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9. ABSTRACT Supplementary feeding programs designed to combat malnutrition among pregnant and nursing mothers, preschool children, and school children can be improved through evaluations of their performance. This was the rationale for an evaluative field study in 1971 and 1972 of the nine feeding programs operating in the State of Tamil Nadu, India. The feeding programs were in general found to be effective delivery systems, although the food is usually consumed as a substitute for, rather than a supplement to, the usual dietary intakes of low-income families. Caloric deficiencies were found to be more widespread than protein deficiencies among the target group (families with incomes below Rs. 300 per month). The nine distinct supplementary feeding programs in the state feed only 12 percent of the preschool target population, but 52 percent of the school children require supplemental food. Feeding program administrators are mainly concerned with accountability for food delivered, rather than estimates of actual consumption by particular beneficiaries and the effects of total intake on health. Feeding programs conducted at the balwadies can be made more efficient, but this would require additional financial resources and manpower. The present mid-day meal program should not be expanded. Programs directed toward preschool children and pregnant and nursing mothers should be rapidly expanded. The existing 30,000 schools in the state should be used to reach those target groups. The government should support more research on pre-cooked food technology, since pre-cooked foods would introduce more flexibility into the food distribution systems. Future evaluations of the feeding programs should be conducted by a department separate from those responsible for administering the programs.		
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PART II

A STUDY OF FEEDING PROGRAMS
IN TAMIL NADU

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CANTOR/ATAC
TAMIL NADU NUTRITION PROJECT
FIELD REPORT

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A STUDY OF FEEDING PROGRAMS
IN TAMIL NADU

COMMENTARY

The plan of the Tamil Nadu Nutrition Study included an operational component. This component can best be described in integrated marketing terms as the "market or mini test" or "consumer test." The tests or mini studies were to provide "feedback" or information designed to correct or modify the developing understanding of the food system. As distinguished from data collection, which is another component of the field work, market tests are derived from preconceptions. They are mostly tests of ideas relating to proposed end-products. In the case of the Tamil Nadu Nutrition Study, some ideas or end products were identified: (a) interventions in the existing food system, designed generally to improve it; (b) new delivery schemes designed chiefly to increase effectiveness of distribution; and (c) new food products primarily designed for improved adaptability to recognized food behavior. End products (c) seeks increased acceptance and nutritional effectiveness, or meets the increasing need for processes providing for mass production of foods related in scale-up potential to mass consumption needs.

The field staff, because its first priority task was data collection, had time for only three "market tests": (1) test of a take home food distribution system, (2) test of some pre-cooked food products in an ongoing distribution system (pre-processing in a mass way, i. e., continuous extruder processing as distinguished from central kitchen preparation), (3) evaluation of ongoing food delivery schemes (recognized as already functioning, preconceived interventions).

The following report covers item (3) above. In order to achieve some measure of evaluation, it was necessary to provide some beginnings of baseline data against which to make the evaluation.

As shown in the report, these baseline data were derived from secondary sources, early primary data which contained some serious distortions and a limited appreciation of the complexities of the system. The conclusions reached were largely qualitative, but as gross estimates of the situation they were useful.

They served the purpose expected to be served by probes or mini-studies designed largely to provide feedback for a more detailed examination, principally of the consumer subsystem: They isolated goals which needed more careful examination. More specifically they provided a "roughing out" of problem areas; they demonstrated the need for considering additional variables in the evaluation methodology; they did not present precise enough evaluation of nutrition status of target groups to recommend optimal interventions.

The evaluations did characterize the ongoing feeding programs as family subsidies; they did flag the calorie versus protein situation for further refinement; they did frame some more obvious options for action in the language and context of both planning and development economics. In many ways, however, they also emphasized the shortcomings of conventional approaches to planning.

The principal thing learned from the field evaluation of ongoing feeding programs was that food and nutrition planning requires a much greater appreciation of the culturally derived component of food behavior than has been generally conceded by development economists.

Much has been made of the point that "a complex nutrition planning undertaking could be counterproductive" or that "nutrition planning need not be..... regarded as a highly sophisticated computerized model..... rather..... as a systematic way of looking at a problem....." (a) The work of C. J. Hitch^(b) has been quoted specifically to the effect that the hard problems "are not those of analytic technique..... (but) ability to formulate the problem..... choose appropriate objectives;..... ingenuity..... in inventing new alternatives to evaluate."

(a) Alan Berg and Robert Muscat "An Approach to Nutrition Planning" Am. J. Clin. Nutr. 25, 939-954 (1972).

(b) Hitch, C. J., "Decision Making for Defense" Univ. Calif. Press, Berkely 1965, 54.

Unfortunately, the emphasis in all of this thinking is misplaced in matters relating to food and nutrition. While innovation is required, it is required in response to the recognition and existence of a real world need and as complete an understanding of this need in its ecological setting as it is possible to achieve.^(a) Thus the complexities of the analytic technique are generated by the need to know the critical interactions of the multivariate system that generates the food behavior. Even the most fertile imagination cannot generate the operationally effective alternatives in the absence of identification of and with the need. The best testimony to the futility of ignoring the behavioral complexity of nutrition is the paucity of successful interventions.

The results of a simplistic superimposition of solutions derived exclusively from a food technology approach, or from a conventional economic approach, or from an isolated nutrition approach, can be seen all around us. Characteristically, they seem mainly to generate new problems and in advanced cases to substitute one form of malnutrition for another.

To summarize the value of the early field work, it emphasized for the entire TN study group that it must:

- (1) Let the system under study generate an understanding of the nutrition status and needs of the target groups without the distortions created by preaggregation of data and pre-conceived, imaginary world models.

(a) J. Cravioto. "Complexity of Factors Involved in Protein-Calorie Malnutrition" In Malnutrition is a Problem of Ecology P. Gyorgy and O. L. Kline, Eds., S. Karger, Basel, 1970, 7-22.

- (2) Provide an analytical technique with a capacity for examining the problem in sufficient complexity to resolve the fine structure of food behavior (e. g. , rural/urban; caste relations, intrafamily distribution, etc.)
- (3) Provide enough dimensions in the data base so that subsequent mini-studies, following intervention tests, could generate an independent and dependable evaluation system.
- (4) Reveal the consequences of any intervention with sufficient clarity, understanding of effectiveness, and deference to the interactions of critical ecological factors so that planning and decision-making become deliberate.

A STUDY OF FEEDING PROGRAMS
IN TAMIL NADU

CONTENTS

<u>CHAPTER</u>		<u>Page No.</u>
I	Introduction, Summary and Recommendations	1
II	Incidence and Magnitude of Nutrition Deficiency in Tamil Nadu	7
III	Description of Existing Feeding Programs	14
IV	Some Problems of On-Going Balwady Feeding Programs - A Mini-Study	25
V	A Proposed Integrated Feeding Scheme	37
VI	The Evaluation of Feeding Program	50
APPENDIX 1	The Problem of Substitution Versus Supplementation	75
APPENDIX 2	Statistical Background of TABLE 8	76

**A STUDY OF FEEDING PROGRAMS
IN TAMIL NADU**

TABLES

		<u>Page No.</u>
TABLE 1	Risk and Target Population in Tamil Nadu	10
TABLE 2	Calorie/Protein Gap Comparison of the Risk Population	11
TABLE 3	Existing Feeding Programs in Tamil Nadu (Program Year 1 April 1971 to 30 March 1972)	15-16
TABLE 4	Actual Balwady Attendance on Date of Visit	26
TABLE 5	Comparison of Rations Cooked to Beneficiaries Present	28
TABLE 6	Outside Beneficiaries: Consumption at Feeding Centers	31
TABLE 7	Local Contribution	33
TABLE 8	Proposed Integrated Feeding Program Costs Under Alternate Menus	43
TABLE 9	Estimated Cost of Producing an Extruded Food (15,000 ton plant capacity operating at 90% efficiency for 300 days/year, 5,000 tons per shift/year)	45
TABLE 9A	Cost of Delivering 100 Calories of Food Through Various Feeding Programs (Program Year 1 April 1971-31 March, 1972)	73
TABLE 10	Mannivakam and Manampathy Villages Average Daily - Caloric Consumption	74

CHARTS

CHART A	An Illustrative Goal Statement for Feeding Programs	54
CHART B	Some Suggested Data Requirements for Evaluation	55-56

CHAPTER I

INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

Introduction

The Tamil Nadu project was in part, a two-year field study of the food and nutrition situation in the state. The methodology in general was directed to the study in the context of an integrated system. The section of the field study described here began in December 1970, and ended in January 1973. The objective of this particular portion was to:

- (a) examine the existing supplementary feeding programs in Tamil Nadu, and their contribution to the delivery of nutrition.
- (b) provide an estimate of the extent and need for feeding program services in the immediate future.
- (c) provide some suggestions on the evaluation of such programs,
- (d) suggest possible new components which might adapt to the existing schemes.

This chapter summarizes briefly the conclusions and recommendations of the study.

Summary

- (1) Feeding programs in the state were in general found to be effective delivery systems. "Delivery systems" as the term is being used here simply means all of the administrative and logistic procedures by which the food is brought from its source to the ultimate beneficiary.
- (2) However, a critical aspect in the effectiveness of feeding programs is the question of whether the food provided by the delivery system is in fact a supplement to the beneficiary's normal diet,

or whether it is a substitution in whole or in part, hence a supplement to the family plate. In the latter case, the beneficiary's total intake of nutrients is not increased by the entire quantity of food successfully delivered. It was the impression, based on a limited sample, that there is considerable substitution taking place in the feeding programs in Tamil Nadu, and that this is a problem which must be addressed by planners and administrators of these programs.

- (3) For purposes of this paper, we have defined the nutritionally "at-risk" population as members of households spending less than Rs. 300 per month. By far, the greatest proportion of under-nutrition exists among members of households in this income bracket.
- (4) The food behavior survey conducted by the Tamil Nadu Nutrition Project study team, and the independent food habits survey conducted by the Protein Foods Association of India in 1971, indicates that calorie under-nourishment is substantially greater than protein under-nourishment. This is not to say that there is no protein deficiency, but quantitatively it is of a lesser magnitude than calorie deficiency. Thus about 67% of the pre-school children in the at-risk population received less than their minimum daily calorie requirements. By contrast, only about 30% received less than the minimum protein requirements. ^(a)
- (5) A little over 50% of the pre-school children who were under-nourished to any degree received less than half of their minimum daily calorie requirements. For purposes of this paper, this very deprived group has been called "hard-core target population."
- (6) There are nine distinct supplementary feeding programs in the state directed toward pre-school children, pregnant and nursing mothers, and school children. These programs feed only 12% of

(a) Throughout the report Indian Council of Medical Research standards for minimum daily requirements of nutrients are used.

the pre-school target population, while feeding 52% of the school children needing supplementary food.

- (7) Supplemental feeding schemes in Tamil Nadu, and in India generally insofar as the study team is aware, have not been evaluated in the past in terms of attempting to determine results or impact in comparison with state goals. And usually the goals themselves are not stated in terms that are very readily quantifiable. The result is that usually the delivery system has virtually been considered the goal, and programs have been judged in terms of their efficiency in getting planned quantities of food into eligible beneficiaries.
- (8) Thus, the main concern of feeding program administrators has generally been accountability for food delivered. The accounting system indicates adequately when the aggregate quantities delivered are below the target figures. But it is unable to estimate actual consumption by particular beneficiaries, nor to provide data for determining effects on total intake, nor impact on health or mortality experience.
- (9) The operation of existing feeding programs, such as those conducted at the balwadies, can be improved so as to achieve better and more efficient performance of food delivery to target beneficiaries. This will require additional financial resources and manpower to implement administrative, logistic, and supervisory changes in order to diminish or eliminate some of the existing shortcomings in operating programs, but the study team feels justified in concluding that direct distribution feeding programs are effective intervention systems, and can be made better.

Recommendations

- (1) It is recommended on the basis of this evaluation that the present mid-day meal program not be expanded. Some 52% of the school children needing supplementary feeding are already covered, and

there now seems to be general acceptance of the priority of the vulnerable groups - pre-school children, and pregnant and nursing mothers. Presently, only about 12% of the at-risk pre-school children and about 8% of the pregnant and nursing mothers are being reached by the existing feeding schemes in Tamil Nadu. These programs should be rapidly expanded.

- (2) It is apparent that many feeding programs in India have fallen short of the implicit goals that their designers had planned. But the lack of specific definition of the goals, and the consequent absence of rigorous evaluation, has made it difficult to identify program deficiencies and failures except in terms of the aggregate delivery system. Feeding program administrators and planners must develop evaluation frameworks that go beyond the delivery system.
- (3) Having reviewed the existing feeding programs in the state, the study team discusses a new type of scheme. The intention is not necessarily to recommend the abolition of any of the existing programs, but to suggest a feasible alternative, which would adapt to programs.

For these purposes, the target population in Tamil Nadu is divided operationally into three categories:

- (a) Infants up to 3 years
- (b) Pre-school children - 3 to 5-1/2 years
- (c) Pregnant women and nursing mothers

It is suggested that the above categories of beneficiaries receive food through the existing mid-day meal primary school feeding program. Pre-schoolers would be fed similarly to the school children; while infants, and pregnant/nursing women would be reached through a take home food scheme.

Such a program may have distinct advantages over existing feeding schemes in terms of supervision, participation, and economics of scale. The food to be distributed could be existing CSM menus, balahar, or a pre-cooked food formulation. A principal advantage is the network of 30,000 schools existing in the state. This system could provide for speedy implementation of the suggested feeding scheme without the additional cost and delay of building a new network of centers.

Chapter V examines these alternatives in terms of costs, and other significant elements.

