.	Kerala	46.00	51.44	46.95
10.	Madhya Pradesh	59.82	48.09	57.73
11.	Maharashtra	55.85	31.62	47.71
12.	Manipur	30.54	25.48	29.71
13.	Meghalaya	53.87	18.16	48.03
14.	Nagaland	N.A	4.11	4.11

15. Orissa	68.97	42.19	66.40
16. Punjab	11.87	24.66	15.13
17. Rajasthan	33.75	33.80	33.76
18. Tamil Nadu	55.68	44.79	52.12
19. Tripura	64.28	26.34	59.73
20. Uttar Pradesh	50.23	49.24	50.09
21. West Bengal	58.94	34.71	52.54
22. All Union Territories	34.32	17.96	21.69
All India (weighted)	50.82	38.19	48.13

The *per capita* nutrient availability in India has not improved any significantly during the last three decades; child mortality continues to be very high and remains unabated after early seventies. In addition to these aggregate features, the economic inequalities have not improved in favour of equitable distribution of resources. Therefore, the poverty/nutrition situation needs to be tackled in a multi-pronged approach if the desired results are to be achieved.

As regards Tamil Nadu, there are studies which indicate that there has been considerable improvement in poverty/nutrition status (from more than 60 per cent population below poverty line two decades ago, the percentage came down to around 50 per cent presently). However, the scope for improvement is considerable.

The surveys conducted by the National Nutrition Monitoring Bureau indicate that except in the case of milk, the *per capita* average consumption of food items in Tamil Nadu is no worse than the average for most States. Also, the major deficient nutrient on an aggregate basis seems to be Vitamin A.

The projected food gaps based on the projections of nutrition requirements (ICMR norms) and production trends (based on trend projections corrected for estimated irrigation growth) are given in Table 2.

TABLE 2.
Food Gaps Between Requirements and Production in TN
(Thousand tonnes)

Commodity	1981-82	82-83	83-84	84-85	85-86	86-87
Rice	742.0 (12.0)	782.2 (12.4)	820.8 (12.7)	871.1 (13.2)	886.8 (13.3)	930.1 (13.7)
Cereals	927.2 (10.9)	951.6 (11.0)	974.1 (11.1)	1013.0 (11.3)	1005.2 (11.0)	1035.7 (11.1)
Grams & pulses	279.9 (56.7)	283.2 (56.3)	285.6 (55.8)	209.9 (55.5)	292.2 (55.0)	296.7 (54.7)

Figures in brackets are percentage of gap to requirement

3. Issues Studied

Issues studied under different heads are given below :

a) Nutritional Aspects of Food Policy

- i) Historical review of food policy and its bearing on nutrition aspects
- ii) Analysis of components of food policy and review of the implication of policies on nutritional aspects
- iii) Suggestions for short-term and long-term policies governing some of the components

b) Integrated Nutrition Planning Models

- i) Critical review of standard nutrition requirements
- ii) Review of specifications of nutrition requirements as normally advocated and adopted in practice
- iii) Structural formulation for demand for supply of nutrients
- iv) A review of nutrition planning models used in previous published studies
- v) Formulations of integrated nutrition planning models, incorporating demand and supply aspects and computational methods

c) Demand for Nutrients

- i) Analysis of sample data available with Tamil Nadu Nutrition Data Bank regarding various parameters of consumable nutrients
- ii) Analysis of food and nutrients parameters in general terms and *per capita* terms for the last few years in Tamil Nadu
- iii) Projections of normative and behavioural demand for food and nutrients
- iv) Assessment of few food and nutrient gaps

d) Child Nutrition (Supplementary Report)

- i) Analysis of child nutrition and morbidity
- ii) Morbidity, mortality
- iii) Determinants dealing with children and intake of nutrient
- iv) Policy implications and analysis

e) Co-ordination, Monitoring, and evaluation. (Supplementary Report)

- i) Review of practices at State and other levels governing co-ordination, monitoring, and evaluation programmes
- ii) Review of on-going nutrition programmes in Tamil Nadu
- iii) Suggestions for improvement in integrated planning and implementation

f) Integrated Nutrition Planning : A Synthesis

- i) Assessment of food and nutrition gaps, "gaps between economic behaviour, demand and production, gaps between normative demand and production alternative scenarios
- ii) Models of intervention and outline of approaches for integration

