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**Report No. 13783-IN**

**IMPACT EVALUATION REPORT**

**INDIA**

**TAMIL NADU INTEGRATED NUTRITION PROJECT  
(CREDIT 1003-IN)**

**DECEMBER 12, 1994**

**Operations Evaluation Department**

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## *ACRONYMS*

<b>ACC/SCN</b>	-	<b>Administrative Committee on Coordination/ Sub-Committee on Nutrition</b>
<b>CDC</b>	-	<b>Center for Disease Control, Atlanta</b>
<b>CNC</b>	-	<b>Community Nutrition Center</b>
<b>CNW</b>	-	<b>Community Nutrition Worker</b>
<b>DEAR</b>	-	<b>Department of Evaluation and Applied Research</b>
<b>HSC</b>	-	<b>Health Sub-Center</b>
<b>ICDS</b>	-	<b>Integrated Child Development Services</b>
<b>IDA</b>	-	<b>International Development Association</b>
<b>IEC</b>	-	<b>Information, Education, Communication</b>
<b>IMR</b>	-	<b>Infant Mortality Rate</b>
<b>MIS</b>	-	<b>Management Information System</b>
<b>NCHS</b>	-	<b>National Center for Health Statistics, USA</b>
<b>NMP</b>	-	<b>Nutritious Meals Program</b>
<b>NNMB</b>	-	<b>National Nutrition Monitoring Bureau</b>
<b>NSSO</b>	-	<b>National Sample Survey Organization, India</b>
<b>SAR</b>	-	<b>Staff Appraisal Report</b>
<b>SRS</b>	-	<b>Sample Registration Survey</b>
<b>TINP</b>	-	<b>Tamil Nadu Integrated Nutrition Project</b>

THE WORLD BANK  
Washington, D.C. 20433  
U.S.A.

Office of Director-General  
Operations Evaluation

December 12, 1994

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

**SUBJECT:** Impact Evaluation Report on INDIA  
Tamil Nadu Integrated Nutrition Project (Credit 1003-IN)

Attached is the Impact Evaluation Report on INDIA—Tamil Nadu Integrated Nutrition Project (Credit 1003-IN) prepared by the Operations Evaluation Department.

A handwritten signature in black ink, consisting of a large, stylized initial 'F' or 'J' followed by several vertical and diagonal strokes.

Attachment

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## IMPACT EVALUATION REPORT

### INDIA TAMIL NADU INTEGRATED NUTRITION PROJECT (CREDIT 1003-IN)

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The report was prepared by Ronald G. Ridker (Task Manager) and Meera Shekar (Consultant). Pilar Barquero provided administrative support.

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**IMPACT EVALUATION REPORT****INDIA  
TAMIL NADU INTEGRATED NUTRITION PROJECT  
(CREDIT 1003-IN)****PREFACE**

This is a report on an impact study of the first Tamil Nadu Integrated Nutrition Project (TINP-I), for which Credit 1003-IN in the amount of US\$32.0 million was approved on April 15, 1980. The Credit was closed on March 31, 1989, two years behind schedule. It was almost fully disbursed, the last disbursement made on October 17, 1989.

The Project Completion Report was submitted to the Board on January 9, 1991. Because of its high quality and completeness, OED did not audit this project. It was selected for an impact evaluation report because of its innovative character, the availability of data and its relevance for future operations.

The report is based on statistical analysis of service records, two field trips, a review of the documents and literature on this project, and interviews with beneficiaries and relevant Bank and Government officials. The cooperation and assistance of the TINP Project Coordination Office and of the India Division of the Bank is gratefully acknowledged.

A draft of the Impact Evaluation Report was sent to the Borrower for comments on July 19, 1994. One set of comments was received and has been taken into account as appropriate, in the text.





## IMPACT EVALUATION REPORT

INDIA  
TAMIL NADU INTEGRATED NUTRITION PROJECT  
(CREDIT 1003-IN)

## BASIC DATA SHEET

## KEY PROJECT DATA

Item	Appraisal Expectation	Actual	Actual as % of Appraisal Estimate
Total Project Costs (US\$ million)	66.40	81.00	122
Credit Amount (US\$ million)	32.0		
Disbursed		31.97	
Cancelled		0.03	
Institutional Performance		Substantial	

## CUMULATIVE ESTIMATED AND ACTUAL DISBURSEMENTS

	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90
Appraisal Estimate (US\$ million)	2.90	6.80	12.45	20.95	32.00	32.00	32.00	32.00	32.00	32.00
Actual (US\$ million)	1.13	4.63	7.91	10.99	16.74	22.66	26.14	28.41	30.16	31.98
Actual as % of Appraisal	38.97	68.09	63.53	52.46	52.31	70.81	81.69	88.78	94.25	99.94
Date of Final Disbursement:	October 17, 1989									

## PROJECT DATES

	Planned	Revised	Actual
Identification			May 1978
Preparation Mission	September 1978		October 1978
Appraisal Mission	March 1979		July 30, 1979
Credit Negotiations	August 1979		February 27, 1980
Board Approval	September 1979		April 15, 1980
Credit Signing			May 12, 1980
Credit Effectiveness			August 5, 1980
Credit Closing	March 31, 1987	March 31, 1989	March 31, 1989
Project Completion	June 30, 1986	March 31, 1989	March 31, 1989

## STAFF INPUT (STAFFWEEKS)

Fiscal Year:	73	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	92	Total
Preappraisal	.0	1.1	.5	.1	49.7	69.2	3.4												124.0
Appraisal							94.0												94.0
Negotiations							8.3												8.3
Supervision							37.6	28.7	41.9	26.4	31.6	22.5	54.0	31.4	5.9	1.6	5.7	.2	287.4
Other					5.3	1.3	5.7												12.2
Total	.0	1.1	.5	.1	55.0	70.5	149.0	28.7	41.9	26.4	31.6	22.5	54.0	31.4	5.9	1.6	5.7	.2	525.5

## MISSION DATA

Month/Year	No. of Person	Days in Field	Specialization Represented <sup>a</sup>	Performance Rating Status <sup>b</sup>	Types of Problems <sup>c</sup>
<i>Through Appraisal:</i>					
May 1978	9	21	NTR, AGR, ECN, ARC		
August 1978	1	19	NTR		
October 1978	6	28	NTR, AGR, ECN, HLT, COM		
March 1979	8	21	NTR, ECN, HLT		
July 1979	7	21	NTR, ECN, HLT, ARC		
<i>Appraisal through Board Approval:</i>					
January 1980	2	7	NTR		
<i>Supervision:</i>					
May 1980	4	15	NTR, MSP, ARC	1	M,P
November 1980	4	15	NTR, HLT, COM	2	M
July 1981	4	15	NTR, M&E, HLT	2	M,P
April 1982	4	14	NTR, HLT, M&E	2	M
October 1982	2	13	NTR, M&E	2	T,M
June 1983	5	16	NTR, COM, ARC, M&E	2	T,M
October 1983	4	11	NTR, COM, ARC, M&E	2	M
May 1984	5	15	NTR, M&E, ARC, HLT	1	T,M
March 1985	5	15	HLT, M&E, ARC	2	M
September 1985	4	13	HLT, ARC, NTR	2	M
June 1986	4	14	HLT, NTR, ARC, ECN	2	
December 1986	3	10	HLT, ECN, ARC	2	M
May 1987	3	14	MTR, HLT	2	M
February 1988	2	10	NTR, ECN	2	

a. NTR = Nutrition Specialist; AGR = Agriculturist; ECN = Economist; ARC = Architect; HLT = Health Specialist; COM = Communications Specialist; MSP = Management Specialist; M&E = Monitoring & Evaluation Specialist

b. 1 = Problem-free or minor problems; 2 = Moderate problems; 3 = Major problems

c. M = Management; T = Technical; P = Political

## IMPACT EVALUATION REPORT

### INDIA TAMIL NADU INTEGRATED NUTRITION PROJECT (CREDIT 1003-IN)

#### EXECUTIVE SUMMARY

1. This document reports on the results of a study of the impact of the first Tamil Nadu Integrated Nutrition Project, for which Credit 1003-IN in the amount of US\$32 million was approved by IDA in 1980. The project was completed in 1989, two years later than planned, by which time nearly all planned inputs, plus some additional elements made possible by utilizing the foreign exchange "savings" resulting from devaluation of the rupee, had been put in place. The credit was almost fully disbursed.

2. The overall goal of the project was to improve the nutritional and health status of preschool children, primarily those 6-36 months old, and pregnant and nursing women. For this purpose, a package of services was provided: nutrition education, primary health care, supplementary on-site feeding of children who were severely malnourished or whose growth was found to be faltering, education for diarrhea management, administration of vitamin A, periodic deworming, and supplementary feeding of a limited number of women. A principal characteristic of this project was the use of growth monitoring through monthly weighing of all children 6-36 months old to target delivery of these nutrition and health services to needy children and to serve as an educational device for mothers. Indeed, this project was the first large-scale use of growth monitoring for this purpose. Project funds were utilized, among other things, to establish, equip and operate some 9,000 Community Nutrition Centers (CNCs) and 2,000 new health sub-centers in 173 of Tamil Nadu's 373 rural blocks (an administrative unit covering a population of about 100,000).

3. The study focuses mainly on the nutrition and health impacts on children and relies mainly on statistical analyses of a large representative sample of service records from CNCs covering the period 1982 to 1990. Project monitoring data, a field visit, interviews, and a review of the literature were also used to reach its conclusions. The results are organized around a series of questions which serve as the outline for this summary.

#### **Was service delivery adequate to have warranted an impact?**

4. For growth monitoring and nutrition inputs, the answer to this question is yes. While enrollment of 6-36 month old children was less than desired (about 77 percent, largely because of difficulties in reaching families in outlying hamlets<sup>1</sup>), once they were enrolled monthly weighing was fairly regular and systematic (in 1986, 82 percent of the maximum, a figure that compares very favorably with other efforts to use growth monitoring). Other indicators suggest that the procedures laid down—e. g., for beginning and ending supplementary feeding, providing educational inputs, encouraging community participation, and keeping accurate records—were carefully followed. Leakage of supplemental food to non-participants (i.e., by reducing beneficiary food intake at home) was probably small.

5. For health inputs, the answer is no. Except for immunization, target levels of implementation were not achieved, record keeping was less reliable, and procedures were not as systematically followed.<sup>2</sup>

6. The data were analyzed for three points in time: 1982, 1986 and 1990. While all service delivery indicators improved between 1982 and 1986, a number of them deteriorated between 1986 and 1990. This peak and decline pattern is most likely explained by a decline in performance resulting from low morale created by uncertainties in 1989 and 1990 about whether and in what form the project would continue. Once the follow-on project, TINP-II, started, performance appeared to pick up.