- (4) When more research and experimentation with pre-cooked food has been accomplished, serious consideration should be given to utilizing ready-to-eat formulations for at least part of the food used in these programs. A number of potential advantages urge such a plan: (1) food comes from a centralized processing unit, (2) is delivered in a ready-to-eat or ready-to-mix forms, (3) the feeding center administrators and staff are relieved from many of the problems of supervision and daily preparation of food on site, (4) pre-cooked food is likely to have a longer shelf-life, thus facilitating a less costly food distribution schedule, and (5) this approach will provide more flexibility at the feeding center level. For example, balwady programs might be able to have three daily feedings - two snacks and a mid-day meal - without an undue extra burden on the balsevika.

It is recommended that government encourage and assist further research and development of the pre-cooked food technology, and experimentation with various formulations.

- (5) This field work may well be most useful in emphasizing the complexity of the food and nutrition problem, particularly with infants below the age of 2-1/2. It is essential that the planners and administrators of these programs devote more resources to

evaluation, and this in turn implies planning of goals and purposes in terms beyond the delivery system ^(a) in terms that are susceptible to quantified measurements. We consider two points essential to accomplish this aim:

- (1) that evaluation, and assistance with planning, be done by a separate unit which is not part of the regular departments and agencies responsible for administering the programs.
- (2) that all concerned recognize that it is essential, if evaluation beyond the delivery system is to be meaningfully accomplished, that samples of the total population be used. Small samples chosen with appropriate statistical methodology can provide a high degree of accuracy in data collection, and can serve as well as mass collection of figures.

^(a) These statements should be considered together with Vol. II, Section D, Part I, "An Organizational Alternative for Child Nutrition Programming," K. B. Kothari.

CHAPTER II

INCIDENCE AND MAGNITUDE OF NUTRITION DEFICIENCY IN TAMIL NADU

Introduction

One of the critical aspects in planning any feeding scheme should be the quantification, to the extent the data permits of the nutritional problems of the target population. It is not sufficient to describe the people to be reached in terms such as "the disadvantaged groups" or "the weaker sections of the population." Discovering the degree and extent of deficiency in terms of nutrient intake should be the basic preliminary requirement for any nutrition program planning process, and the description of this deficiency should virtually identify the target group.

The findings summarized in this chapter are based primarily on early conclusions from a 2800 household food behavior and expenditure survey undertaken by the field study team. The survey extended over a period of slightly more than one year. It focused on households containing pregnant women, nursing mothers, and pre-school children. A food habits survey conducted independently by the Protein Foods Association in India in 1971 was also consulted. The two surveys used different questionnaires and were based on different sample designs, but in comparable areas there was reasonable agreement.

"At-Risk Population" and "Target Population" - Definitions

The survey returns suggested two sub-classifications of the population which, for purposes of this field report, are useful in describing the magnitude of the problem.

The At-Risk Population - The at-risk population is considered to be members of households whose monthly expenditure is below Rs 300. The survey results showed that by far the greatest number of persons who consume less

than the minimum daily requirements of nutrients are among members of households in this expenditure bracket. There is some under-consumption among higher expenditure households, but the proportions are much smaller. Under-consumption in these better-off-households is probably linked to traditional food habits, and lack of knowledge of nutrition, rather than to economic conditions.

Households with expenditure below Rs. 300 per month comprised some 70% of the population sampled in the food habits survey. This is approximately the same proportion (allowing for inflation) as that found by the Indian Census Bureau food habits survey conducted in Tamil Nadu in 1961. The "poverty line" has been defined by the central government planning commission as private consumption below Rs. 40 per capita per month (at 1972 prices). By relating this figure to the average size of households in Tamil Nadu, the Rs. 300 level per family is comparable to the poverty line estimate. To emphasize, this is expenditure rather than income. The latter is a much more difficult and is believed to be a less reliable statistic. Table (1) presents estimates of the magnitude of the at-risk population.

The Target Population - The target population for purposes of this field report is defined as pre-school children, pregnant women, and nursing mothers, whose caloric intake is below the daily minimum requirements recommended by the Indian Council of Medical Research (ICMR).^(a) The use of calories as the yardstick for determining the target population for purposes of this paper should not be understood to indicate a lack of awareness of other nutritional problems. Surveys seem to indicate that at least in terms of intake there were much greater deficiencies of calories than protein. There is implicit in this yardstick the assumption that the provision of sufficient calories is likely to provide enough of most other nutrients as well. Nutritionists may consider the calorie yardstick an over-simplification. But this field paper reflects attitudes of the day-to-day planner and administrator who must make decisions on the allocation of resources without delay and often with admittedly imperfect information.

^(a) ICMR Nutrition Expert Group: New Delhi 1968

The target population is almost exclusively contained in the at-risk households - those spending less than Rs. 300 per month. To try to provide a more detailed conception of the extent of the problem we further divided the at-risk population into two sub-groups:

- (a) the under-nourished target population - those who receive anything less than the minimum daily calorie requirements.
- (b) the hard-core malnourished target population - those who receive less than 50% of their minimum daily calorie requirements. The choice of the 50% level of determine the hard-core group is arbitrary, and other levels could have been chosen. However, as well be noted from Table 1, approximately one-half of all the pre-school children who are getting anything less than the minimum calorie requirements are in fact below the 50% minimum daily requirement (MDR) level (1.68 million out of 3.10 million).

The approach to definition and identification of the target group is intended to demonstrate the intensity of under-nourishment in these segments of the population.

The Under-Nourished Target Population

Table 1 provides an outline of the target population distributed by age and category for the state as a whole. It should be noted that there are some differences in levels of consumption from one district to another. A similar table could be generated for each of the districts, and the determination of numbers of beneficiaries for a feeding program could be weighted toward those areas which are relatively worse off in terms of food consumption. It will be noted that Table 1 identifies the target groups in terms of calories only. As noted previously, calorie identification was assumed to be a sufficient indicator for field work. Table 2 however shows a comparison between calorie and protein intakes; protein is not corrected for quality in this table.

TABLE 1

RISK^(a) AND TARGET^(b) POPULATION IN TAMIL NADU

<u>Population Category</u>	<u>Total Population in 1971 (in millions)</u>	<u>Risk Population (in millions)</u>	<u>Minimum Daily Recommended Calorie Requirement (ICMR)</u>	<u>Under-nourished Target Population (in millions)</u>	<u>Malnourished or Hard Core Target Population</u>	<u>Calorie Intake of Hard Core Target Population</u>
0-2-1/2 years	3.7	2.59	1200	1.74 (67% of Col. 3)	932,000 (36% of Col. 3)	Below 700
2-1/2-5-1/2 years	2.9	2.03	1500	1.36 (67% of Col. 3)	730,000 (36% of Col. 3)	Below 700
Pregnant Women	0.5	0.35	2500	0.27 (76% of Col. 3)	102,000 (29% of Col. 3)	Below 1250
Nursing Mothers	1.2	0.84	2750	0.67 (80% of Col. 3)	286,000 (34% of Col. 3)	Below 1500
5-1/2-12 years	<u>5.8</u>	<u>4.06</u>	1800	3.05 (75% of Col. 3)	1,015,000 (25% of Col. 3)	Below 900
TOTAL	14.1	9.87				

(a) Risk population is defined as: below income Rs 300/month (70% of total population).

(b) Target population is defined as: below income Rs. 300/month and below minimum calorie requirement.

Source: Tamil Nadu Study - Early Field Data

TABLE 2

CALORIE/PROTEIN GAP COMPARISON OF THE RISK POPULATION^(a)

<u>Population Category</u>	<u>Total Risk Population (in millions)</u>	<u>Under-Nourished</u>		<u>Malnourished</u>	
		<u>Percent Receiving Below MDR: Calorie</u>	<u>Percent Receiving Below MDR: Protein</u>	<u>Percent Receiving Below Half of MDR: Calorie</u>	<u>Percent Receiving Below Half of MDR: Protein</u>
0-5-1/2 years	4.62	67 (below 1200-1500 calories)	30 (below 17-20 grams)	36 (below 600-700 calories)	16 (below 9 grams)
Pregnant Women	0.35	76 (below 2500-calories)	59 (below 55 grams)	29 (below 1250 calories)	26 (below 25 grams)
Nursing Mothers	0.84	80 (below 2750 calories)	71 (below 65 grams)	34 (below 1500 calories)	36 (below 35 grams)
5-1/2-12 years	4.06	75 (below 1800 calories)	23 (below 22 grams)	25 (below 900 calories)	11 (below 11 grams)

^(a)Risk population is defined in Table 1.

Source: Protein Foods Association - Food Habits Survey, 1971.

Source: Tamil Nadu Study - Early Field Data.

The two tables reveal some striking details about under-consumption in a gross context:

- (a) About 50% of the pre-school children (0-6) in the at-risk population receive less than their minimum daily calorie requirements. By contrast, only 30% do not receive the minimum protein requirements.
- (b) There is a greater incidence of under-consumption of calories among school children than pre-schoolers. About 75% of school children are below the minimum daily calorie requirements but only about 22% below the corresponding protein needs. No attempt is made here to quantify factors such as net protein utilization nor are the negative effects of frequent episodes of illnesses such as gastroenteritis, and parasitic infections considered which may prevent the complete absorption and utilization of what nutrients are consumed. These aspects were left for the more detailed analysis being conducted in another part of the project.
- (c) Pregnant women and nursing mothers are even more under-nourished than school or pre-school children. This holds true for both calorie and protein intake.

For use in planning feeding programs, it is expected that the above summary qualitative description of the more important findings of the food habits survey will provide a basis for determining the best nutrition profile of foods to be distributed, ^(a) as well as the identification of the target group in the population. The calorie gap among a substantial portion of the risk population is greater than 50% of the minimum daily requirements. Unfortunately, from an operational point of view in the field, it is difficult to impossible to attempt to pinpoint only the hard-core mal-nourished in a large-scale intervention program.

(a) In the past, the choice of menus has mainly been determined by what is available rather than by what is desirable.

The Hard-Core Malnourished Target Population

As defined for our preliminary purposes, this sub-group of the total target population consists of vulnerable group members of families spending under Rs. 300 per month who are obtaining less than 50% of their calorie requirements. Tables 1 and 2 together provide estimates of the size of this group by population category. The critical fact that about half of all the infants, pre-schoolers, and mothers who are malnourished at all are getting less than 50% of their requirements illustrates the overpowering magnitude of the problem. Refined studies are required to quantify the magnitude carefully.

Inadequate income appears to be the basic problem in these groups, but differences can also be partially explained by culture and social behavior. There appears to be a limited understanding of the special dietary needs of infants. Among some communities for example, concern about the "hot" and "cold" nature of certain foods tends to result in denying the weaning infant most nutritious foods.

It is also characteristic of much of the population to delay starting weaning infants on solid foods until well past six months of age. There is little evidence to date as to how and what types of nutrition education might change these deeply ingrained traditional beliefs. There has been no significant large-scale nutrition education scheme in India which has actually been successful in creating positive changes in food behavior. Even greatly improved nutrition education techniques would still face the poverty line problem. For families in the poverty category, nutrition education of any kind is of questionable value. This underlines the basic nature of the distribution problem.

CHAPTER III

DESCRIPTION OF EXISTING FEEDING PROGRAMS

Introduction

There are nine separate feeding programs in Tamil Nadu (see Table 3). The state was the first in India to establish a primary school lunch program. It has the largest number of beneficiaries and provides the greatest inputs of money and food of any state in India. Tamil Nadu has also initiated and expanded programs designed to reach pre-school children, pregnant women, and lactating mothers. Their purpose is similar to that of the school lunch scheme - to provide supplemental food. However, as noted elsewhere, the coverage as a proportion of the total target population is relatively small.

Table 3 shows the existing feeding programs, their respective beneficiary coverage, and associated costs. It is important to make a clear distinction between the mid-day meal program in the primary schools, and the various programs aimed at pre-school children, pregnant women, and nursing mothers. The school program is well-established, extensive in its coverage, and has been successfully operating for more than 15 years. The maternal and child programs are recent, have limited coverage, and are yet to provide an operational pattern which can clearly be extended on a mass scale without significant modifications.

The characteristics of the existing feeding programs grouped together by pattern of operation and administration are described below:

The Primary Schools Mid-day Meal Program

The scheme enjoys well-established administrative procedures, a logistic system which is readily capable of moving the imported food smoothly from the port of Madras through successive godown levels to the school, and adequate financing by government. For the 12 months ending March 1972, the mid-day meal program delivered approximately 76% of its programmed quantities of food. This compares favorably with other state mid-day meal programs in India.

TABLE 3
EXISTING FEEDING PROGRAMS IN TAMIL NADU
 (Program Year 1 April 1971 to 31 March 1972)

<u>Program Title</u>	<u>Target Group</u>	<u>Planned Number of Beneficiaries</u>		<u>Feeding Days/Year</u>	<u>Programmed Food (tonnes)</u>	<u>Budgeted Program Costs (Rs. in millions)</u>
		<u>Children</u>	<u>P/N Women</u>			
School Mid-Day Meal Program: Department of School Education, CARE	Primary School Children	1,600,000	-----	200	42,134	89.56
Regular Balwady Program: Department of Social Welfare, CARE	Children, 0-5-1/2 years, P/N Women	80,000	40,000	300	4,084	9.99
Industrial Canteen Program: Labor Department, CARE	Children 0-5-1/2 years P/N Women	50,000	50,080	300	2,042	4.49
Special Nutrition Program: State Social Welfare Department, Government of India	Children, 0-3 years	172,000	-----	250	5,404	9.71
Maternal and Child Health Program: Department of Health & Family Planning, CARE	Children 0-3 years P/N Women	94,500	23,600	300	3,798	9.75
Sub-Total		1,996,000	113,680		57,462	123.50

TABLE 3 (continued)

<u>Program Title</u>	<u>Target Group</u>	<u>Planned Number of Beneficiaries</u>		<u>Feeding Days/Year</u>	<u>Programmed Food (tonnes)</u>	<u>Budgeted Program Costs (Rs. in millions)</u>
		<u>Children</u>	<u>P/N Women</u>			
	(from preceding page)	1,996,600	113,600		57,462	123.50
Integrated Child Welfare Demonstration Program: State Department of Social Welfare Central Social Welfare Board	Children, 0-5-1/2 years	2,100	-----	300	44	8.20
Composite Demonstration Program: State Department of Social Welfare, Government of India	Children, 0-5-1/2 years, P/N Women	4,200	2,520	300	242	0.47 (a)
Catholic Relief Services Program	Children, 0-5-1/2 years	194,230	8,890	300	12,170	unknown
Christian Agency for Social Action Program	Children, 0-5-1/2 years, P/N Women	19,770	6,230	250	679	1.77 (a)
Sub-Total	School Children	1,680,000	-----		42,134	89.56
	Pre-School	616,900	131,240		28,463	--- (b)
Grand Total		2,348,140			70,597	--- (b)

(a) Actual figure; budgeted figure not available

(b) Due to unavailable information (Catholic Relief Services), sub-total and grand total cannot be calculated.