4. Short-term Policy Implications and Recommendations

a) General (all States/Union Government)

1. If the production of high-nutrient content varieties for a given commodity is not inconsistent with the objective of improved net production of nutrients (that is, if there is no compromise in yield is involved) the, procurement price for the nutrient-rich variety should be higher and the difference between the different varieties should be governed mainly by the difference in the nutrition content (w.r.t. relevant nutrient calories/proteins or others in specific commodities). This approach is extendable, to a limited extent, across different commodities produced, subject to agro-hydro-geological considerations. The Agricultural Prices Commission at the Centre and also the Departments of Food and Agriculture or the corresponding State-level organisations should recognise the nutrition element for fixing prices for different varieties.

2. In respect of public distribution, the nutrition deficient regions should be identified and retail outlets provided with proper choice of food commodities (mainly locally produced foods) which conform to the purchasing capacity and consumer acceptability.

3. Food subsidy should favour the nutrient-rich varieties so as to induce increased effective intake of nutrients.

4. Based on a number of considerations, economic and non-economic, it is clear that the top-most priority in attending to nutrition problems should be accorded to pre-school children. It is doubtful if some of the policies aiming at the development of school-going children, compared to the above vulnerable age group, have any greater advantages except

that it is convenient to administer the programmes in the later case. However, when we recognise the need for breast-feeding of children upto about one year, it is evident that the practical feasibility of implementing nutrition programmes aimed at the development of children in the age group 0-1 year is considerably greater if we operate *via* proper feeding of lactating mothers. The child age-group 1-4 years could, however, be a problem for practical implementation of feeding programmes in the absence of institutional arrangements for the distribution of different supplementary foods. This aspect can be overcome possibly through market mechanism, by undertaking the production and supply of low-cost weaning foods.

Special categories of food items catered to specific age groups must be channelised through a distribution network in order to reduce the long-term costs of mal-nourishment to the society ; similarly, whenever drought occurs or other seasonal and periodic shortages occur, necessary arrangements be made to augment food supplies on a priority basis, particularly nutrition requirements of pre-school children, and pregnant and lactating women. The experiences of the subsidy scheme given for the pregnant women in countries like Britain may be relevant and should be carefully examined.

5. The method of allocating food stocks from the Central pool of States should have a relationship with the food and nutrition gaps in different States and guidelines may be issued that these factors are also taken into account in addition to administration and political considerations.

6. Monitoring activities should focus attention on (i) selection of eligible beneficiaries—adherence to specified criteria, (ii) coverage of scheme in specified areas and target groups, (iii) administrative, technical and other resource availability for implementation of programmes, (iv) progress of implementation according to time-schedules, and (v) ad-

herence to cost and other resource limits. The evaluation activities should analyse (a) the compliance of the scheme to objectives, the operationalisation of higher level objectives to lower level objectives, identification of discrepancies, if any, (b) assessment of programme benefits results in terms of these objectives, (c) identification of relative contributions of different inputs and factors which affect the success of the programmes, and (d) suggestions for formulating and implementing future programmes. There is an urgent need to create/organise monitoring and evaluation units and take steps to enable them to function effectively.

Some Specific Programmes include :

1) Inclusion of inferior cereals and pulses in the public distribution system particularly of the relatively poorer region of the State.

(2) The Agricultural Prices Commission at the Centre and the corresponding bodies at the State levels to review pricing strategies and incorporate nutrition dimension while fixing prices for different varieties of food commodities in addition to the other considerations like cost of production, marketability, and consumers acceptance.

(3) Effective reorganisation of coordination mechanism at the State and lower levels and creation of necessary staff and data bank for effective monitoring, concurrent evaluation and ex-post evaluation of different programmes.

(4) Developing, preferably with the assistance of CFTRI, Mysore, specific food products, and subsidising some to enhance the intake levels of pregnant women and also developing low-cost food items for children.

(5) Popularisation of the consumption of drumstick leaves for reducing Vitamin A deficiency.

(6) Developing horticulture sections in all the schools, involving children in these activities.

(7) Extending the coverage of nutrition education/extension activities, especially using mass communication methods.

(8) Critical review of food processing technologies with a bearing on food wastages involved and employment potential.

(9) Increased production of milk, milk products, and fruits.