**Was there a meaningful change in malnutrition levels?<sup>3</sup>**

7. The data indicate a statistically significant improvement in weight-for-age over the period 1982 to 1990. They also indicate a steady drop in malnutrition rates for all ages included. These improvements were continuous over time; they did not follow the peak and decline pattern found with service delivery indicators.

**How much of the change is attributable to TINP?**

8. The observed nutritional improvements can be attributed to TINP if the effects of other factors that might explain the improvements can be separated out. This was attempted in two stages, first comparing changes within TINP districts with changes that occurred in non-TINP areas, and second, considering the differential impact of other programs operating within TINP areas—the one of interest here being the Nutritious Meals Program (NMP).

9. Unfortunately, there are no pure control areas that could be used to compare with TINP areas.<sup>4</sup> Instead, the study relied on aggregate data on nutrition status gathered for other purposes in nearby districts, data for TINP areas for the period before TINP was implemented, baseline data available at the start of TINP in each set of blocks<sup>5</sup>, and information from other large-scale nutrition interventions. In addition, an estimate of the effect of income changes on nutrition was made for the TINP areas, using an

elasticity measure estimated from other studies. In each case the comparisons are favorable to TINP. Roughly averaging the figures together suggests that between one half to three-fourths of the decline in malnutrition in TINP areas was due to TINP and other nutrition programs operating in the TINP areas.

10. Although the NMP operated in all districts in which TINP operated, the study identifies a variety of factors which suggest that this nutrition program cannot explain much of the observed improvements in nutrition within the 6-36 month age group.

**Who benefitted?**

11. Improvements in nutrition status were found to have occurred across the board, regardless of gender, caste, age groups, and income levels. There is some indication that lower caste individuals and higher income groups benefitted more.

**Who participated?**

12. Slightly more boys participated than girls, the participation of scheduled caste children increased from 37 to 42 percent, and the average age at enrollment declined over time. The last two of these findings suggest an increasing capacity of the program to enroll the most needy.

**Which program inputs contributed the most to improvements in nutritional status?**

13. Multivariate analysis suggests, among other things, that frequency of weighing, younger age of enrollment, and immunization were statistically significant while deworming and Vitamin A inputs were not.

**Cost effectiveness.**

14. Available evidence suggests that TINP-I has lower costs per capita and per beneficiary than other nutrition projects that are not narrowly targeted. It also suggests that benefits in

terms of reduction in severe malnutrition are greater.

### Sustainability.

15. On financial and institutional grounds, the project seems sustainable (though some qualifications must be noted). But the most important dimension has to do with permanent behavioral change. Are women internalizing TINP's messages so that the program can eventually be phased out without loss of nutritional and health status? There are only a few signs available—knowledge and attitude surveys, extent of breastfeeding and percent of children requiring feeding. These are all moving in favorable directions. Of more significance would be evidence that nutritional and health status of younger siblings of children who were once in the program and of new mothers and their children are improving. Unfortunately, analysis of such evidence was not possible within the scope of this study.

### Conclusions

16. This study should allay concerns sometimes voiced about the practicality of successfully operating a large-scale nutrition and health program based on growth monitoring and narrowly focussed targeting of short-term supplemental feeding. Women can be induced to bring their children in for weighing on a regular basis. Short-term feeding based on narrowly focused

targeting with clear entry and exit rules can be made to work as planned—keeping costs down, reducing dependence on feeding, and serving, along with growth monitoring, as a powerful educational tool. All this can be accomplished with acceptably small leakages and costs. Most important, the education provided can induce permanent changes in mothers' behavior that positively affects their children's health and nutritional status.

17. The key to TINP's success has been the great care exercised in planning and execution of its process elements: the careful selection and training of CNWs, detailed work routines, heavy emphasis on intensive and supportive supervision, efforts to gain community support, emphasis on accurate monitoring and use of the data gathered in trouble-shooting and feedback, and so on. The areas where TINP-I failed—implementation of an effective health program and integration of the nutrition and health components—were precisely those where less attention was paid to process issues.

18. The study concludes with a brief review and evaluation of the changes made in the program from TINP-I to TINP-II. It finds many of the changes to be positive but a few to be questionable given the results of this study. In particular, it questions changes in supplemental feedings rules and supervision:worker ratios and notes that evaluation capacity, which was weak in the first project, has not improved.

1. Difficulties which the follow-on project, TINP-II, is making special efforts to overcome.
2. Special efforts are being made in TINP-II to correct these problems and to more thoroughly integrate the health and nutrition components—apparently, with some success.
3. Data on other health indicators, in particular morbidity and mortality, was found to be so poor that plans to analyze them were dropped.
4. Cases where none of the TINP interventions was provided but weight gain is nevertheless known may be impossible to find, since improved nutrition may result from the attention to nutrition triggered by the weighing itself. An experiment in which all TINP inputs other than nutrition supplements is provided has been proposed and should shed some light on this issue. The best that can be done is use aggregate data from non-TINP areas.
5. The initiation of TINP was staggered over time. A comparison of nutrition status at the beginning of each new group of blocks can help indicate what might have happened in the absence of TINP.



**IMPACT EVALUATION REPORT****INDIA  
TAMIL NADU INTEGRATED NUTRITION PROJECT  
(CREDIT 1003-IN)****1. INTRODUCTION****A. The Study**

1.1 This is a study of the impact of the first Tamil Nadu Integrated Nutrition Project (TINP-I), for which Credit 1003-IN in the amount of US\$32.0 million was approved by IDA on April 15, 1980. At the time of appraisal, total project costs were estimated at US\$66.4 million. The Credit became effective in August 1980 and closed March 31, 1989, two years later than planned. This extension was made to utilize the foreign exchange "savings" made possible by devaluation of the rupee for additional investments; it also allowed for continuation of operations until negotiations on the future course of the TINP program were completed. Actual project costs amounted to US\$81 million and the amount of the IDA Credit disbursed was US\$31.97.

1.2 This study attempts to answer the following questions about this project: (1) What has been the impact of this project on the nutrition and health status of the target population, independent of other factors that have influenced the outcome? To answer this question, one should look not only at output indicators, but at changes in input or process indicators, to make sure that these inputs were capable of generating the desired effect. Hence (2), was service delivery of sufficient quality to make it plausible that positive impacts could have resulted?<sup>1</sup> (3) Which program inputs created the impacts? (4) Who were the beneficiaries? (5) Who were the participants? (6) How cost effective has this project been? And (7), are there any signs that the results achieved so far are likely to be sustainable?

1.3 While much has already been written about TINP-I,<sup>2</sup> because of data and analytical limitations, none of the previous studies does justice to these questions. This study comes somewhat closer to providing adequate answers by extending previous analyses in three respects. First, it includes a review of progress since 1986, the date of the last large-scale evaluation, undertaken when the project was originally scheduled to end. Second, while all but one of the earlier studies relied on aggregate data (and the one that did not was limited to a small geographical area), this study utilizes a large, representative sample of individual beneficiaries for its analysis. This permits application of more appropriate statistical

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1. This question will be discussed first, to give the reader a picture of how the program operated before continuing with the evaluation.
  2. The Project Completion Report, dated December 28, 1990, reviews most of what was available at that time. It also provides a particularly good description of the procedural aspects of the project. Findings from other studies are reviewed in this report.

techniques and investigation of a number of questions not discussed by previous studies—for example, which project components were responsible for the observed impacts and who benefitted the most from the program. And third, it goes farther than previous analyses in attempting to separate out the influence of other determinants of nutrition and health in the area. Because of data shortcomings—the absence of equally good data from non-TINP areas, lack of reliable and extensive data on health inputs and outputs, and changes in data reporting and recording quality over time—the analysis still leaves much to be desired. But sufficient progress has been made to warrant this detailed report of findings.

1.4 Ideally, three criteria should be used to judge a program's impact: efficacy, effectiveness, and efficiency. Efficacy refers to the ability of the project to produce the desired impact among those who have participated in the project; i.e., do the project inputs produce the desired effect? This is addressed through the primary data analyzed in this report. Effectiveness is a function of efficacy and project coverage; i.e., in what proportion of the target population has the desired effect been produced? This issue is addressed to a limited extent using data from previous evaluations, as well as independent data sources. Efficiency is concerned with costs of this delivery mode compared to alternatives. This is also addressed to the extent that data permit.

1.5 The principal body of data utilized in this study comes from the service delivery records of a sample of Community Nutrition Centers—herein called the 100-CNC sample.<sup>3</sup> Information from these records on individual children was extracted for three points in time: 1982 (the start of TINP-I in several districts), 1986 (when the project was originally supposed to close) and 1990 (just before the start of TINP-II). In each of the CNCs selected, all children enrolled in the project during these three periods were included. The CNCs were randomly selected from three strata: districts in which the program started in 1982, in 1983 and in 1985. Sample sizes vary from 950 to 1,600. Appendix 2 provides more details about this data set and how the sample was drawn. These data have been supplemented with information from other evaluation studies<sup>4</sup> to round out the analysis and with project monitoring data to bring the picture up to date.

## **B. The project and its setting**

1.6 By the second half of the 1970s, when TINP began to be developed, there were a variety of public feeding programs throughout India, estimated to be reaching about 20 million people. The most important of these programs developed into the Integrated Child Development Services (ICDS) program. Started in 1975, it was still small when TINP was developed; but by the early 1990s, it covered almost half of the country.

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3. The Project Coordination Office randomly selected 100 CNCs from each of eleven district and is in the process of having all records from these CNCs computerized. The sample used in this study was derived from that data set.

4. Prior to this study, there have been two main sources of data on this project: reports from Project Coordination Office which are based on service records, and data gathered by the Directorate of Evaluation and Applied Research (DEAR) in its baseline and terminal evaluation surveys, the latter undertaken in 1986 when TINP was originally scheduled to end. Since the DEAR data are based on a representative sample of the whole population located within blocks in which TINP operated, they differ somewhat from Project Coordination Office data which include only participants.



1.7 The problem of malnutrition was particularly severe in the state of Tamil Nadu. During the second half of the 1970s, the Government of Tamil Nadu commissioned studies that indicated that average daily food intake in the state was amongst the lowest in India. Eighty-five percent of children under six were found to be less than 90 percent of recommended body weight, and malnutrition was associated with 75 percent of the deaths of 0-3 year old children. The most seriously affected groups were weaning children (6-18 months), pregnant and nursing mothers, and adolescents, especially girls (SAR).