Source: Tamil Nadu Study

There are, however, areas where program improvements could be achieved:

- (1) Collection of local contributions to match the Education Department's direct financing are a continuing problem to the headmasters. Indications are that most headmasters are actually able to raise only a small proportion of the 4 new paise per child per day in local resources which is planned.
- (2) No matter how smoothly the raw food moves down to the school level it still has to be stored, accounted for, and cooked. The headmaster must be responsible for the recurring procurement of items like seasonings and condiments, vegetables, and firewood. He must purchase the local rice which is used on half of the feeding days, obtain the services of a cook, concern himself with assuring a regular supply of water, and supervise the daily preparation. This is a continuing burden on an already fully-employed civil servant.
- (3) Inevitably, with daily preparation taking place at nearly 30,000 centers, the hygiene, the quality, and the regularity of the cooking process will suffer from some unevenness.

The state government has been aware of these problems for some time. A promising solution was the elimination of preparation at the feeding center level, and transferring it to a central cooking facility which would deliver pre-cooked food to a number of individual schools. Accordingly, a central kitchen scheme was initiated, and the first phase has been in Chingleput District for some two years. The program calls for each Development Block to have a separate central kitchen, each of which does the cooking for anywhere from 40 to 75 individual schools. The kitchens cook conventional preparations of rice, (provided by the state government) CSM, and bulgur wheat.

The central kitchens have experienced some difficulties of operation. Since the food prepared is hot, ready-to-eat, and has no shelf-life, each kitchen must make its deliveries every day by lorry on an extremely tight schedule. Thus a day's failure in the functioning of the kitchen or of the transporting vehicles means a lost day for the delivery of food to the beneficiaries. The Central Kitchen Program has not yet been in operation long enough to demonstrate whether it can consistently equal or perhaps surpass the efficiency of delivery of the conventional mid-day meal program operation. There is no doubt, however, that a successful central processing program could relieve the headmaster, whose regularly stated preference is for his educational responsibilities, of the burden of the various tasks of running a day-to-day cooking operation. A centralized facility would also provide much greater assurance of consistent quality and cleanliness in the preparation of food.

Balwady^(a) Feeding Programs

The Department of Social Welfare operates approximately 1,700 balwadies (as of June 1972) for pre-school children in the 3 - 5-1/2 age group. There are also a number of similar institutions operated by local government bodies and private organizations and individuals. Most of the Social Welfare Department balwadies provide a daily cooked mid-day lunch for their children under one of several schemes. Food is provided either by the CARE organization (CSM and oil) or is locally purchased. The meal is cooked at the feeding center.

Balwadies are also confronted with inconsistencies in the quality and cleanliness of the cooking. But supervision of daily preparation is much less of a burden on the balsevika in charge of the balwady than on the headmaster in the school. For one thing, the maximum number of children enrolled in a balwady is 40, while many primary schools have an enrollment in the hundreds. Perhaps most important, the balwady

(a) Pre-schools are called Kelandaigal Kappagams (KKs) in Tamil Nadu. Balwady is being used in this report because it is the term generally used in India outside of Tamil Nadu.

is a child care institution, and most balsevikas seem to think of the provision of food as a necessary and integral part of the institution's routine, rather than a burden imposed by outside authority.

The 1,700 or so balwadies operated by government are now able to reach only about 86,300 children out of the 3.1 million in the 0 - 5-1/2 age group needing supplemental nutrition. When considering all maternal child feeding centers (including balwadies) operated or supported by the government, some 362,000 pre-school children are reached. This represents only about 12% coverage of the 3.1 million we have identified as the target population. In comparison, the mid-day meal program feeds 1.6 million school children (6 - 12 years) out of 3.05 million, or 52% of those needing supplemental feeding. Clearly, pre-school feeding programs require a large expansion to make a real impact on the problem.

A proposal is pending before government to increase the number of balwadies by 10,000 in the next three years. Such a plan is a large step in the right direction, but will require changes in operations. For example,

- (1) The present program calls for deliveries of food to be made to balwadies by the block development officer's jeep. This system is none too efficient even when there are only a few balwadies in each block (see Chapter IV). It would be completely impractical if the balwady system were expanded to have a feeding center in each village (each proposal however has its own merits).
- (2) In the programs where local food is purchased for feeding, most blocks have centralized purchasing for all balwadies under the supervision of the mukyasevika. This seems to be well within the capabilities of the existing block administrative structure when, as in most blocks there are no more than three balwadies in the program. But 30 balwadies in a block might put too great a strain on the

available time of the balsevika. It might also be necessary for the vender of the commodities to arrange for delivery to the village level, rather than having individual balsevikas coming into block headquarters pick up their weekly ration as at present.

- (3) Our investigations seem to indicate strongly that almost no pre-school children living outside a radius of one-quarter to three-eighths of a mile from a balwady are likely to become enrolled. This becomes a critical factor in terms of the GOTN's stated intention of operating balwadies for the benefit of the disadvantaged groups. As long as the physical location where the balwady is carried on is dependent on local voluntary effort, government cannot have any control over the location, and thus no assurance that in fact the balwady is capable of enrolling these children who are most in need of the services. (a)

Industrial Canteen Program

The Labor Department, in cooperation with CARE, provides imported food to the families of employees of various industrial plants, primarily in Madras but also in some other urban centers. The target is children up to age 5-1/2, plus pregnant women and nursing mothers. A requirement is that the plants have an established canteen where meals are prepared for their own employees; and also that these private companies be willing to bear all administrative expenses of the program; including transportation from godown to plant.

(a) The balwady programs also include the feeding of "outside" beneficiaries - children below the age of 2-1/2 years, pregnant women, and lactating mothers. There is a different set of operational considerations involved in reaching this category of beneficiaries, and accordingly programs for this group are discussed separately below.

This program has been in operation for several years, but has not proved particularly efficient. Actual delivery of food against program targets was under 24% during 1971-1972. Systems used by the various industries to deliver the food from their own in-plant kitchens to the ultimate beneficiaries vary greatly, as does the degree of supervision, and assurance as to whether the food actually reaches the intended target within the family. The potential for expansion of the beneficiary coverage is not large.

Program with "outside" Beneficiaries

Outside beneficiary is here taken to mean an individual who comes daily to the distribution point to receive cooked or fully processed food, but who is not provided any other services by the center, and who does not spend time at the distribution point beyond that needed to receive the food and either eat it or carry it away.

This pattern is carried out in the following programs:

- (a) Regular Balwady (for some beneficiaries)
- (b) Special Nutrition (for all beneficiaries)
- (c) Health Department Maternal/Child (for all beneficiaries)
- (d) Composite Demonstration Program (for some beneficiaries)

This type of operation contrasts with the program for the primary school child, or regularly enrolled balwady child, where the educational services provided are significant, and where the children spend a number of hours each day at the institution.

It was the government's intention in all the above programs that the outside beneficiaries should be required to eat at the distribution point under supervision. But observation of a number of feeding centers has indicated that this is not being done, and that the great majority of recipients carry the food away from the distribution point. The reasons why these outside beneficiaries do not remain at the center to eat can be briefly summarized as follows:

- (1) Most centers do not have sufficient space or shelter to accommodate the numbers coming forward. For example, in the Special Nutrition Program, some distribution points serve 500 or more beneficiaries per day. The schedule calls for the distribution to be completed in an hour and a half or so. Few of the centers have the physical plant required to accommodate this number of people while they eat.
- (2) The recipients do not want to remain at the center. This is especially true of adult women; and pregnant women particularly do not usually wish to eat in the presence of strangers for social reasons. There would be less problem with children remaining at the center to eat provided physical space was sufficient. But the target beneficiaries in these programs are below the age of 2-1/2 and are necessarily accompanied by mothers or elder siblings.
- (3) There are too few supervisors at each distribution point to do much more than control the people. To take the Special Nutrition Program again as an example, there are only two semi-voluntary workers for every 200 people, and as the number of beneficiaries have increased the tendency has been to enhance the honorarium of the existing supervisors rather than to increase their number.

- (4) Finally, even with adequate space and shelter, and numerically adequate staff, there is some doubt as to the presence of the necessary motivation for staff members to serve virtually as policemen.

Most of the food currently being provided under these schemes is being carried away from the center. What happens to it? Does the food reach the home at all - or is it sold off between the distribution point and the house? Our conclusion, based on small-scale surveys, is that the food is not sold. Three of the programs provide conventional cooked food such as uppuma or pongal, which has no special market value and no shelf-life. The Special Nutrition Program provides a fully processed food - Modern Bread - which does have a useful shelf-life. However, three individual unwrapped slices may suffer from saleability by comparison with a packaged project. In any event, our investigation revealed very few instances of bread being sold after being distributed at the center.

Assuming, then, that the food reaches the house, the question remains: is it consumed by the specific target beneficiary? The survey conducted by the study team indicated a high degree of likelihood of the food being shared with other children in the household. Even food intended for pregnant and nursing mothers may end up being shared among the children. (a) This, of course, means that a ration designed to have an impact on a single child may be so diluted by sharing among several children that it has no appreciable effect on any of them. On the other hand, it was encouraging to find little evidence that food was being shared by adult members of the household, and it should be possible to design a planned take home scheme which could obviate the problem.

(a) See Vol. II, Section C. A Study of Take Home Dry Food as a Distribution System.

The various programs providing food for outside beneficiaries have proved to be reasonably efficient delivery systems up to the distribution point. (Indeed, insofar as recorded deliveries are concerned, the Special Nutrition Program is easily the best in the state - achieving over 95% of its programmed out-turn each day.) However, since the distributed food is carried away from the center by the recipients or their proxies, there is no observational evidence as to who finally consumes the food. And there is considerable doubt that any increase in administrative input or improvement in physical plant is likely to change this pattern.

CHAPTER IV
SOME PROBLEMS OF ON-GOING BALWADY FEEDING PROGRAMS
A MINI-STUDY

Introduction

The purpose of this chapter is to present the results of an examination of a selected number of balwadies in greater detail. The observations are based largely on a mini-survey conducted in North Arcot District, which was one of the first districts in the state to start a balwady program.

North Arcot is rural in setting and is located in the northern part of the state. Two administrative blocks, Tirupathur and Arni, were chosen because of their large number of operating balwadies. Unannounced visits were made by experienced female investigators. A total of 29 balwadies were visited between the 5th and 21st of October 1972. Uppuma made out of CSM and salad oil was the food distributed by 28 balwadies; one unit was part of the Composite Demonstration Feeding Program (see Table 3 for description).

- (1) Out of 28 balwadies provided with CARE food, three were not operating on the dates of our visit. (This was due in each case to the failure of the balsevika to obtain the monthly supply from block headquarters.)
- (2) Table 4 shows the attendance record of 25 balwadies on the day of visit. Only 732 children were physically present out of 980 enrolled. On this schedule, only 75% of the target number of children are the effective beneficiaries on any one day. This record is comparable to the situation in balwadies in other districts visited.

Participation and attendance at balwadies is affected by a variety of modifying factors. Social attitudes are important. The balwady must be physically accessible, and the conditions under which activities are conducted must be socially acceptable to the target groups. From our observations, it seems clear that the optimum balwady site in a village is midway between the village proper and the "colony" where the harijans reside. (a)

(a) The colony is usually, though not invariably, physically separate the village.

TABLE 4

ACTUAL BALWADY ATTENDANCE ON DATE OF VISIT

<u>Balwady</u>	<u>Number on Rolls</u>	<u>Number Present</u>
1. Bommikuppam	40	38
2. Agaram	40	26
3. Reddiyur	40	34
4. Kalnarasampatti	40	30
5. Sowdakuppam	40	38
6. Chinnakallupatti	40	30
7. Jolarpettai	40	22
8. Chinnaponneri	40	35
9. Sheladampatti	40	30
10. Andiappanur	40	25
11. Pachal	40	27
12. Kadariampatti	40	25
13. Yelagiri Hills	29	14
14. Nosal	40	30
15. Kalariputtu	40	27
16. Paniyoor	40	20
17. Athanoor	40	40
18. Katteri	40	35
19. Ladapadi	40	27
20. Melayanpoondi	40	35
21. 12 Puthur	40	26
22. KK Thoppa	40	25
23. Vadugachettu	40	30
24. Valari	40	23
25. Kani Kalupay	<u>40</u>	<u>40</u>
TOTAL:	980	732 - 74.6%

Source: Tamil Nadu Study

There is no doubt that balwady location in the colony itself eliminates participation by caste Hindus. Caste women, in particular, react more strongly than their children to having to go into the colony. Yet locating the balwady in the village makes it more difficult for colony children to attend.