(b) Tamil Nadu :

1. As regards the trends in the net availability of different food and nutrition elements, it appears that Vitamin 'A' deficiency in Tamil Nadu, the second most important nutrition deficiency (the first being calorie), is going to be on the increase, especially since there appears to be a declining trend in the net availability of milk and fruits. Urgent steps, therefore, are needed to rectify this situation. Special attention is needed in this regard either in terms of artificial doses of Vitamin 'A' or augmenting the supply of natural foods, mainly leafy vegetables, fruits, and milk.

2. It is estimated that, on an average, about 86K calories and 2 gms. of protein per day per capita are wasted. Although it is practically impossible to eliminate the wastage completely perhaps it is possible to reduce it. It is very useful to investigate, therefore, the social cost-benefit implications of varying investment patterns for reducing wastage at different levels; thus from observations, it is possible to identify the relative priorities in intervention in food processing systems to enable reducing wastages. It emerges from this that improved food processing and preserving methods especially in the case of perishables like fruits are likely to be socially profitable and might justify investment in this direction for reducing wastages.

3. The marginal propensity to consume calories is of the order of 2,300K calories per additional rupee (at 1970-71 prices) expenditure; the corresponding increase in the case of proteins is about 50 gms, in the case of Vitamin 'A' it is about 60 I.U., whereas in the case of iron it is about 34 mgms. It appears that the protein gap will be automatically eliminated, if only the calorie gap is eliminated, and therefore, it suffices to focus attention mainly on Vitamin 'A'. It also appears that under the existing price structure and market mechanism governing the traditional food commodities, unless drastic improvements in incomes take place for the majority of population, it is not possible to eliminate the nutrition gap as far as Vitamin 'A' is concerned. Therefore the remedy appears to lie in the popularisation of relatively less common foods like drumstick leaves, in addition to administering doses of Vitamin 'A'.

4. All the recommendations contained in the previous sub-section (for all States) are relevant to Tamil Nadu.

5. Long-term Policy Implications and Recommendations

a) General (all States/Union Government) :

1. Even after incorporating the nutritional dimensions of food policy in the Five year plans commencing from the Fourth, it is apparent that enough concerted efforts were not made to progressively eliminate the nutrition gap. A number of schemes and departments operate simultaneously in different areas in the country; hence, there is need to evolve a systematic pattern in the identification of priorities in terms of geographic location and sections of society for nutritional development; this calls for an area planning approach, in addition to target group/beneficiary-oriented approach. Separate studies have indicated the long-term social benefits of betterment in nutritional status of the vulnerable groups of society (especially children) and on those grounds, high priorities needs to be assigned to this sector; at present, the nutrition sector stands as a residual component in the five year plan formulation. The attempted integration given in the Sixth Plan can be strengthened further.

2. There must be a long-term policy of commitment concerning the distribution of foodgrains with an aim to progressively reduce the nutrition gap, the portion of gap that needs to be eliminated using intervention mechanisms should be arrived at after assessing the existing magnitudes and type of nutrition gap and the estimated impact of other direct and indirect relevant incomes, changes in relative prices, health facilities, and preventive medicine, nutrition education, etc.

3. The impact of urbanisation and hence change in demand pattern should be recognised in the light of which the overall food and nutrition availability should be planned.

4. For policy purposes, an approach towards the estimation of population at risk in terms of malnutrition should be based on a design evolving composite indicator of nutritional health status or health status (expressed in terms of nutritional status and other functional features) which can distinguish features like age, sex, environment, activity levels, and historical physiological background.

5. The state of knowledge is inadequate to prescribe the minimal nutrition requirements for different types of individuals. Also, the alternatives suggested by some for correcting the traditionally used specifications of nutrition requirements are based on weak foundations and are unacceptable for the purposes of policy planning and aimed at betterment of nutritional status of the affected sections of the society. The estimation of the magnitude of poverty can be guided only partially by the nutrition norms. Further research work on relevant issues in nutrition science is, therefore, called for.

6. Effective integration of nutrition dimension with various rural development programmes should be ensured; necessary guidelines for their implementation should be evolved.

7. Improving the network of dairy farms will enable the proper distribution of milk. Apart from this, animal husbandry schemes have been introduced to ensure the optimum (improved) yield and better health of the animals. Following the Anand pattern, and adopting the cross-breeding programme of animals, it is necessary to develop milk production as a subsidiary industry in rural areas. The programme should be addressed to the small and marginal farmers by giving necessary facilities in view of their lack of purchasing power.