1.8 At the time these studies were commissioned, some 25 different nutrition programs were operating in the state. Most of these programs were supported by the state government which at the time was spending nearly US\$9 million (in then-current prices) on them. Three-fourths of this amount was devoted to a school meal program. All together, however, these programs were reaching only a small fraction of the groups identified as the most vulnerable. As a consequence, the Government decided to significantly expand its programs. In 1980, TINP was launched. In 1982, the Government initiated a second major nutrition program, the Chief Minister's Nutritious Meals Program (NMP), which covered all children two to 14 years old. In 1989, when TINP closed, four major programs were in operation: TINP which covered 173 of the state's 373 rural blocks in 11 districts,<sup>5</sup> NMP which covered the whole state, ICDS which operated in 28 rural blocks and 37 major urban slums, and the Public Distribution System, which provided subsidized staples to poorer families through a network of "fair price shops" operating mostly in urban areas. Shortly thereafter, the Government approached IDA for funding to expand TINP to the remainder of the state (except for three districts which have only ICDS). The resulting follow-on project, TINP-II, is currently under implementation.

1.9 Evaluation studies of feeding programs prior to 1980 showed that they had limited success in reducing malnutrition. The principal reasons for this were believed to be the following<sup>6</sup>:

- These programs reached only a small number of the most vulnerable groups. In Tamil Nadu, for example, all programs combined were estimated to be reaching only 10 percent of pre-school children. This result occurred in part because of limited budgets; but also because, for several of the reasons listed below, the limited budgets were not utilized as efficiently as they might have been.
- Many programs were loosely targeted, admitting persons who were not in the most vulnerable groups.
- Even when targeted to vulnerable groups—children from birth to three, for example—some programs provided the same inputs to nourished as well as malnourished children.

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5. A district is an administrative unit subdivided into taluks which are further subdivided into blocks, each block covering a population of about 100,000.

6. A good analytical discussion of many of these and related, issues can be found in Odin Knudsen, 1981.

- Even when the program was successfully restricted to the malnourished, vulnerable children, the intended beneficiary may not have received all the benefits because of intra-family substitution. On-site feeding can be substituted for food which beneficiaries would otherwise have consumed at home; and food taken home can be shared with other family members. While there has been little evidence about the extent of such substitution, economic analysis suggests that it can be substantial among poor groups.
- Most programs relied on a "clinic" approach without active outreach activities. The percent of needy persons receiving nutrition supplements in such cases was found to be quite limited.
- Insufficient attention was given to complementary factors that are necessary along with feeding to make a sustained improvement in nutritional status: education of mothers, and health inputs such as treatment for diarrhea and worms, etc.
- The supplement given was sometimes too bulky (low energy density) and unsuitable for consumption by very young children.

The Tamil Nadu Integrated Nutrition Project resulted from the search to find ways to overcome these problems.

1.10 The overall goal of the project was to improve the nutritional and health status of pre-school children, primarily those 6-36 months old, and pregnant and nursing women. Four targets were specified: (1) a 50 percent reduction in protein-energy malnutrition from a level at appraisal of about 60 percent; (2) a 25 percent reduction in the infant mortality, then about 125 per 1,000; (3) a reduction in Vitamin A deficiency in children under 5 from about 27 to about 5 percent; and (4) a reduction in nutritional anaemia of pregnant and nursing women from about 55 to 20 percent. Informal project targets for service delivery were of 80-90 percent coverage of target populations.

1.11 To accomplish these objectives, a package of services was provided: nutrition education and primary health care for pregnant and lactating women and their children, growth monitoring through monthly weighing of all children 6-36 months old, supplementary on-site feeding of children who were severely malnourished or whose growth was found to be faltering, education for diarrhea management, administration of vitamin A, periodic deworming, and supplementary feeding of a limited number of pregnant and nursing women.

1.12 Some 9,000 Community Nutrition Centers (CNCs), each serving an average of 1,500 people, were eventually established. Each was staffed by a local female Community Nutrition Worker (CNW) selected, where possible, to serve as an example of a poor person with healthy well-nourished children. She was assisted by a female helper and supported by a supervisory cadre consisting of a Community Nutrition Supervisor (responsible for quality control and trouble shooting) and a Community Nutrition Instructress (responsible for a two-month pre-service program and regular in-service training). The CNW was responsible for record keeping, weighing of children, nutrition counselling, deciding when supplementary feeding was appropriate, referrals to the health staff as required, oral rehydration therapy, administration of vitamin A, organizing mothers' working groups and eliciting community

participation in project activities. When children failed to appear for weighing at the appropriate time, she was expected to find out why, encourage the mother to come in, or if necessary provide the required services in the home. A high supervisor-worker ratio and intensive on-the-job training were critical design features of TINP.

1.13 A central tenet of this project is the notion that most malnutrition is the result of inappropriate child care practices, as well as, at times income, famine, and non-preventable health problems. Hence the heavy emphasis on education, growth monitoring, and the provision of supplemental feeding and related interventions only to cases where a problem had arisen.

1.14 Growth monitoring was a critical element of this strategy. It was the key means by which interventions were targeted only to problem cases, thereby controlling program costs. It provided the paraprofessional CNWs with a simple, objective way to decide when supplemental feeding and other interventions were called for. It was conceived of as an important educational tool, to explain to mothers why one child was receiving feeding and another not, and to provide them with objective feedback about how well they were doing in caring for their children.

1.15 The health component was somewhat less innovative, though equally important in terms of project costs and potential benefits. It provided resources for construction, equipment and operating costs for 1600 new Health Sub-Centers (HSCs), both central and field training facilities, transport equipment, drugs, vaccines and other supplies. Work routines were designed for health workers to regularly visit CNCs and provide support to the CNWs. However, these visits often failed to take place as planned and coordination of health and nutrition activities was weak.

1.16 The project's closing date was extended from March 1987 to March 1989 to fully utilize the additional project funds made generated by devaluation of the rupee. In the end, of the total project costs of US\$81 million, the nutrition component absorbed 47 percent of project costs, the health component 43 percent, communications 6 percent, monitoring and evaluation 2 percent and project coordination 2 percent. Project funds were used, among other things, to construct or rent, equip, provision and staff some 9,000 CNCs, 1,600 HSCs, a number of training facilities, and the Project Coordination Unit. Funds were also made available for baseline and subsequent surveys, innovative activities and operational research studies.

## 2. EVALUATION RESULTS

### A. Was Service Delivery Adequate to Have Warranted an Impact?

2.1 Before reviewing the evidence on impacts, it is important to ask whether the impacts found could plausibly be related to program inputs and activities. Were program inputs of sufficient quality and quantity to have achieved a positive impact on output?

2.2 Unfortunately, this question cannot be answered straight-forwardly since many indicators that might be used for the purpose have ambiguous interpretations. For example, a decline in feeding rates taken by itself could be the result of a decline in the adequacy of service delivery or a sign that mothers are incorporating the lessons of the project and feeding their children more responsibly. Deworming rates could be lower than targeted because service delivery was poor, because mothers failed to take advantage of the service or because worm load was lower than estimated. This study handles such problems by reviewing a wide variety of performance indicators, focusing on the least ambiguous ones in order to develop an overall impression of process quality, and then, unless there is independent countervailing evidence, interpreting information about the more ambiguous indicators in a fashion that is consistent with that general impression.<sup>7</sup>

2.3 **Participation, growth monitoring, and age of beneficiaries.** The project aimed to enroll all children 6-36 months old in the weighing program within specified districts. The CNW was expected to go to individual homes to persuade mothers if they did not come in on their own. According to the terminal evaluation report, about 77 percent of eligible children were so enrolled (Chidambaram, 1989, p. 52). Interviews indicated that the main reason (78 percent of households) was the CNCs' difficulties in reaching outlying hamlets, a problem which TINP-II is making special efforts to overcome. Other reasons included antipathy to weighing (14 percent) and the feeling that the program was not needed or appropriate, e.g., because of social status (2 percent). Antipathy to weighing should go down over time as mothers become more familiar with the program, but there is no evidence to indicate whether it did.

2.4 The program design called for children to be enrolled in the program at 6 months and remain until 36 months. As Table A-1 indicates, mean enrollment age was 16.8 months in 1982, 8.6 months in 1986 and 7.8 months in 1990, suggesting substantial progress in moving towards this ideal. The figure is unlikely to decline further because of immigration into the village and the few hard-core cases of refusal to participate. On the other hand, age at exit from the program, which was almost 34 months in 1982, has declined significantly, to 23 months in 1990. No explanation is available for this unfavorable trend.

2.5 The project also aimed to weigh each child once per month—theoretically, a maximum of 31 times between 6 and 36 months of age. Table A-1 indicates that in 1986, children enrolled in the program were weighed, on the average, 82 percent of this maximum, a figure that compares favorably with similar projects in India and other parts of the world. However, comparable figures for 1982 and 1990 were 57 and 58 percent. While the first can be explained by startup problems which were quickly overcome, the latter must indicate some decline in service delivery quality, at least at the end of the project period. This can be explained by uncertainties at that time about whether the program would be continued.

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7. In the example given, there would be less of a problem if there were independent information on malnutrition and growth faltering rates. But if the only data available are on feeding rates, we must look at performance indicators such as the percent of children weighed, whether CNWs are rigorously and fairly applying the entry and exit rules for feeding, whether their records are reasonably accurate and complete, and whether food inventories have been adequate to decide how to interpret a decline in feeding rates.

2.6 If this hypothesis is correct, data for earlier and later years (before and after this period of uncertainty) should be higher, closer to that for 1986. While such data are not available from the sample used in this study, project monitoring reports covering both the TINP-I and TINP-II period indicate that (except for large variations in the first two years and a fall-off from about mid-1988 to late 1989) there was a steady increase in the percent of children weighed, from around 85 percent in 1982 to 95 percent in 1993, a finding that is consistent with the explanation given above (Figure A-1).<sup>8</sup>

2.7 **Supplementary feeding.** The rules for determining when to provide supplementary feeding and when to stop were fairly complex, but nevertheless seem to have been understood and implemented fairly well.<sup>9</sup> For children 6-12 months old, feeding was initiated if a child failed to gain at least 300 grams per month for two months; for children 12-36 months, four months of failure to meet this criteria were required. In addition, all children judged to be severely malnourished (grades III and IV, which roughly means that their weight was less than 60 percent of the norm) were fed a double ration. Once begun, feeding continued once per day for a minimum of three months (or until age 36 months). If a child gained 500 grams or more by that time, feeding ceased; otherwise, the child was referred to the health subcenter and feeding continued until adequate weight gain was recorded.

2.8 Table A-2 indicates that 78 percent of children enrolled in the program were being fed when the observations were made in 1982. This figure remained the same in 1986 and decreased to 66 percent in 1990. Those fed for prolonged periods (>180 days) were about 31 percent in 1982, increased to 45 percent in 1986, and declined to 28 percent by 1990. Figures from other sources indicate lower levels of feeding overall but the same pattern of decreasing proportion being fed over time. The decline from 1986 to 1990 could be the result of improved nutritional status or of a deterioration in service delivery. As indicated below, we believe both factors played a role at least in 1990.