One factor is simply distance. If the balwady is centered in the village and concentric recruitment is carried out, the colony will not be reached even at the enrollment stage. This will be especially true if the colony is situated more than a quarter of a mile or so from the village. This distance for a pre-schooler is significant, and our evidence indicates it will prevent attendance with any regularity, no matter what his family's condition of poverty.

The present site selection procedures do not take into account the factors mentioned above. Most balwadies are located where space has been donated, usually in private village houses, or in panchayat headquarters buildings. Both are almost invariably in the main village. Where new buildings are being put up explicitly as balwadies, the official criteria for site selection take account of location in relation to caste and community residence locations only as low priority items.

- (3) The balsevika and other officials want to demonstrate (on the records) that they are running a high performance program. Consequently, the rations withdrawn from the block headquarters tend to correspond with enrollment rather than actual attendance.

During our mini-survey, we learned that even in a center where only 59 beneficiaries were actually fed, the total ration cooked or said to have been cooked - and shown on the records - was 120 thus representing 100% over-rationing. We also observed a balwady where the number fed was 142 as against 120 rations cooked. Table 5 shows the balwadies with total rations drawn as compared to the number of beneficiaries present.

TABLE 5
COMPARISON OF RATIONS COOKED TO
BENEFICIARIES PRESENT

	Total Rations Cooked	Total Beneficiaries Actually Present
SECTION A: Over-rationing in balwadies		
1. Bommikuppam	120	103
2. Agaram	120	88
3. Reddiyur	120	92
4. Kalnarasampatti	120	87
5. Sowdekuppam	120	102
6. Chinnakallupatti	40	30
7. Jolarpettai	120	66
8. Chinnaponneri	120	91
9. Sheladampatti	120	88
10. Andiappanur	120	66
11. Pachal	120	59
12. Kadariampatti	120	90
13. Yelagiri Hills	20	14
14. Nosal	120	92
15. Kalariputtu	120	97
16. Paniyoor	120	100
17. Athanoor	120	120
18. Katteri	120	115
19. Ladapadi	120	87
20. Melayanpoondi	120	116
TOTAL	<u>2220</u>	<u>1703</u>

SECTION B: Under-rationing in balwadies

1. KK Thoppa	120	133
2. 12 Puthur	120	142
3. Vadugachettu	120	125
4. Velari	120	135
5. Kani Kalupay	120	127
TOTAL	<u>600</u>	<u>662</u>

NOTE: Three balawadies did not cook on day of visit.

Source: Tamil Nadu Study

Need for Correction - The present system makes it almost inevitable that balsevikas will show almost perfect attendance, regardless of actual conditions. But it should not be impossible to alter the situation to relieve the balsevikas of the pressure of having to appear to be achieving performance levels which are not truly attained. Government could, for example, consider basing its distribution of food each month on average daily attendance rather than enrollment, while simultaneously disengaging the degree of financial support for the program from the attendance figures. Issuing of commodities and determining of the number of rations to be prepared daily has been done successfully on the basis of average attendance, rather than enrollment, in the school lunch program in Mysore State for a number of years.

Just how the system might be changed is locally a matter for consideration outside the limits of this report. What is important is that the present procedures are not providing the administrators with a really accurate picture of what is going on at the feeding center level.

- (4) Another problem in this connection is the fact that at present the enrollment target for each balwady is the same, regardless of the population of the village in which it is located. Thus the set figure of 40 enrolled children from 2-1/2 to 5-1/2, 40 infants below 2-1/2, and 40 pregnant and lactating mothers is the standard for each center. This is the case whether the village has a population of a few hundred or several thousand.

Such conditions are factors in the balsevika's need to reorder reported attendance. Primary schools, which seek to offer a place in the enrollment for every child of school age, vary enormously in their total enrollment from one village to another. There seems to be no overriding reason why balwadies, both for inside and outside beneficiaries, could not similarly vary their enrollment in proportion to the population of the village in which they are located.

A further sophistication to this approach would be to add a weighting factor in accordance with food behavior and other data on the extent and degree of malnutrition in a given area or district. This weighting pattern is already done to some extent in the regular mid-day meals programs in Tamil Nadu. The normal pattern is for one-third of the total enrollment of each school to be the beneficiaries of the supplemental feeding program. But in areas which are very economically depressed, the percentage is sometimes raised to 40% or even 50%. Similar provision could be made for higher enrollment in proportion to total population in the balwady program.

- (5) Although the instructions to balsevikas state that all the food is to be eaten on site, in practice most of the non-balwady children and the pregnant and nursing mothers carry the food away to their homes. It is not uncommon to have proxies collect food for some of the beneficiaries. A frequent explanation given is that mothers are away at work in the fields.

Table 6 illustrates the total number of beneficiaries receiving food at each balwady as compared to those who are fed on site. It will be observed that out of 2365 beneficiaries, only 768, or 33% ate at the centers. As noted above with respect to the Special Nutrition Program, control over and even knowledge of who finally consumed the food is lost when it is carried away.

Yet, this may not be a critical problem if we are correct in our belief that sharing^(a) tends to take place among the children as a group, without adult participation. Providing food by one means or another to all of the 0 - 6 age group children in a family might accordingly solve the problem to a great extent.

(a) See Vol. II, Section D, Part I, A Study of Take Home Dry Food as a Distribution System.

TABLE 6

OUTSIDE BENEFICIARIES
CONSUMPTION AT FEEDING CENTERS

<u>Balawady</u>	<u>Total Number Served</u>	<u>Total Number Consumer Rations At Feeding Centers</u>
1. Bommikuppam	103	38
2. Agaram	88	26
3. Reddiyur	92	44
4. Kalnarasampatti	87	30
5. Sowdekuppam	102	38
6. Chinnakallupatti	30	30
7. Jolarpettai	66	22
8. Chinnaponneri	91	35
9. Sheladampatti	88	30
10. Andiappanur	66	25
11. Pachal	59	27
12. Kadariampatti	90	25
13. Yelagiri Hills	14	14
14. Nesal	92	20
15. Kalariputtu	97	20
16. Paniyoor	100	20
17. Athanoor	120	120
18. Katteri	115	--
19. Ladapadi	87	16
20. Melayanpoondi	116	--
21. KK Thoppa	133	--
22. 12 Puthur	142	--
23. Vadugachettu	125	125
24. Velari	135	23
25. Kani Kalupay	<u>127</u>	<u>40</u>
TOTAL	2365	768 - 32.5%

Source: Tamil Nadu Study

- (6) Collection of local contributions, at 3 paise per beneficiary per day, is extremely difficult and irregular.

As explained earlier (Chapter III), for every 3 paise contribution by beneficiaries, the government contributes an equal share. This money goes towards the purchase of vegetables, condiments, fuel, and other miscellaneous recurring expenses. It is very difficult for these funds to be regularly collected. But since this is supposed to be a matching grant from government, there is a strong tendency among balsevikas to fictitiously record the target amount as received in the books and thus be able to claim the government contribution. The consequent reality is that the balsevika has to manage her feeding program with less financial resources.

Local Contribution - Table 7 shows that, out of 28 regular balwadies, 20 had no local contribution. Even in the eight balawadies where some collections were made, the total value was only Rs. 180 for the month for 780 beneficiaries, yielding 1 paise per beneficiary per day, compared to the target of 3 paise.

While the idea of local contributions ought to be encouraged from the point of view of social involvement, the nutrition planner/administrator cannot and should not rely on it as a source of finance. This should not deter more nutritional studies to determine reasons for or against local contributions.

- (7) The present system does not ensure that the neediest children are benefited by the balwady system. This is the conclusion from other detailed studies of balawady enrollment as well as the two block investigations.

TABLE 7

LOCAL CONTRIBUTION

Number of balwadies visited	28
Number of balwadies with no local contribution	20
Number of balwadies with some local contribution	8

Details of Public Contribution
(Item 3 Above)

Balwady	Total Beneficiaries	Total Contribution (Cash and Kind)
1. Bommikuppam	120	Rs. 2
2. Kalnarasampatti	120	20
3. Chinnakallupatti	40	20
4. Jolarpettai	120	33
5. Chinnaponneri	120	20
6. Sheladampatti	120	50
7. Andiappanur	120	15
8. Yelagiri Hills	20	20
TOTAL	780	Rs. 180

Average: 23 paise/beneficiary/month

or

1 paise/beneficiary/day

Source: Tamil Nadu Study

If government were to take the decision to ensure direct control by department of Social Welfare over the location of sites in the village, plus establishing realistic target enrollment figures in line with actual village population figures, then it should also be possible to establish some criteria for the selection of beneficiaries. Under the present system, particularly for the regularly enrolled children, entry to the balwady roster is primarily a function of the location of the balwady building in the village, combined with the energy and attitudes with which the balsevika attacks the problem of putting together an enrollment register of 40 age-eligible children. Government's criteria for selection at the present time are quite non-specific, and since in most villages there is more than a sufficiency of age-eligible children, the balsevika has no difficulty in filling her roster. But there is little or no assurance that the roster is going to contain the most disadvantaged children.

Conclusions - The observations described in this chapter are by no means unique to Arni and Tirupathur blocks. We found similar situations in other parts of the state. Those observations do not indicate program failure, but rather call attention to areas where improvement is necessary and attainable. It is probably impossible to design a food distribution system, or any system involving humans, which is 100% effective. Yet it is critical that programs be established with realistic objectives and goals bearing in mind the exigencies of local behavior.

One special operational problem area is the difficulty in reaching the so-called outside beneficiaries under this program - pre-balwady age infants, and mothers. But the importance of reaching these groups should identify the problems not as discouragements but challenges to the ingenuity of planners of nutrition programs. The very young child has ostensibly been a high priority target for supplemental feeding since at least 1965 or 1966 in India. But large-scale successful programs are still disturbingly conspicuous by their absence.

As we have noted, feeding programs which are designed to reach the recipient on a daily basis, and which require the child's physical presence at a distribution point are not going according to plan. Moreover, there are grave doubts as to whether any possible changes in the structure of these schemes can produce the hypothetically desirable result of having the child eat at the center while under observation and supervision.

Thus, a take home distribution may be one of a very limited number of alternatives. A traditional administrator of feeding programs tends to recoil instinctively from this type of scheme, since by definition it implies the loss of the opportunity of observing the beneficiary consume the food. He is concerned about the break in the accountability chain of the delivery system. But, as we have noted, more evidence is needed about actual consumption as opposed to data drawn from distribution statistics.

This being the case, there seems no reason why an attempt cannot be made to design an operational take home program in such a way that the target beneficiary will be significantly benefited. Experience gained in Coimbatore District should be very useful. For example if:

- (1) the planner/administrator is concerned with black-marketing of donated items, he can pick a food which, while adequate nutritionally, has no special resale value. It is a commonplace that skimmed milk powder is a very difficult item on which to maintain accountability in India. Milk and milk products are in such high demand and short supply that the economic advantage in selling milk powder to buy grain would probably control in a take home program. A poor family might be able to buy 10 or more kilos of coarse grain for the open market price of a kilo of milk powder. But in the

Coimbatore take home test we found no evidence at all that any selling of the distributed food was taking place. This was because the combination of CSM and brown sugar, while nutritionally excellent, has no extra market value, since it was identified with cholam by the local communities. Cholam during the test period was selling at well under Rs. 1.00 per kilo.

- (2) If, as appears likely, the mother has a general concern about her children up to the age of 5 or 6, and thus the prospect of sharing a single ration becomes a significant factor, solutions are still possible. The planner could, for example, provide food for all of the pre-school age children, even though the prime target was the infant below 2-1/2 years.
- (3) If the problem is one of substitution of the donated take home food for all or part of the child's regular diet, then this too should be the occasion for some serious new thinking. For example, we have evidence from the extruded food acceptability test that when a supplement is given in a form which the recipients and families think is a snack - for example, preparations similar to SEV - there may be less dilution of the child's regular diet.

It is not the intention here to go into great detail on the administration of feeding programs. Rather, it is hoped that some new thinking on the subject may be generated, particularly for the very knotty problem of reaching the child below 2-1/2 years.

CHAPTER V
A PROPOSED INTEGRATED FEEDING SCHEME

Introduction

In previous chapters, we have considered some of the indications of the extent of malnutrition in Tamil Nadu, reviewed the on-going supplemental feeding programs for pre-school children and mothers, and called attention to some of the operational problems. The purpose of this chapter is to describe a proposed feeding scheme which appears feasible and could provide either a good alternative or a supplement to existing programs.

The proposed feeding scheme is examined with respect to the total target population, and the associated costs for complete coverage.

Program Framework

The approach to reaching the vulnerable part of the at-risk population in Tamil Nadu with supplemental nutrition through various feeding schemes can be organized around the three categories:

- (a) Infants up to 3 years
- (b) Pregnant women and nursing mothers
- (c) Pre-school children between 3 and 5-1/2 years.

Given the needed resources of food, money, and personnel, it is the opinion of the study team that large-scale increases in the coverage of children in the 3 - 5-1/2 year group can be accomplished fairly quickly by expanding the primary school mid-day meal program to include pre-school children. The suggested scheme is not a complicated one. Pre-schoolers could be invited to come to school at a given time and partake of the same menu as the school children. The mechanics of food preparation are not made more complex since all that is required is an increase in the quantity of food to be cooked.

The Tamil Nadu Government could also consider providing 2 or 3 hours of educational programs in addition to feeding. However, this is not an essential for the proposed feeding program. There are already 30,000 plus primary schools in the state, and nearly all have a mid-day meal program. The suggested scheme can provide virtually "instant" coverage of one important target group.

The Department of Public Instruction, Government of Mysore, has been including pre-school children in the state's regular primary school feeding program for the last six years. It was started by them as an emergency famine relief measure during the drought period from 1965 to 1967, and the program was considered sufficiently successful to justify being continued on a permanent basis.