8. The intervention strategies should aim at an integrated approach affecting both produce system and consumer system at macro and micro-levels of each system. The intervention should be so optimally designed to bring about an economic and behavioural rapprochement between the desired socio-economic objectives and the existing realisation of the same. The analysis for designing the intervention can better be done by examining the decision-making process of different units in their production and consumption behaviour under differing sets of available alternatives and information associated with the decision-making processes.

It is advisable to isolate the intervention programmes, which, in a sense, are indivisible with respect to individuals like nutrition education, sanitation and preventive medicines, natural betterment of disease resistance by improving quality of water, etc. The programmes should be designed by using the cost-effectiveness analysis.

It is possible to formulate a comprehensive model to arrive at optimal nutrition intervention policies. This could be accomplished in the following manner: Formulate an input output frame in respect of each possible intervention sub-system, for instance, school feeding, processing of foods, etc. when inputs are in terms of economic parameters like prices of commodities, and other inputs (like labour, etc.) and outputs are (linear) functions of the resultant nutrient gain (in respect of different nutrients) in terms of, say, some of the anthropometric features. Once this frame is arrived at, optimisation models incorporating least cost objective or maximisation of parameters of nutrition status as an objective, subject to the input-output relations and other relevant constraints can be formulated. However, it is difficult to obtain the input-output relations using the existing knowledge. Hence, the need for formulating models which can reasonably approximate the above type of general model.

9. The major determinant of illness of children seems to be the provision of protected water supply. Thus, urgent priority needs to be given to problems ensuring proper assimilation of given intake of nutrients by children. Preventive medicine, improved hygiene and sanitation also fall in this category. Further studies dealing with disease specific determinants of illness may be more useful; relevant data are available in select few children hospitals in the country.

10. The calorie/protein content of diet consumed by children is a poor indicator of nutrition status of children, and much less the health status of children. This is mainly because the food basket composition for children is as important as the actual nutrition content of the basket. Again, the role and need for evolving weaning foods becomes apparent, in addition to the need for improving quality of water, hygiene and sanitation.

11. Until a viable National Institute is launched, the National Nutrition Monitoring Bureau and other research institutions have to play a more active role in nutrition monitoring, especially by ascertaining the relative efficacies of different direct and indirect nutrition development programmes using appropriate sampling basis.

12. Further improvement in nutrition information system (primary data as well as processed information, including efficacy of programmes, types and degrees of malnourishment, etc) is necessary.

Specific Recommendations on Long-Term Programmes

(i) Critical review of specifications of calorie requirements in relation to different physiological measurements and working conditions and desired productivity of personnel.

(ii) Organising research on specific themes identified (some priorities identified in the next section) in addition to the above aspects.

(iii) Evolving institutional mechanism for effective coordination, monitoring and evaluation, and for strengthening the same, as well as for effective functioning in all the departments dealing with various nutrition programmes at the State level.

(iv) Evolving effective communication media for health and nutrition education, including documentary movies and mobile units.

(v) Evolving sociological and anthropological approaches to ensure active co-operative participation of the local population for each of the proposed nutrition programmes; preparing for community acceptance of programmes before launching them.

(vi) Evolving administratively feasible schemes for implementation, based on the recommendations/findings given in the first part of 5(a).

(b) Tamil Nadu :

A careful analysis of the review and future prospects of nutrition situation in Tamil Nadu (some of the highlights given in section 2 of this note) indicates that the following steps are required during the next few years :

(i) the percentage gap in respect of grams and pulses is likely to continue to be very high (around 50 per cent) and in absolute terms, the gap is likely to be around 150,000 tonnes in 1986-87; steps are needed to ensure sufficient local supplies with high-yielding varieties (to be developed and popularised for production)

(ii) the estimated gap in respect of rice is likely to increase in the next few years and is likely to be around 930,000 tonnes in 1986-87; steps are needed to increase agricultural productivity; growth rate in increase of irrigated area is very low (around 2 per cent for the current Sixth Plan

period); steps for efficient utilisation of water resources (by conjunctive use of ground and surface waters and by improving irrigation efficiencies etc.) are needed to enhance production.