2.9 **Other indicators of service delivery for children.** Vitamin A, deworming, and immunization measures were supposed to be provided to all children, regardless of need. As Table A-2 indicates, the figures for vitamin A and deworming show the same pattern of increase and decline found for the weighing index, with all figures falling below the 80 percent target. DEAR figures for 1986 (Chidambaram, 1989) report even lower rates, but this is due to the fact that their sample covered all children in TINP blocks, not just those enrolled in the program. The shortfall for vitamin A is likely to be related to the erratic supplies of vitamin A in India during the period. Health referrals followed the same peak and decline pattern. Of these measures, only immunization rates continued to rise over time and achieved the 80 percent target. Figures from DEAR as well the project monitoring figures are very similar.

2.10 **Services for pregnant and lactating women.** The 100-CNC data-set does not provide much information on these services. Some data on these indicators, derived largely from DEAR terminal evaluation reports, and to a lesser extent from the project monitoring data, are discussed here.

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8. Data for 1993 indicate a significant decline in the percent weighed. This may be the result of phasing in new TINP-II areas, but this question has not been explored.

9. Under TINP-II, the decision was made to reduce this complexity. See discussion in Part III.

2.11 Antenatal registration was about 52 percent at terminal evaluation as against the target of 80 percent. Monitoring data give a result only slightly higher. The quality of antenatal is generally considered to have been poor. Immunization against tetanus among pregnant women was unsatisfactory with 45 percent coverage and improper administration, including more than required doses in about six percent of cases. Surprisingly though, the same report gives tetanus toxoid immunization rates among lactating women at over 80 percent. Distribution of iron and folic acid tablets was low (only about 18 percent received adequate quantities), and quality of the tablets was found to be sub-standard. Further, no change in place of delivery is reported over the life of the project. Birth-weight data are not reported by DEAR or the monitoring wing since these are both scanty and of unsure quality.

2.12 **Recruitment, training and supervision of workers.** These are among the best features of TINP. CNWs and these supervisors were recruited from their communities. This was in contrast to other development programs in India wherein administrative staff at various levels are transferred to these positions (often at the end of their careers when motivation is low). In general, they were supposed to be selected from amongst poorer women with healthy, well-nourished children, so they could demonstrate what is possible with limited resources. Considerable care appears to have gone into this selection process.

2.13 The training provided to these women was substantial – 60 days preservice and two days every two months inservice – and generally judged to be of high quality. Work routines were carefully specified to ensure that the workers knew exactly what was expected of them and were not overloaded. Supervisors served more as mentors and facilitators than as enforcers of regulations.

2.14 **Community participation.** According to the SAR, community participation was supposed to play a major role in TINP. If one means by that term, community involvement in decision making, TINP was very deficient.<sup>10</sup> Like most projects in India, the locus of decision-making lay outside the village. On the other hand, the project was designed to elicit community cooperation and involvement. This was to be done, among other ways, by asking the community to nominate CNWs, and by establishing women's working groups for, among other things, production of the food supplement, and children's working groups for the communication of nutrition and health related messages. Field observations suggest that these groups are operating in most communities – in some with considerable enthusiasm – and that they are serving to provide mutual support and reinforcement of the messages. Using women's groups to produce food supplements has not worked well.

2.15 Moreover, failure to involve local communities in decision making does not necessarily mean that decisions were taken from a distance and imposed uniformly without knowledge of local conditions and preferences, as often happens in national programs. The fact that this program was state owned and operated and that the Management Information System (MIS) and supervision systems were designed to obtain and feed back operational information rapidly helped to ensure the decision makers were in close touch with what was happening in the field.

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10. According to Madan (1987), community participation is a situation in which "... the community is involved in the project to such an extent that all initiatives come from the people, including making proposals for improvement of health, converting these proposals in to concrete plans, and participating in implementing and evaluating them." Using such a definition, Shrimpton (1989) concluded that TINP compared unfavorably with comparable projects in other parts of the world.

2.16 **Communications.** Some of the innovations in communications include the women's working groups and the later experiment with the children's working groups. Both of these concentrated on inter-personal communications, which was the strongest component of the TINP communications strategy. However, evaluation of these efforts suggest that while these groups served well to educate members, their reach outside the groups was minimal. Interpersonal education efforts by TINP workers were much more effective channels of communication as evident from beneficiaries' understanding and appreciation of the project, its objectives, and strategies.

2.17 Educational materials produced and used under this component include films, posters, pamphlets, and folk theater. The impact of the communications component was not evaluated in the project evaluation studies. The 100-CNC data-set analyzed here also excludes any data on communications/Information, Education, Communication (IEC) inputs or impact. A study conducted by a TINP consultant on the reach of media materials demonstrated that posters and wall paintings had the greatest reach, while the use (and therefore reach) of films was minimal. It was also suggested that television be explored as a medium for communication/education in view of its rapidly expanding reach in rural Tamil Nadu.

2.18 The TINP project newsletter was a successfully implemented and well appreciated communication channel that did much to ensure that project information was shared with functionaries at all levels. This sharing-caring attitude was one of the underpinnings of the success of the project. The project news-letter has continued since.

2.19 **Leakages of supplementary food.** Knudsen (1981) has outlined three sources of leakages in a supplementary feeding program – i) intra-family leakages from food either directly or indirectly being shared by other members of the family, ii) income-group leakages occurring when children in the program are not malnourished and are from families with sufficient income to feed their children, and iii) income leakages where the family's cost of participation in the program (for example income lost in bringing children to the CNC) reduces the net value of the food transfer. He also concludes, on the basis of his review, that in on-site, full feeding programs, losses through these leakages are less than in partial feeding programs (such as the one in question). Primary data on these issues are not readily available. Instead, an effort is made here to review these issues in the context of the design and implementation of TINP.

2.20 Intra-family food leakages due to sharing with family members are likely to be small in TINP, given the on-site feeding strategy. Some food-sharing with older siblings has, however, been observed when younger siblings are brought to the centers by them. Income group leakages are also unlikely, given the tight targeting strategies for supplementary feeding. The only scope for income leakages is through inefficient application of feeding entry and exit criteria by workers, or through pressurization of workers to feed the non-needy. Given the quality of training, constant re-training, and efficient supervision, the former is implausible. There are some chances for workers feeding some non-needy children under pressure from parents or influential members of the community. But TINP's focus on promulgating the supplementary food as a short-term corrective measure has been successful in reducing the focus from its income-transfer potential to the education potential. The supplementary food therefore is commonly viewed as an educational tool, and less as a supplement per se. This conclusion is supported by a recent base-line study on communications conducted for TINP-II (in TINP-I and new districts) wherein between 91-98 percent mothers from TINP-I areas understood the reasons for supplementary feeding. Even

greater emphasis on this concept in the future will contribute to a further reduction of food leakages through this channel. Income leakages due to the family's lost opportunity costs have not been measured. Nevertheless, observations in TINP centers show that many young children are brought in by older siblings instead of by working mothers. In addition, TINP centers are usually located within a five-to-ten minute walking distance from the homes – the exception being far-off hamlets from where program participation has been reported to be less than satisfactory. For those who live close to the centers, opportunity costs for participation are small. For those living in far-off hamlets, new strategies are being experimented with in the follow-on TINP-II.

2.21 **Service records, monitoring and evaluation.** In 1987, 61 TINP workers were interviewed to ascertain the availability and condition of weighing scales. All reported that the scales were continuously available and in good condition. In rare cases of malfunctioning, scales were borrowed from neighboring centers to ensure uninterrupted weighing. Observers visiting the project at various times generally report favorably on the accuracy and completeness of records.<sup>11</sup>

2.22 The CNWs are required to keep these plus numerous other records on participants and their families and provide periodic reports. These reports are collated, analyzed and fed back to supervisors as needed. The system for accomplishing this has been judged to be of high quality<sup>12</sup>, the only criticism sometimes being that the volume of reporting is excessive.

2.23 On the other hand, the use (and to some extent, the generation) of information required for evaluation is weak. Insufficient attention has been devoted to considering the special data needs for evaluation purposes and finding ways to institutionalize the process of gathering and analyzing these data.

2.24 **Conclusion.** In sum, we conclude that delivery of nutrition services was more than adequate to have created the desired effect. Health-related service delivery was, however, much below target, and of uneven quality, immunization being the only exception. The achievements on this count must, however, be shared with the UNICEF – supported Universal Program of Immunization. Training inputs and the MIS system in TINP were of high quality, and are likely to have contributed heavily in facilitating service delivery. Community participation and communication efforts were adequate but could have been stronger.

2.25 Most of the data on service delivery/utilization suggest that improvements occurred between 1982 and 1986 but that some deterioration had occurred by 1990, immunization being the only service to continue improving. This deterioration is likely to have been due to the uncertainty that existed in 1989 and 1990 about whether and in what form the program would continue, which caused a deterioration in morale and performance. Once the decision was made to proceed with a second project along the same lines, service delivery statistics began to improve again, a factor that lends credence to this hypothesis.

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11. Some records appear to be suspiciously complete, raising questions about whether some CNWs fill in weights for missed weighings by interpolating between actual weighings.

12. See the Project Completion Report and Meera Shekar, 1991.



## B. Was there a meaningful change in malnutrition levels?

2.26 The TINP program was initiated in three strata at different points in time: 1982, 1983, and 1984/85. Since the last year for which the sample of 100-CNC data are available is 1990, the three strata exemplify eight, seven and five years of program operations. Figures 1 to 3 demonstrate how line segments representing mean weights of children as a function of age (W/A) have shifted over time between 1982 and 1990. These figures, plus the tables in Appendix 1 from which they are derived, indicate that:

- There has been an improvement in mean weights of sample children over the eight year period. This improvement is apparent across all three strata.
- Six-month-old children in 1990 from Stratum One are about 360 grams heavier than their counterparts in 1982 (a 6.5 percent gain in weight), the year in which the program started. Corresponding differences at thirty-six months are about 650 grams (a 6.2 percent gain in weight).
- These differences are statistically significant at all monthly ages between 6 to 36 months.
- In Strata One and Two, (where the program was initiated in 1982 and 1983 respectively) differences in weights are also obvious between 1982 (or 1983) and 1986. Weight differences between 1985 and 1986 are not apparent in Stratum Three districts where TINP was initiated in end 1984/early 1985, suggesting that it may take between one to three years for differences to become evident.

Figure 1.