Because of the relative success in Mysore, it is proposed to feed an average of 45 pre-school children at each primary school in Tamil Nadu. This would equal the estimated 1.3 million children of the target population in the age group of 3 - 5-1/2 years.

Infants up to 3 years of age, pregnant women, and nursing mothers present a special problem from an operational point of view. From our observations (see Chapter IV), the present balwady program is not successful, and probably cannot be made successful, in ensuring that these categories of beneficiaries consume the supplementary food at the center. Since reaching these most vulnerable members of the target population is critical, it is suggested that this reality be recognized and accepted, and that a planned take home be designed for them.

It is proposed to distribute take home food on a fortnightly basis at the 30,000 schools. If, on the average, 31 pregnant and nursing women, and 33 pre-balwady children (6 months to 2-1/2 years) are assigned to each school, the program could include all of the 940,000 and 990,000 target beneficiaries in these two categories.

The number of pre-schoolers, pregnant and nursing women, and infants to be fed at each individual school will have to be allocated in accordance with the enrollment of school, the coverage of the mid-day meal scheme, and the incidence of under-nourishment in the particular area.

To illustrate the suggested coverage of the proposed scheme:

<u>Type of Beneficiary</u>	<u>Total Coverage</u>	<u>Average Number/ School</u>	<u>Type of Food Provided</u>
Pregnant/nursing women	0.94 million	31	Take home
School children - 6 - 12 years	1.60 million	55	Consumption at school
Pre-school children 3 - 5-1/2 years	1.36 million	45	Consumption at school
Infants - 6 months - 2-1/2 years	0.99 million	33	Take home
TOTAL	4.89 million		

Operational Details

Based on the gross findings described in Chapter 1, it is apparent that the delivery of feeding program rations is less than adequate. Most feeding programs serve meals containing less than 400 calories per portion. Since half of the target population receives less than 50% of

their minimum daily requirements from their normal diets, the 400 calories served are not enough to bring the beneficiary up to minimum level, even if all of the 400 calories were supplemental rather than substitutional.

The proposed feeding scheme calls for an increase in calories served to at least 500 calories/beneficiary, and that feeding at schools be conducted for 250 days/year instead of the present 200 days. Although there are only some 200+ school days per year, it is felt that feedings can be continued during intermittent school holidays. The target population is to be assigned to two separate distribution systems:

- (a) school children (6 - 12 years) and pre-schoolers (3 - 5½ years) will be fed at site as an extension of the existing school lunch program.
- (b) pregnant and nursing women, and infants (up to 3 years) will collect their food on a fortnightly basis under a take-home distribution arrangement. Table VIII gives the distribution of beneficiaries between take-home and on site, by category.

The take-home concept has been tested by means of a pilot project. Preliminary results, however, suggest the following conclusions:

- (a) The participation rate in the experimental villages was of the order of 60 to 65% of the initially enrolled beneficiaries.
- (b) About 50% of the participants came on a continuous basis for all the 12 months of the project's life.
- (c) In most families, the food distributed was shared by other household members, especially among other children. This is consistent with our observations of other programs.
- (d) In spite of this there were statistically significant differences in weight gain in some of the age brackets in the experimental group compared to the control group.

The take-home test is discussed elsewhere in detail ^(a) but it gave sufficient indication of success to warrant inclusion in a regular program.

Program Costs

The self-reliance Committee of the Central Government is exploring the implications of planning for feeding programs on the basis of indigenously available resources. For this purpose, we examined two alternative food menus in our cost calculations. Table VIII presents a cost analysis of (1) balahar, and (2) a pre-cooked food. The present CSM formulation was included for comparison, since it is being distributed in the existing Mid-day Meal Program.

(1) From Table VIII (Column 2), the total daily cost of feeding a beneficiary ranges between 24 paise and 28 paise, depending on which menu is chosen. This represents an average cost since the proposed scheme consists of two distinct distribution systems (take-home and on-site), and therefore different cost elements. For example, out of 4.8 million total beneficiaries, all but the infants will be fed 135 grams of food while infants will receive only 110 grams.

(2) The non-food recurring costs (Column 3) consist of transport, storage, general administration, packing and feeding program personnel overheads. A detailed breakdown of these elements is provided in the appendix.

The non-food recurring costs are quite similar in both the CSM and the balahar menus. A difference appears, however, when we consider pre-cooked food as the proposed meal. Fuel and condiment costs are not applicable in the case of pre-cooked food since at-site cooking is not required. These costs constitute about 10% of the per child food costs in the previous two meal formulations.

(a) Vol. II, Section C - A Study of Take Home Dry Food as a Distribution System.

- (a) Packaging costs for the pre-cooked food were estimated on the basis of two paise per 135 grams. This was derived on the basis of experience from the experiment with pre-cooked food. Packaging costs were only for the take-home part of the program; on-site consumption food can be delivered in bulk.
- (b) Since the school headmaster will be involved in supervising the balsevika and is also responsible for the orderly distribution of food to all the target beneficiaries, we provided for a monetary incentive of Rs 20 per month. The "school balsevika" will supervise and control the pre-school children so that there is no added burden on the headmaster. Her salary would be increased, however, from the existing level of Rs 40 per month to Rs 60.^(a)
- (c) The "school ayah" who will be primarily responsible for serving the food to the pre-schoolers, and assisting the balsevika, will receive Rs 30 per month.
- (d) We have added an additional staff member to the pre-school feeding scheme - a Food Delivery Administrator (FDA). His or her function will be to distribute the take-home food on a fortnightly basis to pregnant and nursing mothers and infants. The FDA could be either a teacher from the school, the balsevika, or a village worker. The principal qualification for this job is the ability to maintain accurate records.

(3) The present Mid-day meal scheme calls for a local contribution of four paise per child per day. The information in Table VIII shows that, under the existing Mid-day Meal scheme, a budgeted amount of Rs 13 million (Column 4) for 1.6 million children was assumed. We suspect, however, that a much smaller proportion was in fact realized. As suggested earlier, the constraint of uncertain local contributions should be removed from future feeding programs. Local contributions have

(a) On the assumption that there would be some balwady type classes for the pre-schoolers. If they came only for food the salary could be less.

TABLE 8

**PROPOSED INTEGRATED FEEDING PROGRAM COSTS
UNDER ALTERNATE MENUS**

<u>Food Serving/Beneficiary</u>	<u>Daily Cost</u> (paise)	<u>Yearly Costs</u> (in millions of Rs.)			
	<u>Per</u> <u>Beneficiary</u> <u>Per Meal</u>	<u>Non-Food</u>	<u>Local</u> <u>Contribution</u>	<u>Food^(a)</u>	<u>Total</u> <u>Program</u>
Existing School Lunch Program (1.6 million beneficiaries, 200 feeding days)					
CSM, bulgar wheat, rice and salad oil: 138 grams, 534 calories	27.4	5.7	13.0	69.0	87.7
Integrated Program (4.89 million beneficiaries, 250 feeding days)					
1. Same menu as above 130 grams, 534 calories 110 grams, 424 calories	27.8	83.2	---	257.5	340.7
2. Balahar 135 grams, 483 calories 110 grams, 394 calories	27.9	83.2	---	258.8	341.98
3. Pre-cooked food 135 grams, 489 calories 110 grams, 400 calories	24.3	87.9	---	202.4	280.3

(a) Excluding local contribution, which is a recurring feeding center cost.

Source: Tamil Nadu Study

been excluded from the proposed integrated feeding scheme. Only a government contribution of Rs 5.13 per child per year towards fuel and recurring cost was allocated.

(4) The various food costs (Column 5) were estimated on the basis of information obtained from the state government and CARE - Tamil Nadu. The appendix gives details of the calculations performed for Table VIII.

- (a) The food costs were calculated on the basis of 1971-72 market prices. In the case of pre-cooked food it should be noted that in order to obtain 135 grams of product, 156 grams have to be processed, allowing for 12% cooking wastage.
- (b) Processing costs were included as part of the food costs in the case of pre-cooked food, because this is a necessary stop before raw ingredients can be consumed by the beneficiary. The processing cost of Rs 233 per ton was estimated on the basis of experience abroad, plus very limited operations in India (see Table 9).

The non-food recurring costs and the food costs comprise the program financial requirements. The total program costs were estimated to range between Rs 287.6 million and Rs 341.98 million, to serve 4.89 million beneficiaries.

From Table 9 it is apparent that the least expensive program is the one using pre-cooked food. The most expensive is balahar: Rs 341.98 million as the total program costs. From such a review, the planner is tempted to choose the least expensive method of feeding.

However, pre-cooked food from extruder-cookers has had limited trial in India. Large scale technology and know-how in this field is not yet

TABLE 9
ESTIMATED COST OF PRODUCING AN EXTRUDED FOOD

(15,000 ton plant capacity operating at 90% efficiency for 300 days/
year, 5,000 tons per shift/year)

FIXED CAPITAL					
Total building inc. storage	Rs. 1,803,000				
Equipment	1,245,000				
Total	Rs. 3,048,000				
Cost of fixed capital @ 10% interest	Rs. 305,000				
Taxes @ 3% fixed capital	92,000				
Depreciation: 10% of equipment	125,000				
5% of building	90,000				
TOTAL FIXED EXPENSES	Rs. 612,000	<u>1 Shift</u>	<u>2 Shifts</u>	<u>3 Shifts</u>	
		Rs. 612,000	Rs. 612,000	Rs. 612,000	
VARIABLE EXPENSES					
Labor at monthly rate @ 10%			134,000	174,000	223,000
Power @ Rs. 25/ton, 5,000 tons/shift			125,000	250,000	375,000
Interest on working capital			234,000	466,000	697,000
	<u>1 Shift</u>	<u>2 Shifts</u>	<u>3 Shifts</u>		
3 months' labor	Rs. 34,000	Rs. 44,000	Rs. 56,000		
3 months' power	31,000	62,000	93,000		
3 months' materials					
at 1,500/ton	2,062,000	4,126,000	6,189,000		
Contingency at 20% above	213,000	423,000	634,000		
	Rs. 2,340,000	Rs. 4,655,000	Rs. 6,972,000		
Maintenance at Rs. 28.5/ton produced					
			412,500	825,000	1,237,000
TOTAL ANNUAL OPERATING COSTS			Rs. 1,517,000	Rs. 2,327,000	Rs. 3,144,000
OPERATING COSTS PER TON			303	233	210

U. S. manufacturers claim maintenance costs equivalent to a range of Rs. 38.5-97.0 per metric ton. This gives higher maintenance charges than those calculated on the basis of 20% of operating equipment for a large plant, but less for a small plant.

Source: Tamil Nadu Study

available. Some research in food formulation remains to be done before extrusion-cooking can be suggested as an alternative to CSM, or balahar, or local products. The concept appears valid however and must be followed up.

Test of Pre-cooked Food

The Tamil Nadu study field team conducted a pilot project for testing the acceptability of a pre-cooked food made from corn and soya with a vitamin/mineral additive. Twenty-two balwadies in North Arcot District were chosen for this experiment. Generally, our findings show that the pre-cooked food was reasonably well accepted and consumed by the beneficiaries.^(a) It should be noted, however, that the proposed food formulation is not restrictive. Any change in the food composition or proportional mix ingredients could alter the cost with a specific nutritional profile for a given ration and target, an almost limitless combination of food products can be formulated to yield the required nutrient specifications. Such research should be encouraged by government.

While pre-cooked food is frequently thought of as a product of imported extrusion-cooking equipment, there are indigenous preparations as well which are being used successfully in feeding programs. An example is Sukhada, a preparation of CSM, jaggery, and oil, which is being used in a maternal child program in Maharashtra State. Despite the present limitations, we found the pre-cooked food attractive enough to justify its inclusion in this analysis as a possible alternative in the future.

Disadvantages and Advantages of the Proposed Scheme

Having described the suggested integrated feeding scheme, the planner/administrator must weigh its various elements before taking a decision.

(a) See Vol. II, Section E, Part I - A Test of Extruded Foods in Balwady Feeding Program.

(1) Disadvantages

- (a)** The take-home aspect of our distribution scheme is less than ideal. There are countries which have been able to establish networks of day care centers where several meals during the day provide pre-schoolers with substantially all their food requirements. But under Indian conditions we favor take-home over other alternatives examined within the existing social and institutional realities.
- (b)** As mentioned earlier, there is little experience in existing feeding programs with pre-cooked food. But food acceptability is a minimal impediment here. If we assumed that the pre-cooked food technology is well developed and that the particular food is acceptable, there is a possible risk of menu monotony when compared to existing feeding practices. The Mid-day Meal Program, for example, varies its menu by using CSM, rice, bulgar wheat, and oil in various combinations. However, variations of formula around a central pre-cooked cereal have been discussed. Therefore, creating a variety of ready-to-eat formulations is not impossible, and this is one of the advantages of extrusion-cooking.
- (c)** It may be argued that integrating pre-school children, mothers and infants into the school system will over-burden the headmaster and the educational purposes of the school. However, it is felt that such an imposition can be kept within manageable limits since the take-home aspect of the proposed scheme will be conducted on non-school days, and feeding the pre-schoolers will be done at the same time when school children take their lunch. The additional pay for headmaster and food delivery administrator (who could well be a teacher) should also help to lighten the burden. Finally, as noted above, we have the **example** of a successful similar program in Mysore.