(iii) horticulture should be encouraged to solve some of the nutrition deficiencies like Vitamin A and iron, especially in children.

(iv) the suggestions contained in the previous subsection applicable to States also are relevant to Tamil Nadu.

6. Further Research Needs

An approach of synthesis enabling the government to prioritise and identify areas for further research is an urgent necessity. Accordingly, the following write-up indicates the role and relevance of some of the identified areas for further research. A comprehensive list of areas for further investigation has been drawn up by the Multi-disciplinary Committee on Nutrition, set up by the Planning Commission, New Delhi (1979).

1. The fundamental problem of assessment of nutrition requirement and the consequential assessment of poverty is still a controversial issue. The debate generated by various researchers is only a part of the overall analysis required for proper appreciation of the dimensions of the programme. It would be useful if a national institute like NIN or an entirely new organisation could undertake (on the basis of carefully and properly statistically designed study on the requirements) to provide the empirical basis. Also, indepth studies on metabolic factors and their role in assessing nutrition requirements would be useful.

ISSUES :

- i) If poverty is defined in terms of ability to consume the average calorie requirements, the surveillance of poverty should take this important indicator into consideration. How to account for the inter-individual and intra-individual variations in nutrition requirements and how to evolve average calorie requirements of an average household and how to take family unit as base for poverty norm.
- ii) Empirical indications are that with marginal increase in income levels, the food preferences undergo

significant changes in the lower income strata of population and such increases in income do not necessarily contribute any improvement in nutrition intake and hence in the improvement of poverty situation in the country. In this context, what could be the role of nutrition education in alleviating poverty so defined?

- iii) How to define poverty, considering the heterogeneous environmental factors which have a bearing on metabolic absorption of nutrients i.e. since the average calorie requirement can vary with respect to the features governing other nutrition related factors like quality of water, hygiene, etc., how to define poverty on a location specific/region specific/State specific basis?

2. The impact of the various nutrition programmes in operation is rarely properly assessed. Evaluation studies should be carried out at the earliest before finalising the investment of resources in a number of nutrition programmes.

ISSUES :

- i) A manual, covering the guidelines for monitoring and evaluation is essential and the manual should be made specific to each of the nutrition programmes being implemented.
- ii) A clear definition must be maintained about the operationalising concurrent evaluation and monitoring systems as an important pre-requisite for successful implementation of nutrition programmes, and ex-post evaluation should be separated from function although it is related to this. Accordingly guidelines for short-term monitoring and concurrent evaluation need to be evolved for each of the nutrition programmes.

- iii) Clarity about the objectives of each of the programmes is an important pre-requisite for evaluation of the programmes and, therefore, specification of a hierarchy of objectives for each level of implementation as well as for each region or section of targeted population is important.
- iv) Evaluation of impact of nutrition programmes with reference to the objectives should be carried out as a matter of standard practice rather than exception. It is desirable to examine the organisational requirements and staffing pattern, etc, in order to carry out these activities as well as other monitoring and concurrent evaluation activities.

3. Although integrated nutrition planning models have been developed by the ASCI studies, these have to be improved further; there is need to make them increasingly realistic and operationally more useful, especially from the point of view of the State governments. (In this context, it must, however, be clarified that the present system of treating nutrition programmes almost as a charity programme and incorporating these as a part of several other special welfare activities and entrusting with the Social welfare Department may not be the best way of dealing with the multi-nutritional problem in the country).

ISSUES :

- i) Administratively, how to integrate food and nutritional policies once evolved, and what arrangements needed for monitoring impact, possibly by the Department of Food;
- ii) Role of Social Welfare Departments in respect of those programmes which are drawn only from the social welfare point of view,
- iii) the State level co-ordination as well as project level co-ordination, the span of control and

integration of activities across different departments which have functions relating to alleviation of mal-nutrition along with information system needs to be evolved for an efficient co-ordination and monitoring.

4. Detailed social cost-benefit analysis on project appraisal of different food processing technologies and systems is an important prerequisite for formulating national as well as State level policies. These studies need to be initiated at the earliest.

ISSUES :

Choice of technology for different types of food processing, including food preserving, should be governed in a broader socio-economic framework. The social cost-benefit analysis of alternative technologies leading to choice of appropriate technology could be a useful approach for investment decisions in the public sector, if the government invests in certain categories of food processing, and also for evolving guidelines in respect of control regulations and support for different types of food processing industries in the private sector. The financial subsidies and other incentives could be formulated differently after detailed analysis of social cost-benefit implications of alternative technologies is carried out.