Mean WTS of Sample Children in 1982, 1986 and 1990  
Stratum 1

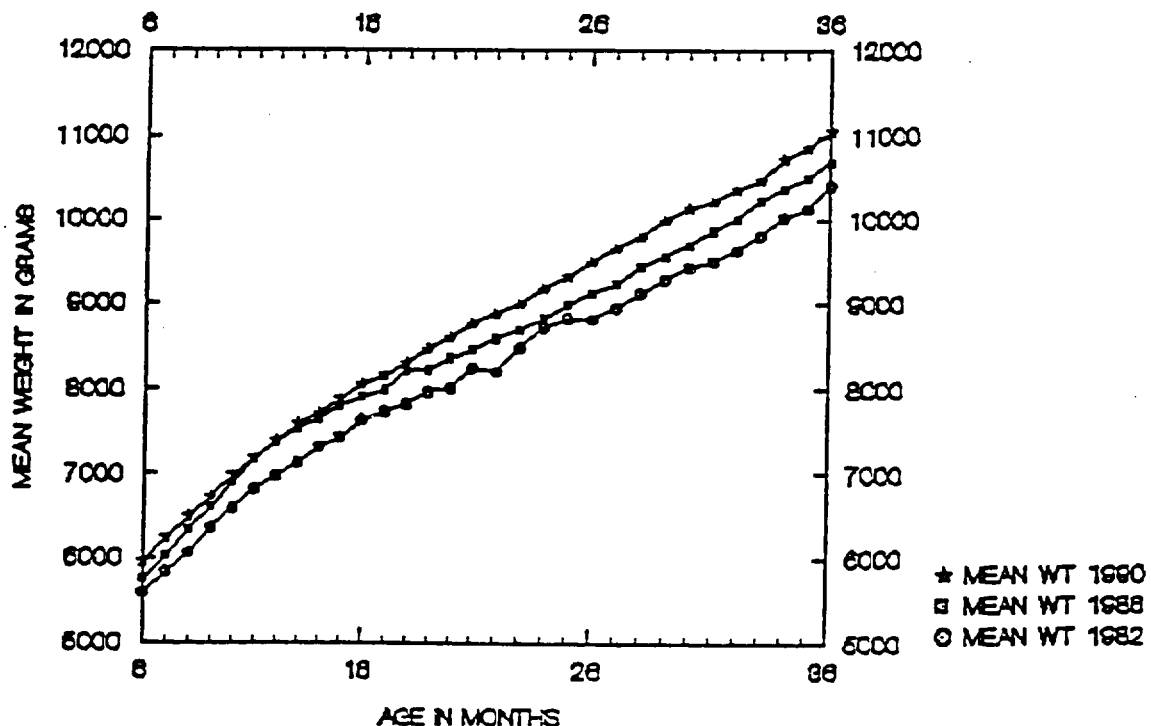


Figure 2  
Mean WTS of Sample Children in 1983, 1986 and 1990  
Stratum 2

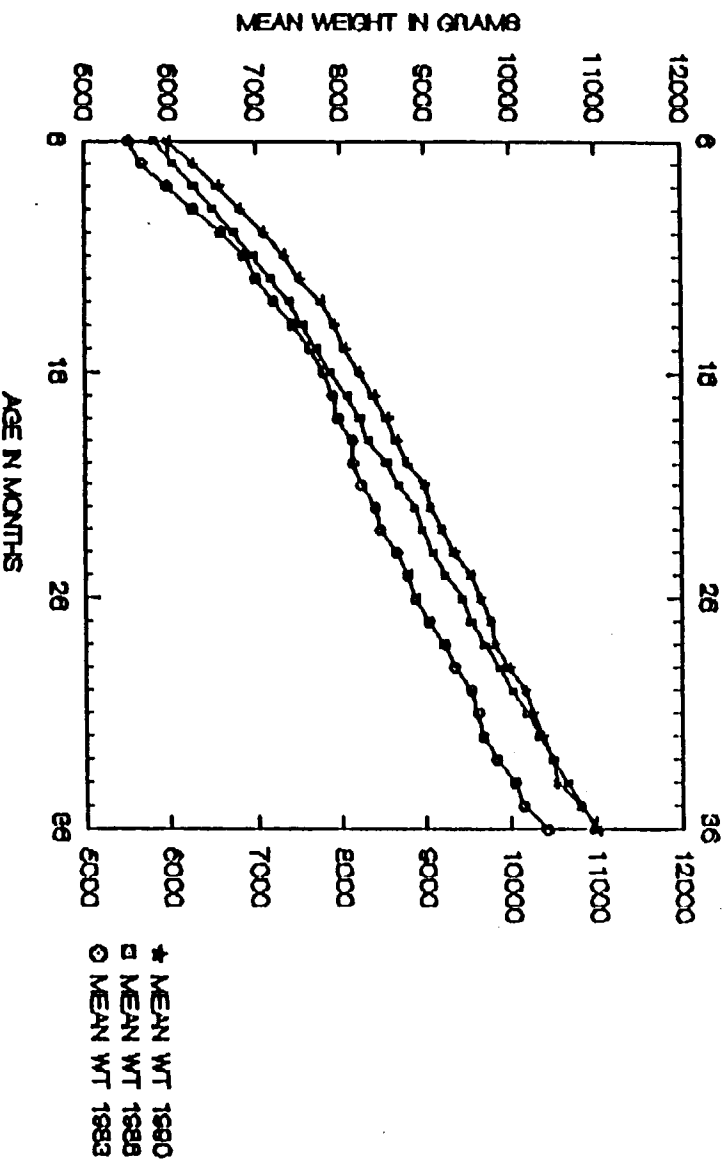
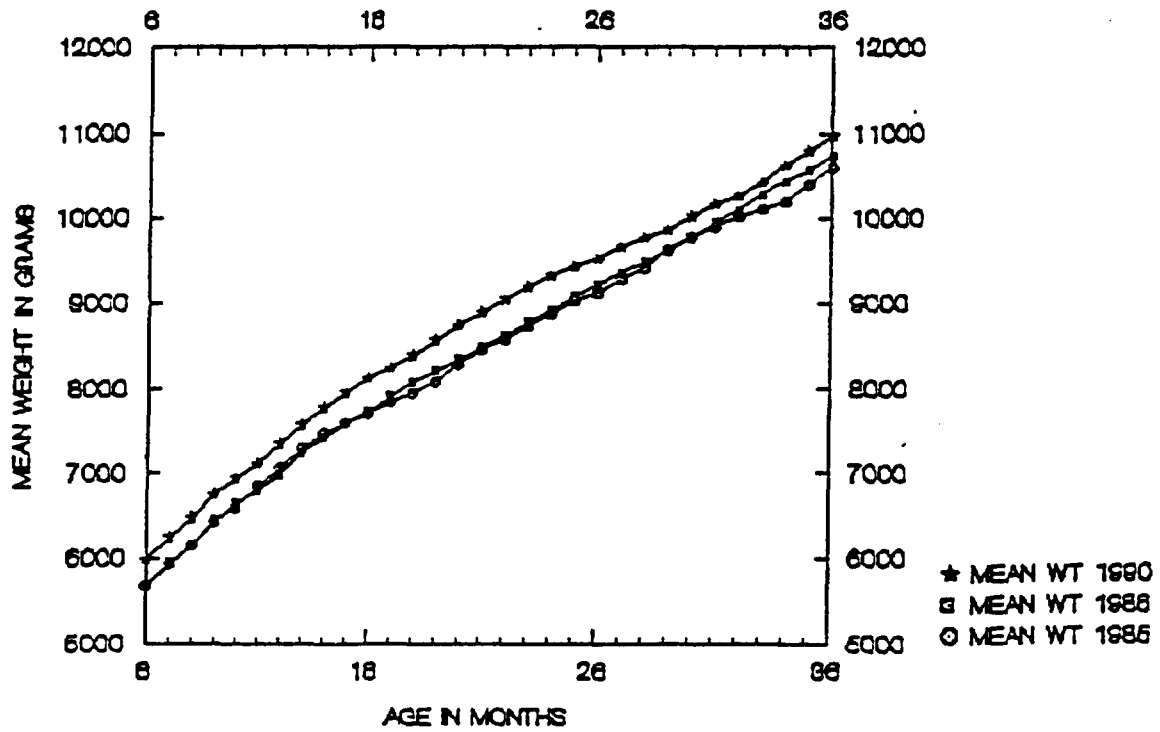


Figure 3

Mean WTS of Sample Children in 1985, 1986 and 1990  
Stratum 3

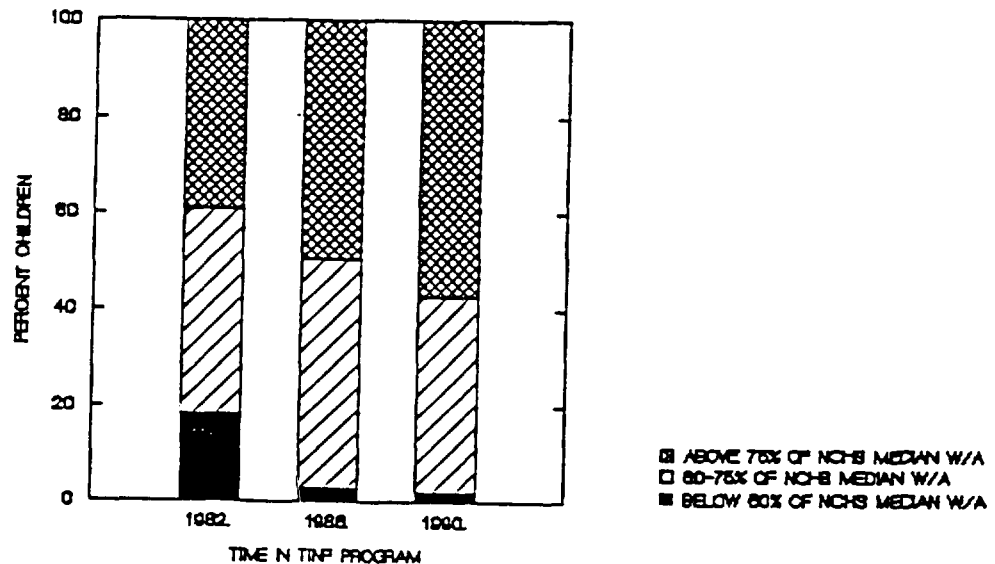


2.27 These changes in weights are particularly meaningful in light of the fact that 1987 and 1988 were poor crop years in Tamil Nadu. The shortage of food in those years, taken by itself, is likely to have reduced mean weights of children in 1990, especially those between 18 and 36 months of age.

2.28 Changes in the nutrition profile are portrayed in Figures 4 through 6. Figure 4 presents malnutrition prevalence rates as percent deviations in weight from National Center for Health Statistics (NCHS) reference medians by age. Figure 5 presents the same data in terms of standard deviations (sometimes called Z-scores) from the standard. While the latter is preferable,<sup>13</sup> both are presented because district-level information from other sources uses the first method. Figure 6 presents a time series drawn from project monitoring data (in this presentation, grade III and IV indicate 60 percent or less of NCHS median W/A, grade II, 60-75 percent, and grade I, 75-100 percent of this norm). All three indicate essentially the same thing, that the percent of children who are seriously malnourished has declined significantly over time while the percent modestly malnourished and normal has increased.