(2) Advantages

Having pre-schoolers and the other target beneficiaries eat or receive the food at the school appears to have more advantages than disadvantages:

- (a) The school balsevika will experience continuous daily supervision by the headmaster. The block officials, with the many demands on their time, can make only infrequent visits to balwadies.
- (b) The only institution which is available within easy reach of any village population in Tamil Nadu is the village school. Both the school itself and the concept of school feeding, through the Mid-day Meals Program, are familiar and accepted institutions.
- (c) Most of the schools in the state are carried on in pukka buildings, with sufficient storage space. This is not true of the present balwady system.
- (d) Although there appears to be little difference in the cost per beneficiary per day (see Table 9), there are some likely savings which were not included in our cost estimates. Transporting the food materials to one distribution point for all beneficiaries should result in economies of scale for the state government. It was not possible to estimate the exact cost savings, but we are convinced that some will accrue.
- (e) If and when the technology and know-how of extruded food is developed or an alternative pre-cooking process utilized, such food will have distinct advantages over CSM or balahar cooked at site. It comes regularly from a clean and efficient central processing unit, and is delivered in a ready-to-eat, or almost ready-to-eat, form. It relieves the headmaster, and the balsevika, as well as other school officials, from most of the problems of supervising the daily preparation of raw food. It

is also expected that most pre-cooked food formulations are likely to have a longer shelf life than balahar or CSM, thus facilitating a timely and effective distribution schedule, and reducing infestation and spoilage.

- (f) For the sake of simplicity of presentation we have assumed only 250 feeding days a year. But in fact take-home distribution could easily be made for 365 days a year. Even during school vacation periods an FDA who was a local resident could keep the distribution going.

We feel that the advantages of the proposed scheme outweigh the disadvantages. The use of schools for reaching the $2\frac{1}{2}$ - $5\frac{1}{2}$ age group has proved itself in Mysore. There is general agreement that a take-home system is the easiest and most economical to administer, and that grave difficulties exist for any scheme which hopes to get infants and mothers to eat at a feeding center on a daily basis. Because all of the children in the 0 - 6 age bracket in a given family are to be fed, the problem of sharing, and thus dilution of the planned ration, should largely be eliminated. Finally, as noted above, the critical factor is that this is a scheme which could be in operation very quickly.

CHAPTER VI

THE EVALUATION OF FEEDING PROGRAM*

Introduction

Supplemental feeding programs in Tamil Nadu, and in India insofar as the study team is aware, have not been evaluated in the past in terms of attempting to determine results or impact. Monitoring of programs has been primarily in terms of the delivery system - that is, in developing and refining procedures for accounting for the delivery of food, and the appropriate expenditure of funds. The main concern of administrators has thus generally been accountability for inputs.

It is very likely that many of the feeding programs in the country have fallen short of the implicit goals that their designers had hoped for. But the lack of specificity of the goals, and the consequent absence of rigorous evaluation, except in forms of the physical targets achieved by the delivery system, has made it difficult to identify program deficiencies and failures.

This chapter explores some general aspects of the evaluation of large-scale feeding programs. An evaluation outline is presented which points the way toward a more rigorous and systematic analysis of the components of a program, including the specification of goals and the quantitative measurement of significant aspects of project performance.

Planning

Planning for evaluation should begin when the program itself is planned. But even in the case of long established programs it should be possible to define or refine goals. In some cases this might consist simply of quantifying what is presently implicit, or stated in very general terms.

*Editorial Note: The terminology and sequences employed in this chapter are not particularly appropriate. See instead, Vol. II, Section D, Part I - Program Evaluation of An Organizational Alternative for Child Nutrition Programming.

Planning

Planning for evaluation should begin when the program itself is planned. But even in the case of long established programs it should be possible to define or refine goals. In some cases this might consist simply of quantifying what is presently implicit, or stated in very general terms.

The planners should also establish intermediate targets for achievement which are related to the overall quantitative goals. These intermediate milestones are prerequisites for the accomplishment of the ultimate goals, and, as a result, can serve as important indicators of progress.

Chart A describes an illustrative statement of a plausible goal for feeding programs. This is not intended as a modus operandi, and actual numbers have been omitted, but the chart tries to emphasize the importance of quantifying the changes being sought. It is necessary to distinguish intermediate targets from the Goal category which includes only the long-run ultimate ends of the program. Intermediate targets are classified as Outputs and Purpose as a function of Inputs of resources.

The relationship of "Input", "Output", "Purpose", and "Goal" constitute a program hypothesis or theory about the chain of consequences expected to flow from the program. Outputs occur earlier in the chain than purposes, and their measurement is easier, since they are based primarily upon observation. In regard to feeding programs it might be useful to consider the following brief definitions of each step in the chain:

- INPUT - Planning, resources used in the program plus management**
- OUTPUT - Delivery of the programmed food to the target beneficiaries**
- PURPOSE - Increase in nutritional intake of the target beneficiaries**
- GOAL - Improvement of nutritional status and general health of the beneficiaries.**

As part of the planning process an evaluation scheme should be developed which allows program managers to assess the progress toward achievement of Outputs, Purposes, and Goals. The evaluation system should include direct measures of change where possible or a set of indicators considered to be acceptable indirect measures of the condition being affected. For example, while the delivery of food can be measured directly, improvement in "health" can be assessed only by reviewing a limited number of variables assumed to reflect the desired changes - mortality, morbidity, health expenditures and physical assessment of a sample of the beneficiaries.

For each indicator, the source of the data to be gathered must be specified, so that the program managers can develop internal reporting forms, and records which can be reviewed and analyzed periodically. Program planning includes identification of the evaluation indicators or criteria, the data sources or reports which will be used, and the collection and reporting procedures required to produce the data. Financial limitations and staff capability must be considered. A less elaborate plan that will be followed is better than a sophisticated one which will be ignored.

The Chain of Causation

The first step in evaluation is to describe the chain of causality or the hypothesis on which the program is based. Proper program design involves completion of this step before implementation. Where this has not been done at the start evaluators can still construct the framework at the time of evaluation. Chart A illustrates the conceptual approach. For purposes of evaluation, however, the chain must be supplemented by more complete assumptions and additional outputs that may flow from the project.

The degree of complexity to be considered in any evaluation depends on:

- (1) purpose of the evaluation
- (2) data availability
- (3) time and budget
- (4) initial appraisal of management effectiveness

The second step is to quantify where possible all stages of program design. For example, the input can readily be quantified - and usually is in present programs - in terms of the amount of food programmed in tons, rations, or quantities of nutrients. The management required can be quantified in man days of each type of service. Outputs can and are quantified, indicating the amount of food consumed by the target groups.

At the present time aggregate figures are routinely collected for the

CHART A

AN ILLUSTRATIVE GOAL STATEMENT FOR FEEDING PROGRAMS

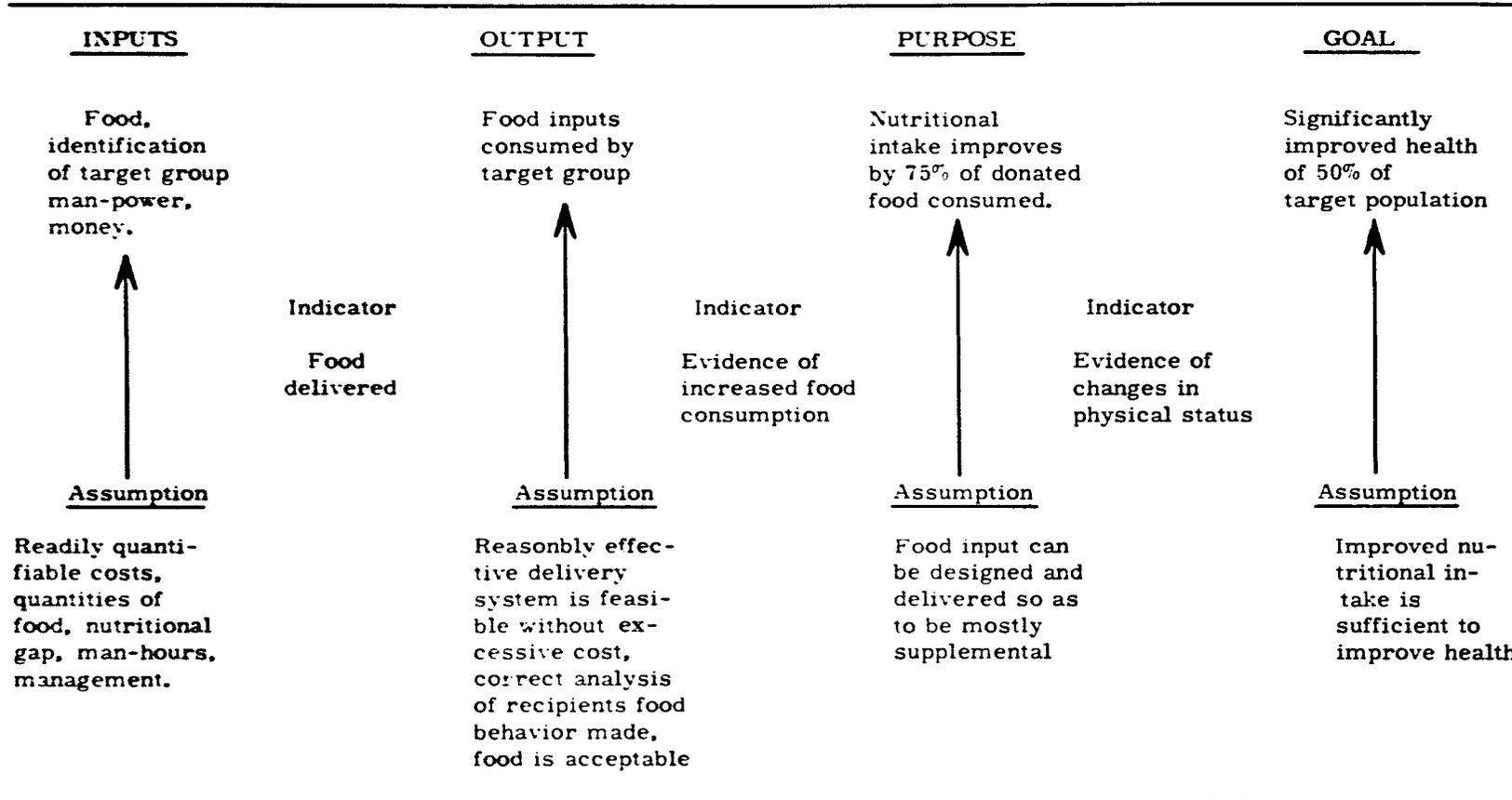


CHART B
SOME SUGGESTED DATA REQUIREMENTS FOR EVALUATION

INPUTS

Food,
identification
of target group
man-power,
money.

OUTPUT

Food inputs
consumed
by target
group.

On an aggregate basis

- 55
- a. Determination of quantity of calorie/protein/other nutrients needed by recipients.
 - b. Budget: Food. administration.
 - c. Assumptions of acceptability of the food, type of preparation, and the condition of its distribution in terms of supplement vs. substitution effect.
 - d. Logistics required: storage, transport, management.
 - e. Supervision required and likely effectiveness.
 - f. Plan criteria for beneficiaries so as to include maximum number from target groups--income or other basis.

On an aggregate basis

- a. Records kept at each level of movement of food through logistic chain and delivery to feeding centers.
- b. Totals of aggregate consumption kept at each feeding center, collected and collated at block level, and returned to state level. Assumption that records are reasonably accurate, including attendance figures.
- c. Compile total expenditures at all levels.

On a sample basis

- d. Field visits by trained field observers to supplement written accounting.

CHART B (continued)
SOME SUGGESTED DATA REQUIREMENTS FOR EVALUATION

PURPOSE

Nutritional
intake improves
by 75% of
donated food
consumed

GOAL

Significantly
improved health
of 50% of
target
population

On an aggregate basis

- a. Determine average intake per beneficiary per year from total reported beneficiaries and total food consumed.
- b. Determine average number of feeding days/center/year on basis of feeding center consumption reports, and identify the proportion of beneficiaries associated with each rank of center.
- c. On the basis of (a) and (b), and estimates of plate-waste and other unreported losses, try to establish a ranking of classes of beneficiaries in terms of total nutrients received during the year.

On a sample basis

- d. Records at feeding centers of consumption by individual beneficiaries.
- e. Mini-food habits surveys.
- f. Household observation of consumption including weighing of all food consumed by family over a period of time.
- g. Indepth interviews with parents by trained anthropologists.

On an aggregate basis

- a. Monitor statewide records of mortality of beneficiary groups by age.
- b. Same for morbidity records, especially of nutrition-related diseases, as recorded by hospitals, health centers, clinics.

On a sample basis

- c. Same statistics as in (a) and (b) above for comparison, on the assumption that the sampling done by special observers will be more accurate than the statewide records.
- d. In a sample of treatment centers install special patient records, with emphasis on secondary diagnoses of nutritional problems.
- e. Periodic clinical assessment of beneficiaries on a scale statistically comparable to items (d), (e), and (f) under "PURPOSE."
- f. Height-weight records over time with same sample as (e) above.

distribution of food, the number of centers participating, the extent of loss and spoilage, and the cost of transportation, storage, and general administration. However, one refinement of the recording of output data which should be made is to try to obtain a better conception of the actual consumption of the programmed food by individual beneficiaries, as opposed to compiling aggregates for the entire state. For example, in the school lunch program it can be stated with some degree of confidence that, say, 80% of the target input figures were delivered in the course of a given school year. But this tells little about the number of meals likely to have been consumed on the average by individual primary school students. Since each school has a back-up list of beneficiaries who receive food on days when individuals in the primary list are absent, in the course of a year the total number of "beneficiaries" in the sense of individuals receiving some meals must considerably exceed the target figures in the programmed plan. Such data on individuals should be collected only on a sample basis, since it would be impossibly laborious and expensive to attempt to obtain such information about all the beneficiaries.

Assumptions on intervening variables can be quantified as well, such as the percentage of waste, degree of substitution of distributed food for the regular diet, and the extent to which the improved intake meets minimum recommended daily nutrient requirements. Often quantification of intervening variables is difficult but rough estimates or "educated guesses" are far better than nothing.