5. In-depth analysis of agricultural production response to different incentives via agricultural inputs (especially to the pricing of fertilisers, etc) would be a useful exercise. Also, the impact of alternative agricultural output pricing on the net availability of nutrients should be assessed in select few cases.

ISSUES :

The nutritional implications of the various role development programmes, especially NREP, DPAP, IRDP, etc, should be carefully examined and ways and means of integrating nutrition dimensions in various micro-level schemes in rural areas being undertaken at the local level (with or without support from the higher levels) should be analysed. It should be possible to synchronise the nutrition development objectives with other economic development objectives like unemployment reduction, welfare of vulnerable group, etc. Other schemes like employment guarantee scheme, unemployment allowance, etc, should also be examined from the point of view of improved nutrition status.

6. Since nutrition is not necessarily an end-product in itself, empirical relationship between the varying levels of nutrition intake in conjunction with different environmental parameters with a bearing on health status should be established in select few regions.

ISSUES :

- i) If health status (defined properly using an index) or morbidity indicator is taken as a relevant factor that could be monitored, what are the relative roles and contributions (by magnitude) of different inputs like environmental parameters (quality of water, hygiene, etc), and intake of different nutrients (defined by type and magnitude) in various regions of the country ?
- ii) What are the cost (direct and indirect) implications of effecting change in morbidity *via* effecting intake of nutrients (both in the mix of nutrients and levels of intake of different nutrients ?)

7. Since child nutrition is the top priority in nutrition development, further investigation based on empirical data are necessary; these could analyse the inter-play of nutrient intake, environmental and socio-economic parameters (including cultural factors) in explaining the pattern of morbidity. For the purpose of this analysis, it may be noted that considerable data are available on a large-scale at the Institute of Child Health, Madras, as well as a few other hospitals like Niloufer Hospital, Hyderabad, CMC, Vellore, and AIIMS, New Delhi.

Issues :

- i) What is the correlation between the different factors regarding which information is recorded in the standard format of medical statistics available with the select institutes in respect of child health ?
- ii) What are the policy implications of the above in terms of preventive and curative steps for improving infant mortality and child morbidity ?

7. Policy Imperatives - Some Conclusions

Although it is well-known that there exists considerably significant inter-relationship between different food and non-food factors in affecting nutrition and health status of the population, it is not entirely clear as to what are the relative magnitudes of these impacts on specific objectives of nutrition development and improvement in quality of life, and also what should be the priorities for policy formulation and implementation at national and State levels. The complex inter-relationships cannot be easily assessed by merely taking a glance at the data. These warrant a systematic methodology in the form of systems analysis and related methods. Once such a methodology is developed (as is the case in respect of the output of this project), the operative aspect, namely, adapting the methodology for the purpose of planning and implementation need not rest with a single department like the Department of Food but should be the main concern of a central co-ordinating body like the Planning Commission at the national level, and its counterparts at the State levels. It is observed that such a methodology could be implemented without any technical handicaps provided the relevant and reliable data are available. It has been noticed that with some approximations and simplifications of technical formulations, the systems models generated out of this Study are replicable for planning purposes at the national and State levels with the present situation governing the data system. However, there is urgent need for improving the data-base as well as the quality of information to bring some semblance to integrated planning. It should be clarified that the relevant information is not simply raw data ; it should be based on processed information, where processing

is to be done using a number of statistical, econometric and systems models. Many of these models have been specified either in the form of general methodology or in the form of specific applications in some of the reports under this study. Scope for further improvement, of course, does exist.