Figure 4

Percent Children Above/Below 75% of NCHS Median W/A  
Stratum I. 1982, 1986 & 1990



13. Because the variance of weight-for-age changes with the age of the child, the standard deviation classification is preferred since it allows for a comparable estimation of nutritional status across ages. For example, 75% of median weight-for-age may indicate much more severe underweight at age twelve months than at thirty-six months. A weight-for-age Z-score calculation obviates this problem by including the change in the variance in the estimation of the score.

Figure 5

Percent Children Above/Below -2SD W/A  
Stratum 1. 1982, 1986 & 1990

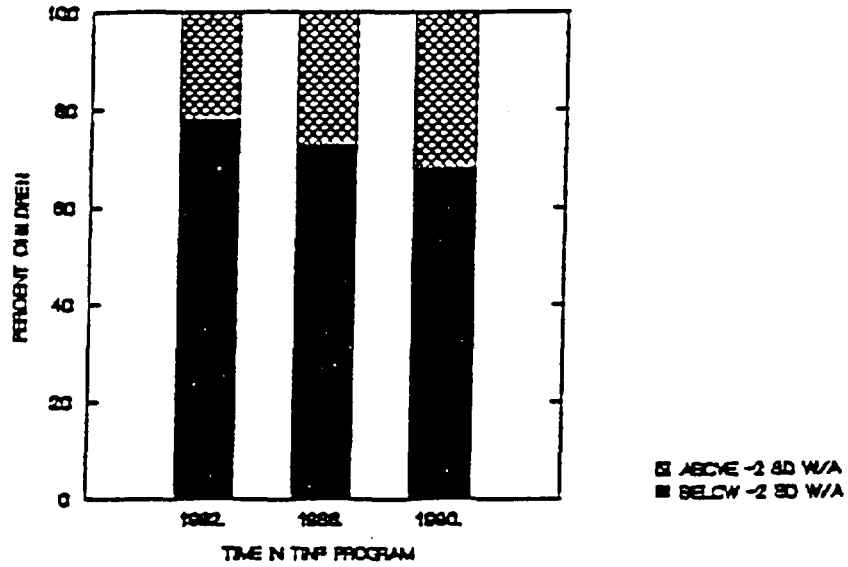
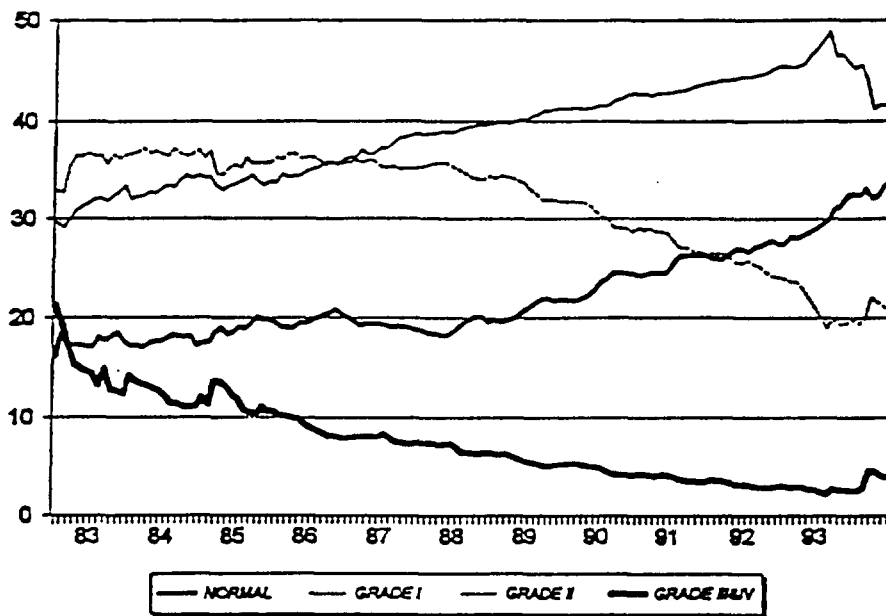


Figure 6

Percent of TINP Children by Nutrition Grades  
Project Monitoring Data



2.29 Tables A-3 and A-4 present W/A data in forms that allow comparisons with data from other sources. Defining malnutrition as W/A less than 75 percent of NCHS reference standard indicates that from the beginning of the program in each stratum to 1990, malnutrition declined by 16.5 (Stratum One), 20.9 (Stratum Two), and 14.4 percentage points (Stratum Three), equivalent to 2.1, 3.0, and 2.9 percentage points per year, respectively. Defining malnutrition as W/A of more than two standard deviations below the NCHS reference standard indicates declines in malnourishment of 1.25, 2.43, and 2.40 percentage points per year for the three strata. These are substantial rates of decline, unprecedented in other parts of India and elsewhere in the world where large scale nutrition interventions have been implemented.

### C. How much of the change is attributable to TINP?

2.30 The observed nutritional improvements can be attributed only to TINP if the effects of other factors that might explain the improvements can be separated out. This is done in two stages, first comparing changes within the TINP districts with changes that occurred in other (non-TINP) areas, and second, considering the differential impact of other programs operating within TINP areas—the one of interest here being the noon meal program.

2.31 Three bases of comparison with changes in malnutrition rates elsewhere are available. The *first* involves data from TINP and non-TINP districts in Tamil Nadu estimated by the National Nutrition Monitoring Bureau (NNMB). These data (computed from Shekar et al, 1993) indicating declines in the percent malnourished (more than 75 percent below the reference median W/A) in three non-TINP districts of 0.26 percent (Thanjavur), 0.79 percent (Nilgiris) and 1.12 percent (Kanyakumari)<sup>14</sup>. These can be compared with the figures given above for the three TINP strata. They can also be compared with NNMB data for TINP districts—1.96 percent for Madurai (Stratum One), 1.07 percent for Ramanathapuram (Stratum Two minus Puddukottai district) and 1.75, 1.61 & 0.83 percent for the three districts in Stratum Three (Tirunelveli, Chengalput & N. Arcot) (see Figure A-2)<sup>15</sup>. Both sets of numbers suggest that the improvements that occurred in TINP areas were several times greater than those occurring elsewhere.

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14. Caution must be exercised in the direct comparison of the data from this study and the NNMB data for two reasons. First, the two data sets are not identical, and data quality and sampling techniques vary between the two. Second, the estimation for TINP areas is based on the eight-year period between 1982 and 1990 while that for non-TINP districts is based on an eleven year period between 1979 and 1990. This caveat notwithstanding, in the absence of any other district-level data for non-TINP areas, we use these data as above for an external comparison of changes in underweight prevalence.
  15. NNMB-estimated underweight rates for each district are consistently higher than those estimated in this study. Two factors can explain this discrepancy. First, NNMB surveys cover the districts as a whole, while our data are limited to TINP participants only (though both regular & irregular participants are included). Though participation rates are estimated to be high, some of the discrepancy therefore reflects the differences between program participants and non-participants within the same districts. In that sense, the NNMB data reflect program effectiveness while results from this study reflect upon program efficacy (See para 1.4). Second, NNMB surveys use small sample sizes which detracts from the validity of their results. Seasonal variations may also be involved, but NNMB does not report on the month of measurement, thus precluding any judgements on that count.

2.32 *Second*, an interim NNMB survey in 1984 suggests that much of the decline in underweight prevalence in Tamil Nadu as a whole occurred after 1983 (with practically no change between 1977 and 1983) – precisely the time when the TINP was underway in several districts covered by the NNMB surveys. This, despite the fact that NNMB also reported a decline in average energy intakes between 1979 and 1988/90.

2.33 *Third*, the Z-scores for the TINP strata can be compared with those derived from all-India data from other sources indicating that the percent of children more than 2 standard deviations below the reference mean has declined by roughly 0.7 percentage points per year in India as a whole over the last decade and by one percentage point per year in South East Asia during the last 15 years (ACC/SCN, 1992a and b). The figure for South East Asia is particularly striking because of the rapid rate of economic growth in this region during the last two decades and the presence there of several large scale nutrition and health programs.

2.34 A sizeable portion of the improvements in nutrition that have occurred throughout the world have resulted from increases in per capita incomes. Between 1982 and 1990, per capita GNP in constant prices increased by about 22 percent in Tamil Nadu (Government of Tamil Nadu, 1991). Applying an elasticity for changes in malnutrition resulting from changes in income derived from the Second Report on World Nutrition (ACC/SCN, Vol II, pg 111, 1992b), one would expect a 0.66 percentage point annual decline in underweight prevalence in Tamil Nadu attributable to changes in per capita GNP during this period.

2.35 Roughly averaging the TINP figures together suggests the conclusion that somewhere between one fourth and one half of the decline in malnutrition in TINP areas is likely to have occurred in the absence of nutrition programs in those areas. This leaves a sizeable, potential contribution due to TINP.

2.36 Could a significant portion of the decline in TINP areas be due to other programs, in particular the noon meal program (NMP), which was concurrent with TINP in several districts?<sup>16</sup> It seems unlikely. First, the NMP caters to children 2-14 years of age, overlapping with TINP in only the last of the latter's two and one half years of coverage. The earlier year and a half is the period in which the nutrition literature suggests supplementary feeding programs are likely to have their greatest effect. Second, this literature also suggests that the education/counselling aspects of these programs are at least as important as the provision of food per se; but the NMP provides only food. Third, the net addition to the diet of the participants is likely to be substantially less than the amount of food provided because they are likely to receive less food at home. Finally, the regression equations presented in Tables A-10 and A-11 suggest that, other things being equal, children from NMP blocks were worse off in all years than those from non-NMP blocks. This result might have occurred because, as indicated in the regression equations of Table 5.1 and 5.2, participation in TINP was higher in non-NMP than in NMP blocks, at least in two of the three years investigated.

2.37 These conclusions are further strengthened by the fact that the W/A Z-scores are similar before and after 24 months of age, suggesting that the NMP does not confer any *additional* benefit to the 24-36 month age group (which is covered by both TINP and NMP) (See Figure A-5). This is especially important in light of the fact that much of the growth faltering occurs before two years of age, and that after this age, the gap between the

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16. Other nutrition-relevant programs in Tamil Nadu such as the ICDS did not overlap geographically with TINP-I.

international norms and observed growth does not increase, so that once the weight deficit has set in (before two years), children after two years of age continue to grow at rates that are similar to the international norms. Once again this suggests that the potential benefits of any intervention may be concentrated in the under-two year age group, and that efforts such as the NMP which starts at age two and the ICDS which starts at age three are unlikely to have had a significant impact on child growth.

#### D. Who benefitted?

2.38 Tables A-6 - A-7 present data from Strata One disaggregated by gender, caste, age group and income class. These data are presented as numbers of standard deviations from the mean (W/A Z-scores).