Quantification at the purpose and goal levels is important because these are the objectives for which the program is carried out. Unless they are stated specifically, a comparison of alternative means to the same end is impossible. Too frequently, project design does not include quantification beyond the output stage. This often limits evaluators to reporting that for a given input a certain amount of programmed food was consumed.

The evaluation process also includes a time dimension. The specific statement at the input, output, purpose, and goal levels should include an estimate of the time required for an event at one stage to cause an effect at a later stage. The planning of evaluation must give careful consideration to these estimates, because the timing of evaluation activities and establishment of data collection practices depend on them. For example, changes in nutritional intake on the one hand, and general health status on the other, are likely to be measurable only at quite different time intervals.

The Stages of Evaluation

As noted above, present evaluations of feeding programs focus on the achievements in reaching objectives at the output level - the efficiency of the delivery system in bringing about consumption of donated foods by the target group. Data sources include administrative records for food delivered to the feeding centers or schools, target group enrollment and attendance, and rations distributed to target groups. Data gathering is facilitated by regularly kept records.

This type of evaluation, while an essential starting point, is really little more than a management and physical audit. It can be done frequently, without excessive cost, but is only a preliminary indication of progress toward the purposes and goals of the program.

However, the next stage of evaluation, which assesses project purpose, in this case, "improved nutritional intake" requires greater care in design and more resources than previous stages. The individual's total food intake is the critical consideration here. Records kept of consumption of the programmed food by specific beneficiaries at feeding centers should be an important indicator. The programmed food by such records now do not reach the state level, but they could - on a sample basis. ^(a)

(a) Note that the systematic evaluation of target families status against a data base as described in the methodology developed in this study (Vol. II Part A) is precisely this.

As noted above, at present the administrator of feeding programs in India is likely to get only aggregate consumption records on the desk. He knows how much total food was consumed by eligible beneficiaries in the month of, say, November 1972. But he does not know whether any individual beneficiary consumed one meal or twenty-five.

Even more important are studies of total food intake by beneficiaries. These must be done on a sample basis. Mini food habits surveys, in-depth interviews by anthropologists or sociologists, in-household observations of consumption are some of the techniques which should enable administrators to get an idea of what the total effect in quantitative terms of the consumption of outputs is. In our example they would be trying to learn to what extent the target of 75% or more of the output being supplemental is being achieved.

Some Suggested Data Requirements for Feeding Programs

Chart B suggests in simplified form some types of record keeping and data collection which could be applied to the proposed integrated feeding scheme, or to any program whose final goal is improved health as a result of increased nutritional intake.

It will be noted that under each section of the planning and evaluation chain a number of suggestions for data collection procedures have been made. These are designated as being either on an "aggregate" basis or a "sample" basis. As the chain proceeds from the planning of inputs, which for a large scale program would necessarily be on a state-wide level, to the assessment of achievement of the goal of better health, which must necessarily be done largely on the basis of individuals, more information is gathered on the basis of samples.

It has been our observation that many nutrition program administrators in India are either unfamiliar with the concept of statistically significant sampling techniques, or are likely to lack confidence in their accuracy or applicability. There is no doubt that the science of statistics holds many traps for the unwary. But this is no reason to ignore the very powerful tool for data collection and analysis which surveys can provide.

This is all the more important since once one gets past the stage of adding up the aggregate outputs it is simply not physically possible to collect accurate information except by sample. For example height/weight records are very useful in assessing a child's general health and growth pattern. But it would be absurd to even suggest that height/weight data be kept on all of the participants in the primary school mid-day meals program. As noted above, the study team found it quite difficult enough to obtain accurate anthropomorphic measurements over a year's period on a group of only 500 children.

Following is a brief comment on each of the sub-paragraphs of Chart B.

INPUTS: FOOD, MONEY AND MANAGEMENT

On An Aggregate Basis

(a) Determination of quantity of calories/protein/other nutrients needed by recipients.

This has to be done on an aggregate basis at the point of program planning. An input into the planning process should be food habits survey and other information on actual normal consumption by the proposed recipients. Mounting an elaborate program at great cost to attempt to deliver an extra 300 calories per day may fail to make an impact if the

target beneficiaries are normally experiencing a deficit of 600 calories per day.

(b) Budget: Food and Administration

Present programs are of course budgeted. But it has been our observation that there frequently has been insufficient effort to arrive at least cost and most efficient approaches to both the selection of food and the various aspects of logistics and general administration. An example, discussed above, is the regular balwady program where the government grant of 3 paise per day must be matched by an equivalent local contribution or withheld. This requirement virtually forces the balsevika to falsify attendance and distribution records, since in the majority of cases she either collects no local contribution at all or considerably less than the prescribed amount. This is the sort of operational evidence of problems which should go into the planning of budget and administration. There is no point in going through the motions year after year of "programming" local contributions which simply do not materialize.

(c) Assumptions of acceptability of the food: type of preparation and conditions of distribution in terms of supplement or substitution effect.

Generally in India there has been little or no attempt to select foods and modes of preparation specifically designed to achieve particular program targets. The type of food going into large scale programs is frequently largely determined by the chance of what is available to an international voluntary agency.

In view of the lack of really determining food behavior and what food is to be used, the assumption of "acceptability" is really little more than presuming that if the food is not rejected outright by the recipients it

is acceptable. Another consideration in the selection of the food, the mode of preparation, and the circumstances of distribution, is the supplement versus substitution effect. If a ration has been designed, as (a) above supposes, on the basis of accurate information about nutrition deficiencies, it will still fail to achieve the purpose of improving total intake to some optimum level if the recipient loses a portion of his regular diet as a consequence of receiving the donated food.

An operational example which we have used above, and which has been experienced both in field surveys and in the extrusion test, is that a hot stomach-filling meal of grain, or a grain based preparation like CSM, will satisfy the child in lieu of a normal lunch or other food intake between early morning and late afternoon. On the other hand, the provision of a bite size ready-to-eat food at lunch time in the extrusion test, even though it was nutritionally equivalent to the usual hot lunch, was not so satisfying to the children. Similarly, mothers or older siblings did not think of the child as having had a regular meal when only the snack food was provided. As a result, the delivery system got the 400 calories into the child and the child still got most or all of his regular quantum of food at home. This is just one example, but it does serve to emphasize the need for more thinking about the problem of substitution.

(d) Logistics required: storage, transport, management

In general the logistics of moving the food to the distribution point in feeding programs in Tamil Nadu are very adequate, and the records concerned full and complete.

(e) Supervision required and likely effectiveness

In the case of government programs there is frequently a lack of

sufficient supervision simply because officers are spread too thin, and have too many responsibilities to adequately discharge all of them. An example is the Directorate of Social Welfare - formerly Women's Welfare. Aside from the director there are effectively only two touring officers at the state level. Yet each year additional programs and expansion of old programs are added to the Department's responsibilities. There seems to be little conception on the part of the government that the effective implementation of new activities may be dependent on a sufficient number of trained supervisors as much as on additional inputs of financial resources. But if the government does not feel able for financial and other reasons to increase staff for the supervision of nutrition programs, the fact should be recognized and cognizance taken in the system to try to reduce the need for or change the type of supervision.

- (f) Plan criteria for beneficiaries so as to include maximum number from target groups - on income or other basis.

As discussed elsewhere, present criteria for selecting beneficiaries when it is not possible to include all of a particular age category tend to be quite vague. As the planning of nutrition programs becomes more rigorous, and target groups are more specifically and narrowly defined, it should be possible to establish more precise criteria.

OUTPUTS: FOOD INPUTS CONSUMED BY TARGET GROUP

On An Aggregate Basis

- (a) Records kept at each level of movement of food through the logistic chain and the delivery to feeding centers.

This is generally quite well done now in Tamil Nadu, with the mid-day meal program the most efficient in this respect as in many others.

Even in the case of programs such as the industrial canteen program, which has a very low rate of delivery of food, reasonably accurate records of which is delivered are maintained.

- (b) Records kept at each feeding center, collected and collated at block level, and returned to state level.
Assumption that records are reasonably accurate, including attendance figures.

The type of record keeping described is characteristic of the school lunch program, the other programs where there is CARE involvement, and the special nutrition program. However, in the programs which rely on local purchases of indigenous food such as the integrated child welfare demonstration program, the emphasis in record keeping is on financial figures rather than food. Thus even at block level there may be no precise knowledge of what is being purchased and consumed at the center in terms of food, though financial records may be complete to the last paisa. As noted at sufficient length elsewhere more questions should be asked about the accuracy of daily attendance figures.

- (c) Compile total expenditures at all levels.

In India this aspect of record keeping is invariably extremely detailed and comprehensive. This is to say, the aggregate cost for a program are fully known and documented. Frequently however, the records are not categorized and compiled in such a way as to be of much practical assistance to planners.

For example, the supervisory cost of a regular balwady program is not a part of the visible program cost since the gazetted officers in the Directorate of Social Welfare and at the District level are accounted

for as part of the establishment cost. Thus the planner/administrator has no easy way of knowing what proportion supervision and management bears to the cost of the food itself and the logistics system of a particular program. If these figures were readily available they would probably produce a certain amount of shock in comparing the tiny allocation for management to the frequently quite significant financial and food resources which are being delivered. If what economists term "performance budgeting" could be introduced into the planning of nutrition programs it could be a very significant improvement.

On a Sample Basis

(d) Field visits by trained field observers to supplement written accounting.

There is a long tradition in India of the touring officer who checks up on government programs through on-the-spot visits. Similarly, in those programs in which voluntary agencies are involved, regular visits by experienced field officers are part of the pattern of administration. It is our feeling, however, that the feedback from this process may not have much effect in inducing operational changes.

To return to our perhaps over-used example of the attendance records at balwadies, it is difficult to believe that the intelligent observer could not be aware that there is inaccuracy on the high side in daily attendance. Similarly, everyone in the state - official and non-official - seems to know that the figures kept by headmasters for local collections are mainly imaginary. Yet the government programs, once started on their way, seem so monolithic that little or no provision is made for changes in the administrative pattern as a result of operational experience and the observations of touring officers.

(e) Estimate of plate waste.

This is a factor in the delivery system which has never received much attention. The implicit assumption is that if a food is "acceptable" in the sense of not being rejected outright, it will be 100% consumed. But our detailed observations in the course of the extrusion test indicate that this may be by no means the case. Data on this point, which would have to be on a sample basis, could help both in determining what is actually being consumed by the end-use beneficiary, and also give a better idea of real acceptability.

PURPOSE: TOTAL NUTRITION INTAKE IMPROVES

On An Aggregate Basis

(a) Determining average intake per beneficiary per year from total reported beneficiaries and total food consumed.

This particular exercise is not, to our knowledge, usually done in nutrition programs in India at present. It would provide only a very rough figure, since the average would be based on very wide variations and because of difficulty in determining just what a "beneficiary" is. (On one definition a beneficiary could be the consumer of just one meal in the course of the year). While crude, this figure could at least be a starting point toward measuring the achievement of purpose.

(b) Determine the average number of feeding days/center/year on the basis of feeding center or consumption reports, and identify the proportion of beneficiaries associated with each rank of center.

For example all of the primary health centers in the health department maternal/child program could be divided into five groups - those that fed from 200 to 250 days, from 150 to 200 days, and so on. Relating

the reported beneficiary totals to this ranking could then generate a table showing that, say, 25% of all beneficiaries were registered at PHCs in the first category; 18%, say, at centers in the second category, and so on. This would be something of a refinement on the rough average determined in paragraph (a) above.

- (c) On the basis of (a) and (b) above plus estimates of plate waste and other unreported losses, try to establish a ranking of classes of beneficiaries in terms of total nutrients received during the year.

How far this ranking could be refined would depend on the quality of the data. If a division into five groups could be established then the administrator would be able to see that the top 20% of all beneficiaries received an average of X calories during the year; the next 20% an average of Y calories, and so on.

On a Sample Basis

- (d) Records at feeding centers of consumption by individual beneficiaries.

Under the present systems of reporting only aggregate consumption figures flow up to the state level. But it should be possible on a sample basis to keep records of consumption by individuals which could be seen by the state administrator. This would provide a useful check on the calculations from aggregate figures derived in (a), (b), and (c) above.

- (e) Mlai food behavior surveys

There has been enough experience in India in food behavior surveys,

particularly small scale ones, to produce a reasonable degree of confidence in their findings. Such surveys, which should include the whole family of the beneficiaries, would be for the purpose of determining total intake, including both donated food and the regular diet. Control groups of children comparable in age and other respects who are not involved in a feeding program would provide additional inputs of data to try to determine the effect on total nutrient intake as a result of the intervention scheme. As indicated elsewhere, we consider this a critical factor, which has been almost completely ignored in the past.

- (f) Household observation of consumption including weighing of all food consumed by family over a period.

Physical observation of consumption over a three day or a seven day period is a tedious task, and calls for extremely competent and experienced observers. There is frequently a great deal of resistance for cultural and religious reasons to having a stranger in the family kitchen weighing out the food. But in spite of these difficulties this kind of survey provides an invaluable check on the recollection of consumption which is reported in normal food habits surveys. The observer can also get information on the family's daily schedule, particularly of eating, which can provide important information about the substitution effect, and how it might be countered.

- (g) In-depth interviews with parents by trained anthropologists or sociologists.

The statistical results gathered in the ways suggested above should be supplemented by anthropological investigations. This sort of interview not only gives the planner/administrator a depth of knowledge as to why things are occurring that could never be revealed in statistics, but also provides a check on the accuracy of the more

narrowly quantitative surveys. In the course of our study we have repeatedly found that the combination of statistical and anthropological inputs provides a far more complete and accurate picture of events than either taken by itself.