2. The nutrition dimension has explicitly figured in the plan development process of our country for the first time in the Fourth-Five Year Plan document. Subsequently, the plan outlays on nutrition have been generally increasing, but a comparison of outlays under the nutrition sectors for the Fifth and Sixth Five-Year plan indicates that in the latest plan the outlay has actually gone down. This was recognised as a deliberate strategy in the plan document and reasons for such an outlay were attributed to (1) relatively inefficient utilisation of financial resources in the past under various nutrition programmes (mainly in the form of feeding programmes) (2) the recognition of the fact that other complementary features like protected water supply scheme, improvement in hygiene and sanitation etc., could contribute effectively in improving the health and nutrition status. Although the logical aspect of this approach cannot possibly be contradicted, operationally it would imply passing the main part of the responsibility of improving the nutritional status to Department other than the erstwhile Central focus, namely, the Department of Food. In this context, such a responsibility should be made explicit so that the ministries, especially Rural Reconstruction and, Health and Social Welfare share the responsibility and also be accountable for certain fulfilments of specific targets. Such an awareness on the part of the concerned departments should be explicitly brought out and the related roles identified. Also, the experience gained so far in implementing various nutrition-related programmes (direct and indirect) should flow as a feedback information for the formulation of the Seventh Five-Year Plan for which the exercises are likely to start soon.

3. The major drawback identified while analysing the experience of the various nutrition programmes is that

although the conceptualisation of the programmes was correct, the implementation has been ineffective for a number of administrative and other reasons. It appears that an important pre-requisite for such successful implementation, namely, effective monitoring, evaluation and co-ordination has unfortunately not been given the necessary impetus. Planning, by and large, was conventional in the sense that it seems to have confined itself after formulation of programmes and passing on them to various departments for implementation. The general suspicion is that the cost component for effecting the requisite monitoring and evaluation function could be considerably high but this should be viewed in comparison with potential and realisable benefits of such functions. In fact, such a function has been accepted in some of the projects which are supported by the World Bank and other agencies. However, the fear of additional cost and other elements seems to have dragged the extension of such functions to other on-going nutrition programmes. There is an urgent need to create monitoring and evaluation cells of the desired configurations and skills in order that the programmes are efficiently implemented. This is true also of the complementary programmes being implemented by other ministries which have considerable bearing on nutrition dimension. A central focus should be located either in the Planning Commission or in the Department of Food, in the form of central policy planning, monitoring and evaluation cell, to overview all the above functions. Such a unit could undertake surveillance of undernutrition and poverty. It could also organise a number of relevant investigations, mainly in the form of applied research studies, in addition to processing information for improved planning and implementation. A review of the on-going nutrition programmes indicate the need for such an institutional mechanism.

4. The controversy on the specified minimum nutrition requirements and suggestions regarding change made by researchers like Sukhatme, and the continued inconclusive

debate should be put into a policy perspective rather than statistical perspective although the latter is relevant for the former. The major issues to be clarified before referring to minimum nutrition requirements are: what are the functional objectives of the specified minimum requirements? Are they simply to preserve the physiological structure and allow functions of the body and mind or do they hinder some desired physiological and psychological developments which would otherwise not take place by status-quo ante approach of nutrition requirements? Also, the time-horizon within which any catch-up growth is aimed at in the case of children makes difference in the specification of nutrition requirements. In any case, depending on the sample size, coverage of population and, overtime, the estimates of average nutrition requirements are bound to vary rather significantly. Thus, in a population with widespread malnutrition the main issue should be to prioritise the most needy groups of population in terms of age-groups socio-economic, groups geographic location, and time periods for possible support (directly or indirectly with government assistance) and to implement various programmes in a co-ordinated manner. Thus, the urgent requirement is not simply an estimate of poverty but eradication of high order under-nourishment which has short-term and long-term implications on physiological, and economic development. The limited set of resources available at the national and State levels need not accrue to the population with doubtful undernourishment.

5. The need for micro planning for nutrition development based on local production of food commodities and local requirements of foods and specific nutrient gaps in each region should be experimented at the earliest occasion, on a pilot basis, so that some of the impediments in implementing programmes evolved on all-India basis can be nullified, and also possibly the cost of administering various programmes brought down. Here again, decentralisation of planning and implementation should be accompanied by vigorous efforts

in respect of co-ordination, monitoring and evaluation—a task of the higher level authorities.

6. Specific studies pertaining to Tamil Nadu deal with analysis of trends in food and nutrient consumption along with determinants of nutrition intake and child illness. Some of the findings lead to policy recommendation on programmes for policy implementation. Projections of behavioural demand for food and those of physiologically required food equivalents of nutrients enable us to estimate the magnitude and type of food gaps likely to prevail in the next few years, after comparative analysis with estimated food production for the next few years.

Similar exercises, when carried out for each State, will be useful for evolving a number of integrated policy intervention programmes.