2.39 **Gender.** Contrary to expectations, these data indicate that girls were better nourished than boys at the beginning of program operations. This gap increased slightly in the first four years, and then declined in the next four-year period, suggesting that girls may have benefitted more from the program initially, but that at the end of eight years of program operation, boys may have benefitted more. Further exploration and analysis may be required to confirm these findings.

2.40 **Caste.** Scheduled caste children were worse off as compared with children from non-scheduled caste families, but they appear to have benefitted more, thereby narrowing the gap between the two groups over the 8 year period.

2.41 **Age groups.** Both the 6-18 and 19-36 month old children show improvements in nutritional status over time. Differences in nutritional status across age-groups were minimal at the start of program operations, increased in 1986, and decreased again by 1990. Two plausible explanations could be given for this result. First, the differences observed in 1986 may reflect differences in the effect of the program on different age groups, younger children benefitting more quickly than older. Second, while younger children may not have benefitted more than older, food-shortages due to the pre-famine situation in Tamil Nadu in 1986 may have negatively effected the weights of older children more than younger ones. Additional analysis using annual data for both age groups would be necessary to decide between these hypotheses.

2.42 **Income**<sup>17</sup>. While malnutrition is lower at higher income levels, children in all three categories experienced improvements over time, the highest income category perhaps benefitting a bit more than the lowest. No significant changes in income distribution are apparent during the period investigated, so this factor could not have influenced these aggregate results.

#### E. Who participated?

2.43 Figures A-3 and A-4 provide information on the gender and caste composition of participants in 1982, 1986 and 1990. In each year, about half the participants are male, with

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17. Information on incomes comes from questions asked of mothers by TINP when they first enroll their children. It is not very accurate since only a single gross question about monetary income was included.



a slight increase in this proportion over time. When compared with the underlying sex ratio for rural Tamil Nadu in 1981 and 1991, these data suggest that the participation of male children was higher than that of females. This complements the finding that boys benefitted more from the project than did girls.

2.44 Participation of scheduled caste children remained constant at about 37 percent in 1982 and 1986, and increased slightly to 41.7 percent in 1990. As earlier noted, the average age of enrollees declined over time. Both factors suggest that TINP's ability to enroll needier groups increased over time.

2.45 The multivariate analyses presented in Table A-8<sup>18</sup> support these findings and add a number of other points. In 1982, children from cultivator households and from larger households were more likely to be enrolled. Children from these groups and from poorer households were more likely to be enrolled at an earlier age, and children from larger households tended to remain in the program to an older age. In 1986, factors associated with greater participation were male gender, scheduled caste, cultivator families, middle income group, large family size, and high parity. Early enrollment was associated with scheduled caste, low or middle income group, and high parity. Male children, and children from scheduled castes, laborers, middle income, and large families are more likely to stay in the program until the full 36 months of age, while others may drop out earlier. In 1990, regular participation is positively associated with cultivator status, small household size, and high parity. Gender, income and caste do not seem to be associated with regularity of participation in 1990. Early enrollment is associated with cultivator status and high parity. Those likely to stay the longest in the program include female children, non-scheduled castes, smaller family size, and high parity.

#### **F. Which program inputs contributed the most to improvements in nutritional status?**

2.46 Some answers to this question can be obtained from Tables A-10 and A-11 which present results from multivariate analyses using Z-scores at the time each child left the program as the dependent variable. The tables suggest:

- Nutritional status is enhanced by greater frequency of weighing and younger enrollment in the program, both proxies for more intensive participation in the program. The effect seems to grow with the age of the program.
- Complete immunization (BCG, OPV, & DPT) is positively associated with nutritional status, with the magnitude of the association increasing over time.
- Deworming and Vitamin A inputs are not significantly associated with nutritional status in any year (except for Vitamin A in 1980). One explanation for this may be that the effect of these two inputs is confounded with the effects of program participation since every child who participated was expected to receive vitamin A prophylaxis and deworming drugs. However, as the section on health indicates, service delivery rates were low for these two inputs; the regression results may indicate these rates were too low to have had a measurable impact.

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18. In this table, regular participation in growth monitoring is taken as a proxy for program participation.

- The number of days of supplementary feeding has a small, but statistically significant, negative effect on nutritional status. Consistent with this, program participation and supplementary feeding days are also negatively related. Not too much should be read into this finding. While it is obvious from growth charts that supplemental feeding has a positive effect on W/A, only those with poor nutritional status are provided with supplemental feeding.
- As noted above (paragraphs 2.36 - 2.37), and for the reasons discussed there, the presence of the NMP does not appear to be contributing to nutritional status in TINP areas.

### G. Program impact on health outcomes

2.47 The project's health goals consisted of a reduction in Infant Mortality Rate (IMR) by about 25 percent, a reduction in vitamin A deficiency symptoms among under fives from 27 percent to 5 percent, and an amelioration of the high prevalence of anemia among pregnant and lactating women (from 55 percent to about 20 percent).

2.48 DEAR data on health outcomes are scanty and methodologically unsound. For example, clinical disease prevalence data were collected by non-clinicians, and at different times of the year, thus introducing observer errors and seasonal biases. Data on infant mortality are based on far too small sample sizes, and varying methodologies across the different survey rounds. Nonetheless, these reports suggest tentative reductions in IMR of 12 to 30 percent in different project areas over the life of the project. Data from the national Sample Registration Survey (SRS) show declining rural IMR trends in Tamil Nadu State between 1976 and 1989 (from 121 to 80 per thousand live births). A UNICEF report analyses the SRS data further to conclude that the rate of decline in the rural IMR in Tamil Nadu is greater than that seen in the country as a whole, and that it is more pronounced among male infants. Gender discrimination and female infanticide are cited as possible explanations. This report also notes that maternal mortality rates in Tamil Nadu (about 2.3 per 1000 births in rural areas) are lower than the national average of around three. Low birth weight incidence is reported by DEAR to be lower in areas where the TINP has been operational for longer periods of time.

2.49 DEAR collected some data on prevalence of bitot's spots ( a symptom of vitamin A deficiency) among children from project districts. These data suggest a consistent and marked decline in prevalence of vitamin A deficiency over the life of the project. Data from the NNMB also indicate a drop in Vitamin A deficiency over this period. However, poor service delivery reports (due to problems with Vitamin A supplies) do not allow for the observed changes to be attributed to vitamin A prophylaxis. Improvement in dietary practices as a consequence of nutrition education may be a more likely reason. In the absence of more concrete data, these conclusions must remain tentative at best. No information is available on changes in anemia prevalence.

2.50 All of the above data on changes in health indicators are "guesstimates" rather than empirical data. The absence of primary data obviates detailed analyses to segregate the effect of secular trends and changes due to economic growth. Process evaluation does not present a plausible case for an impact on these indicators. It is therefore concluded that any observed improvements in the health indicators is either a consequence of secular trends or economic

growth. A small proportion of the observed health improvements may also be attributed to the nutritional inputs from TINP.

#### H. Cost effectiveness

2.51 Recurrent costs per beneficiary of TINP have been estimated at US\$9.41 for 1984-85, with about 30 percent going for food<sup>19</sup>. In 1988-89, the total financial outlay was of the order of 130 million rupees, with a beneficiary coverage of 0.64 million children and 0.24 million pregnant & lactating women, thus averaging at about 145 rupees (US\$9.50) per beneficiary per annum<sup>20</sup>.

2.52 Such figures compare favorably with other programs. A comparison made with ICDS (excluding its educational components) estimated that on a per capita (per village inhabitant) basis, TINP cost a bit over half of ICDS and had roughly twice the effect on severe malnutrition. If only beneficiaries (children and mothers) are considered, ICDS cost 25 percent more than TINP for half of the benefit.<sup>21</sup> While no comparison has been made with the Nutritious Meals Program, the feeding costs of the latter are clearly much greater and, as indicated in para 2.37, the impact on nutrition is much smaller. While based on many assumptions that can be questioned, these results are quite plausible. It should not be surprising that a strategy that helps only the most needy is both cheaper and more effective than one which aims to help all regardless of need.

#### I. Sustainability

2.53 Sustainability has financial, institutional and behavioral dimensions of relevance to this project. These can be put in terms of the following three questions. (1) If external donors ceased funding, would state or local authorities pick up the slack? (2) Has sufficient institutional capacity been created to continue operations at a high level of quality without further external inputs? (3) Are there signs that women are internalizing TINP's messages so that the program can eventually be phased out without loss of progress in nutritional and health status? The answer to all three is a yes.

2.54 **Financial sustainability**, at the present time, seems assured on two counts. First, the TINP-II agreement with IDA calls for the Government of Tamil Nadu to finance all the operating costs of the program in the TINP-I areas; IDA funds are to be used only for helping finance the expansion of the program into new areas (plus some institutional development investments that help the old as well as the new areas). This the Government has been doing regularly since TINP-I ended. These operating costs were estimated to be Rs 95 million in 1988/89, an amount representing less than five percent of the Tamil Nadu Government's expenditures on nutrition. Second, while the federal government is committed to expansion of the ICDS model throughout the country, it expects substantial contributions from state governments. In recent years, the Tamil Nadu Government has appeared reluctant to expand ICDS without increased funding from the Center while willing to expand TINP,

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19. Berg, 1987.

20. Shekar, *et al*, 1992.

21. Dapice, 1986.

apparently in recognition of the lower costs involved in providing the TINP package. The NMP is likely to continue, but is not viewed as an alternative to TINP, especially in view of the different target age-groups for the two programs.

2.55 But over the longer term, financial sustainability could be threatened by the growing expense of the NMP. This program enjoys a wide base of popularity and has begun to be viewed as an entitlement. If some means is not found to curtail growth in its budget, other programs, including TINP once IDA reimbursements end, run a real risk of being cut.

2.56 **Institutional sustainability** is more difficult to assess. At the present time, the program appears to be operating at a reasonably high level of efficiency. Indeed, it is taking less time to achieve full operational status in new TINP-II areas than it did when new areas were added to TINP-I. Moreover, some dimensions of the project are now being operated by more permanent institutional arrangements than was earlier the case. The main case in point is the establishment of a permanent Communication & Training Center for the project. Overall, however, the program remains dependent on a few key experienced staff who command respect and are able to induce a high level of performance.

2.57 **Permanent behavioral change.** There is evidence coming out of a TINP-II baseline study of knowledge and attitudes that mothers who participated in TINP-I are significantly more aware of good nutritional and health practices than those who have not participated. More significant, there are a few signs of behavioral changes—longer/higher rates of breast feeding, reduction in the percent of children requiring feeding, for example. It is also encouraging to observe in a village that was one of the earliest to establish a CNC that an "adolescent working group" has been formed from former participants in the program. A more convincing test would be evidence that the nutritional and health status of younger siblings of children who were once in the program and of new mothers and their children are improving. While some field data now exists to explore these possibilities, that could not be done as part of this project because of time and budget constraints.