GOAL: PHYSICAL GROWTH AND HEALTH IMPROVES

On An Aggregate Basis

- (a) Monitor state-wide records of mortality of beneficiary groups by age.

Records maintained by the state government may be open to some questions about completeness and accuracy, but the census every ten years provides one check, and at least the trends of change in mortality should certainly be revealed.

- (b) Same for morbidity records, especially of malnutrition-related diseases as reported by hospitals, health centers, and clinics.

Such records also suffer from incompleteness and the lack of emphasis on nutrition in the training of most doctors. But, as in the case of mortality records, they should provide some indication of aggregate trends.

On a Sample Basis

- (c) Same statistics as in (a) and (b) above for comparison, on the assumption that the sampling done by special observers will be more accurate than the state-wide records.

Such sampling will probably reveal some of the deficiencies in the aggregate statistics, and, if linked up with the sample surveys under PURPOSE should be a long step towards relating the intake of individual children to their condition of health.

- (d) In a sample of treatment centers install special patient records, with emphasis on secondary diagnoses of nutritional problems.

A survey done by the study team indicated there is a definite tendency toward under reporting nutritional problems in both in-patient and out-patient records. Doctors typically tend to record a primary diagnosis only, even though many prevalent children's diseases are frequently related to nutritional deficiencies. Changing the system for the whole state toward recording secondary diagnosis of nutritional problems would no doubt take time. But with appropriate instruction and assistance a sample of treatment centers could be switched over to a different technique of recording diagnoses without any interference in the system of medical care.

- (e) Periodic clinical assessments of beneficiaries on a scale statistically comparable to items (d), (e), and (f) under PURPOSE.

There are standard questionnaires and techniques for pediatricians to assess clinical evidence of nutritional deficiencies, including both external physical examination and routine laboratory tests. Such assessments on a sample of children would be invaluable, especially when combined with the knowledge gained about intake of individuals (the same individuals should be the subjects of both types of surveys). Aside from providing data toward the determination of goal achievement, this information would help to settle the endlessly but fruitlessly argued question of which should come first - the egg of proper

nutrition or the chicken of adequate medical care.

- (f) Height/weight records, which should be done with the sample sample as (d) above.**

These records are really a part of clinical assessment, but they need emphasis since they are the clearest statistical indication of changes in growth patterns. Again, the importance cannot be over-emphasized of linking up all of the various sample surveys so that each reinforces and clarifies the other.

To repeat. These suggested data collection areas are by no means exhaustive, but illustrate some areas of evaluation which may not be getting enough attention now - especially in terms of evaluating beyond the delivery system.

An indepth investigation to explore this question was carried out in two villages. Manampathy and Mannivakam in Tirupathur block, Chingleput district, by an anthropologist during October 1972. In the former village, 17 pre-school children and mothers were interviewed who were not enrolled in a feeding balwady. In Mannivakam, 33 children were interviewed, of whom 15 were participating and 18 were not.

It was established that although the children in the balwady were given a 415 calorie lunch time meal, their total daily calorie intake exceeded that of the non-balwady children by only about 116 to 169 calories, an average of 34%. The CSM meal, thus served mainly as a substitute and only partly as a supplement to the child's total calorie intake.

Table 9 -A records specific observations of calorie consumption during breakfast, lunch and dinner for both balwady and non-balwady children. It shows that 60 - 75% of the distributed food serves as a substitute for home meals. Preliminary observations in the Coimbatore take home food test trial tend to support these findings.

Our sample size of beneficiaries was not statistically significant for the state as a whole, and the specific percentage ranges mentioned above may vary greatly from district to district. But we suspect that some degree of substitution is a widespread phenomena in feeding programs in the state, and this is a problem which has not yet been addressed by the planners of nutrition programs.

TABLE 9 -A

**COST OF DELIVERING 100 CALORIES OF FOOD
THROUGH VARIOUS FEEDING PROGRAMS
(Program Year 1 April 1971 - 31 March 1972)**

<u>Program Title</u>	<u>Total Number of Beneficiaries</u>	<u>Total Program Cost (Rs. in Millions)</u>	<u>Cost per Beneficiary per Feeding Day (paise)</u>	<u>Cost per 100 Calories of Food (paise)</u>
School Mid-Day Meal Program	1,600,000	89.56	27.98	5.28
Regular Balwady Program	120,000	9.99	27.75	7.12
Industrial Canteen Program	100,000	4.49	14.96	3.32
Special Nutrition Program *	172,100	9.71	22.57	10.03
Maternal and Child Nutrition Program	118,100	9.75	27.51	7.64
Integrated Child Welfare Demonstration Program	2,100	0.20	31.74	13.80
Composite Demonstration Program *	6,720	0.47	23.31	7.06
Christian Agency for Social Action Program *	26,000	1.77	27.23	4.62

* Actual figures rather than programmed (for 1971-72)

Note: Figures for Catholic Relief Services Program have been omitted.

Source: Tamil Nadu Study

TABLE 10

MANNIVAKAM AND MANAMPATHY VILLAGES
AVERAGE DAILY
CALORIE CONSUMPTION

	Number of <u>Children</u>	<u>Breakfast</u>	<u>Lunch</u>	<u>Dinner</u>	<u>Total Calories</u>
MANNIVAKAM					
Village					
(2 - 3 years)					
Balwady	5	242	415 *	314	971
Non-balwady	5	265	331	259	<u>855</u>
			Difference		116
Colony					
(4 - 5 years)					
Balwady	5	349	415 *	329	1093
Non-balwady	7	263	303	358	<u>924</u>
			Difference		169
MANAMPATHY					
Village					
(2 - 6 years)					
All Non-balwady	17	203	246	240	689

* If the balwady child in Mannivakam consumes his full meal of CSM and oil, then he gets 415 calories.

Source: Tamil Nadu Study

APPENDIX I

THE PROBLEM OF SUBSTITUTION VERSUS SUPPLEMENTATION

To improve the nutritional intake of beneficiaries, feeding programs must supplement existing diets, and the supplement should contain adequate nutritional content to be effective. Feeding program administrators have made a critical assumption - the delivery of the correct ration of donated food to a beneficiary results in a net increase to the recipient's diet - equivalent to the total nutrient value of the donation. The assumption, in other words, is that the programmed ration is entirely supplemental.

For example:

<u>Child</u>	<u>MDR</u>	<u>Average Daily Home Diet</u>	<u>Donated Food</u>	<u>Total Intake</u>
Age - 4	1200 cal.	800 cal.	400 cal.	1200 cal.

To our knowledge, there has been little consideration of the degree to which the donated food may actually be substituted for some of the normal daily dietary intake of the beneficiaries. Yet this is a critical aspect of evaluating the impact of any feeding program. An equally critical data lack for past planners of nutrition programs has been accurate statewide data on consumption. Thus the choice of type and quantity of food to be distributed has necessarily been based on insufficient knowledge of specific nutritional deficiencies of the target population.

The hard-core target population (see Chapter I) in Tamil Nadu receives less than 50% of the minimum 1200-1500 calories per day required for adequate nutrition. Thus the 400 calories, more or less, served as a supplement in the present feeding programs does not raise aggregate total intake to this minimum level even without taking into account the possible substitution effect. Yet there is evidence that substitution may be a significant factor in diluting the effect of even a highly successful delivery system.

APPENDIX II

STATISTICAL BACKGROUND TO TABLE 8

Below are the background calculations for Table 8 - a cost comparison of two alternate menus for the existing School Lunch Program in Tamil Nadu.

The alternatives are Balahar and a pre-cooked food. Both could be indigenously manufactured. The proposed integrated feeding scheme has been dealt with in detail in the text.

A. EXISTING SCHOOL LUNCH PROGRAM

Meal Composition

Rice alternating with bulgar wheat	100 g.	351 cal. (average)	7.5 g. protein (average)
CSM	30 g.	112 cal.	6.0 g.
Salad oil	<u>8 g.</u>	<u>71 cal.</u>	<u>0.0 g.</u>
	138 g.	534 cal.	13.5 g. proteins

Food Costs

1970-71 Prices: (per Kg)	Bulgar wheat	Rs. 1.32
	CSM	2.13
	Salad oil	3.81
	<u>Rice</u>	<u>1.19</u>

Food cost/child/day:	21.99 paise
Food cost/child/year:	Rs 43.98

Cost figures obtained from GOTN and CARE-Tamil Nadu were used in the calculation of program costs; CSM, bulgar wheat, and oil costs are CIF Madras.

Program Costs (Rs in millions)

Food Costs

Rice	19.0
Bulgar wheat	22.0
CSM	18.0
Oil	<u>10.0</u>

Total 69.0 69.0

General administration 2.6

Transport and storage 3.1

Recurring Feeding Center costs 31.0

Total Program Cost 87.7

Cost/Child/Year Rs. 54.81

Cost/Child/Day 27.41 paise
(200 feeding days)

The 19 million rupees for rice purchases was met by the Government of Tamil Nadu at the rate of six paise/child/meal, and the rice was purchased at the feeding center level. The planned local contribution was four paise/child/meal (2 paise from the Panchayat Union and 2 paise from the general public). This collection, to the extent that it was successfully made, was used for fuel, condiments, and other recurring feeding center expenditures.

Bulgar wheat, CSM and oil were supplied free of cost by CARE. Thus the Tamil Nadu Government's share of the expenditure amounts to Rs 24.7 million.

B. PROPOSED FEEDING SCHEME

1. CSM and Bulgar Wheat Menu

Food Costs:

Food cost/child/day	(110 g. serving)	17.4 paise
Food cost/child/year	(110 g. serving)	Rs 43.50
Food cost/beneficiary/day	(138 g.)	21.99 paise
Food cost/beneficiary/year	(138 g.)	Rs 54.98

(Nutritive value for 110 g. : 424 calories; 10.8 g. proteins)

Program Costs: (Rs in millions)

(a) Food Costs

3.9m x Rs 54.98 (138 g.)	214.4	
0.99m x Rs 43.50 (110 g.)	<u>43.1</u>	
	257.5	257.5

(b) Transport, storage and general administration

3.9m x Rs 4.5 (138 g.)	17.55	
0.99m x Rs 3.7 (110 g.)	<u>3.66</u>	
	21.2	21.2

(c) Fuel and condiments

2.96m x Rs 5.13	15.2	15.2
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(d) Recurring feeding center costs

Incentive headmaster @ Rs 240 per year	7.2	
Salary balsevika @ Rs 720 per year	21.6	
Salary FDA @ Rs 120 per year	3.6	
Salary ayah @ Rs 360 per year	10.8	
Salary cook @ Rs 120 per year	<u>3.6</u>	
	46.8	<u>46.8</u>
Total Program Cost		340.7
Average Cost/Beneficiary/Day	27.8p.	

2. Balahar

Ingredient composition:	<u>g.</u>	<u>Calories</u>	<u>Proteins (g.)</u>
White wheat flour	88	304	6.75
Defatted groundnut cake meal	34	131	13.91
Bengal gram flour	13	48	2.7
Vitamin-mineral mix & salt *	<u>-</u>	<u>-</u>	<u>-</u>
Per meal	135	403	23.36
Per 110 g. serving		394	19.03

* Vitamin-mineral mix and salt figures are not included in calculations due to insignificant quantities.

Food Costs:

1971-72 prices (per Kg.):	Wheat	Rs 1.34
	Groundnut	2.15
	Bengal gram	1.10

Food cost/beneficiary/day	(110 g. serving)	17.9 p. ***
Food cost/beneficiary/year	(110 g. serving)	Rs 44.75
Food cost/beneficiary/day	(135 g. serving)	22.0 p. ***
Food cost/beneficiary/year	(135 g. serving)	Rs 55.0

Program Costs: (Rs in millions)

Food Costs		
3.9m	x Rs 55	214.5
0.99m	x 44.75	<u>44.3</u>
		258.8

Transport, storage and
general administration ** 21.2

Fuel and condiments ** 15.2

Recurring feeding center costs 46.8

Total Program Cost 341.98

Cost/Beneficiary/Day 27.9 p.

** Worked out as in the case of CSM and bulgar wheat menu

*** Processing cost of 1.6 paise and 2 paise are included respectively.

3. Pre-cooked Food (Composition used in the project test)

Ingredient composition:	<u>G.</u>	<u>Calories</u>	<u>Proteins (g.)</u>
Ground whole corn	99	339	10.99
Ground defatted soya grits	19	82	6.46
Sugar	<u>17</u>	<u>68</u>	<u>-</u>
Per meal	135	489	17.45
Per 110 g. serving		398	14.2

Food costs:

1971-72 prices	Corn	Rs. 80 per quintal	
	Soya	150 per quintal	
	Sugar	2 per kilogram	
		<u>Per 135 g. serving</u>	<u>Per 100 g. serving</u>
Raw ingredient cost (including 12% waste)		13.8 paise	11.2 paise
Processing cost		<u>3.4</u>	<u>2.8</u>
Food cost/beneficiary/day		17.2 paise	14.0 paise
Food cost/beneficiary/year	Rs 43.00		Rs 35.00

Program Costs:

Packaging cost: 2 paise per 135 g. serving, equivalent to Rs 5 per beneficiary per year, and Rs 4 per beneficiary per year for 110 g serving.

Food costs (Rs in millions)

3.9m x Rs 43	167.7	
0.99m x Rs 35	<u>34.65</u>	
	202.4	202.4

Transport, storage and general administration		21.2
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Packaging		
3.9m x Rs 5	19.5	
0.99m x Rs 4	<u>3.96</u>	
	23.5	23.5

Recurring food center costs (Rs in millions)

Incentive headmaster	Rs 7.2	
Salary balsevika	21.6	
Salary FDA	3.6	
Salary ayah	<u>10.8</u>	
	43.2	<u>43.2</u>

Total Program Costs	Rs 290.3
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Cost/Beneficiary/Day	24.3 paise
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