2.58 But even if it could be demonstrated that permanent behavioral changes are taking place, villagers, and of course the TINP field staff, both want and expect TINP to continue. To phase it out would require careful, long term planning. No thought has yet been given to what this might entail. Even if another five years are required to achieve an acceptable level of permanent behavioral change, it is not too soon to be thinking about this since some aspects might best be built in from the beginning—for example, an understanding that external funds will cease after a certain number of years, at which time the village would have to take responsibility for program operations if it wants them to continue.

2.59 The results of an experiment planned as part of TINP-II to introduce in a few new blocks all aspects of the program except for the feeding component should be especially interesting in this regard. It has for some time been argued that the most important part of the TINP is not the food but the contact with children and mothers to check on weight gain, infections, diarrhea, etc., the food serving more as an inducement to get the mothers to bring the children in. Such an experiment would provide a test of this proposition.

### 3. CONCLUSIONS

3.1 There has been considerable skepticism about the practicality of successfully operating a nutrition and health program based on growth monitoring and narrowly focused targeting of short-term supplemental feeding. And with apparently good reason, since prior to TINP there has been no successful case of a large, sustained application of these principles. It is for this reason that a careful assessment of TINP and a detailed quantitative documentation of its achievements is so important. Prior to this study such documentation was not available. There have been good qualitative assessments—the PCR is an excellent example—and limited quantitative assessments, but no study that simultaneously employs a large representative sample, attempts to control for other factors which could be producing the outcomes of interest, and quantitatively investigates subsidiary questions such as who benefits and which inputs were crucial to the outcome that are important for understanding why this program succeeded where others have failed. This study provides far from optimal answers, but it takes a significant step in the right direction and in the process (and perhaps more importantly) has created a data base that can be used to carry the analysis farther<sup>22</sup>.

3.2 The study should leave little doubt that these principles can be made to work. Women can be induced to bring their children in for weighing on a regular basis. Short-term feeding based on narrowly focused targeting with clear entry and exit rules can be made to work as planned—keeping costs down, reducing dependence on feeding, and serving, along with growth monitoring, as a powerful educational tool. All this can be accomplished with acceptably small leakages and costs. And most importantly, the education provided can "stick"—can induce changes in mothers' behavior that have beneficial effects on their children's health and nutritional status. The process requires more time than originally thought; but the progress once made seems likely not to be reversed by a cessation of the program inputs.

3.3 A corollary from this experience might also be drawn, namely that universal feeding within certain age groups—while perhaps useful as a poverty program—is not necessary to achieve nutritional and health gains. Indeed, it may be counter-productive in that a given budget cannot cover as many of the most needy, leakages to other family members reduce the impact on the target group, and the sustainability is questionable because of the dependency and expectations that are generated and the lesser educational impact.

3.4 The key to TINP's success in applying these principles is great care in the planning and execution of process elements of the program, in particular, (1) the careful selection of CNWs, (2) detailed work routines that are not overloaded and that emphasize seeking women out rather than waiting for them to show up at the center, (3) heavy emphasis on training—continuous, regular in-service as well as pre-service, focused on developing skills rather than learning general principles, (4) intensive, supportive supervision, and (5) a heavy emphasis on gaining community support and enthusiasm for the project. The areas in which TINP-I failed—implementation of an effective health program and integration of the nutrition and health components of the program—were precisely those where less attention was paid to process issues.

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22. This data base will be made available to anyone who wishes to use it. Unfortunately, however, it will not be of much value without detailed explanatory notes which have not been prepared as yet. Efforts to prepare such documentation will be made in the near future.

3.5 Such devotion to detail is not typical in such projects. One reason why it may have occurred in this project is that the project was owned, developed and executed by local authorities. It did not come from afar, based on norms applied in standardized ways no matter what local conditions were present. A second reason is that IDA devoted an extraordinary amount of staff and consultant time to this project: supervision staffweeks for TINP-I averaged 34 per year and ranged from 22.5 to 54 per year. Comparable figures today are less than half this average.

3.6 A concluding comment on the peaking of process data found in this study is in order. A commonly observed pattern in extension projects of this kind is that efficiency of the operation goes through three phases: a break-in phase when problems are worked out, a period of smooth, effective operations, and then a period of some slippage because of waning enthusiasm and discipline. The peaking in service delivery efficiency observed in this study—performance in 1986 being better than in either 1982 or 1990—could be explained in this way. But it can also be explained by noting that 1989/90 were years of great uncertainty about whether and in what form the program would continue, which seriously affected field staff morale. This is the most likely explanation because morale and discipline appear to have picked up again after the decision to proceed with TINP-II was made (at least, this appeared to be the case at the time of the field visit associated with this study). But additional study of the data would be necessary to determine just when program efficiency peaked, whether it was associated in time with period of uncertainty or occurred earlier.

### **Lessons learned and not learned in TINP-II**

3.7 An IDA credit of US\$95.8 million was provided in 1991 for an eight year period to expand TINP in a phased manner to most of the remaining rural population in Tamil Nadu. The specific objectives of TINP-II include reducing severe malnutrition among 0-36 month old children by 50 percent in new and 35 percent in TINP-I areas, contributing to a reduction in infant mortality to 55 per thousand live births, and contributing to a 50 percent reduction in incidence of low birth weights.

Several design features distinguish TINP-II from TINP-I:

- a change in the *target age group* to 0-60 months (from 6-36 months in TINP-I); a new mother-linked child health card is being introduced to establish a link between births and TINP enrollment; maternal growth monitoring introduced;
- *merger of TINP with the Nutritious Meals Program* so that each center is manned by two workers. One is a TINP-designated worker whose primary duties will be in health and nutrition, and the second is responsible primarily for the pre-school education component;
- changes in the *selection criteria for supplementary feeding* to include all children in grade two, three and four of malnutrition, as well as those exhibiting growth faltering; a modification in the exit criteria for feeding so that all children are fed until they reach grade one;
- *food supplements* for severely malnourished made more calorie dense, and the concept of new calorie-dense Amylase-rich-foods introduced through nutrition education;

- greater emphasis on the *communications component*, with special attention to developing and operationalizing a predefined communications strategy; concentrated efforts to use the mother-held growth charts for nutrition education;
- strengthening of *health services delivery*, including structural changes to facilitate improved service delivery; greater stress on realistic and pre-defined work routines; new innovations being attempted to strengthen the referral system; skill-updating for medical and para-medical workers;
- greater attention to *coordination between health and nutrition service delivery* to maximize synergistic benefits; mechanisms for joint health-nutrition service delivery better defined, including joint reviews, supervision and training;
- *increased outreach and coverage* of beneficiaries to include previously uncovered pockets; a special "hamlet-coverage strategy" outlined;
- reduction of *supervisor:field-worker ratio* from 1:10 to 1:15, again bringing it closer to the national ICDS format;
- changes in the *training* to match the updated objectives; and
- a rationalization of the volume of information collected under the *MIS system*; number of registers to be filled-in by field workers reduced from thirty one to seven.

3.8 Most of these changes are positive, resulting directly from lessons learned from the experience of TINP-I. But two are questionable. The most problematic is the relaxation of entry and exit criteria for supplementary feeding. This modification was apparently made in response to the limited success of TINP-I in reducing the levels of moderate malnutrition.<sup>23</sup> This apparent lack of success may be an artifact of several factors including nutritional classifications, shifts in and out of the different grades of malnutrition<sup>24</sup>, and overly ambitious project goals. Moreover, it is not clear that the best way to deal with moderate malnutrition is to provide more food; it could be, for example, that improved health services or more intensive education are more cost effective. A better way to have dealt with this situation would have been to investigate the reasons for the shifts in nutritional status and undertake operations research to determine the best way to correct the situation (assuming it needed correction).

3.9 Another issue of concern is the reduction in supervisory personnel. This change brings the supervisor-to-worker ratio closer to the national average used in ICDS (1:20), despite the fact that the latter has been identified as too low a ratio for effective supervision. In addition, ICDS supervisors are expected to play only a regulatory role whereas TINP supervisors have traditionally been expected to play more supportive, problem-solving and training roles.

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23. Additionally, the new system is simpler to understand. But this is not an overriding consideration since, with careful training, the CNWs proved able to implement the original rules without difficulty.

24. For example, even while grade two children do move up in to grade one and above, concurrently, grades three and four may be moving in to grade two, so that the proportion of children in grade two at any time is a function of both of these factors.

3.10 These two modifications move TINP-II away from what this report views as the primary strength of TINP-I – narrowly targeted quality care – and is moving the program closer to the design parameters of other health and nutrition programs in India. To that extent, the unique value of the TINP-I experience is being diluted.

3.11 Of lesser importance – because it is a problem that is recognized and more easily dealt with – is a problem resulting from the merger of the TINP and NMP programs. This has resulted in two village level workers with somewhat overlapping agenda, raising new problems of coordination.

3.12 Finally, an error of omission should be mentioned. While TINP-I developed an excellent MIS capacity, it failed to develop an adequate evaluation capacity. This weakness has continued in TINP-II. One indication of this are the problems being encountered in obtaining adequate base-line surveys for this follow-on project.



## TABLES AND FIGURES

Table A-1. Indicators of Program Participation<sup>a</sup>

	1982	1986	1990
No. times weighed between 6-36 months of age (Max. possible: 31)	17.578 (0.213, 1609)	25.482 (0.190, 1640)	15.565 (0.263, 1291)
Age at enrollment in to program (proxied by age at first weighing)	16.831 <sup>b</sup> (0.209, 1600)	8.644 (0.124, 1637)	7.847 (0.127, 1291)
Age at exit from program (proxied by age at last weighing)	33.898 (0.136, 1600)	33.672 (0.143, 1637)	22.878 (0.273, 1291)
Age of beneficiaries (Mean age in months measured in June of each year)	19.687 (0.239, 1106)	19.537 (0.235, 1159)	19.199 (0.263, 947)

- Notes:
- a. Numbers in parentheses are standard errors of the mean and sample sizes.
  - b. Since enrollment started for the first time in 1982, and children of all ages between 0-36 months were enrolled, this number will per force be higher than any that for any subsequent years.

Table A-2. Indicators of Service Delivery/Utilization<sup>a</sup>

Service	1982	1986	1990
<i>Supplementary feeding for children</i>			
Percent children not fed at all.	21.8 (24.5, 19.3)	21.2 (23.8, 18.7)	33.6 (37.0, 30.3)
Days per child fed during their participation in TNP.	133.08 (3,097, 1600)	176.07 (3,848, 1637)	112.34 (3,468, 1291)
% Children fed for <= 90 days during their stay during participation in program.	12.7 (14.9, 10.7)	7.5 (9.3, 6.0)	11.2 (13.6, 9.1)
% Children fed for 91-180 days during participation in the program.	34.2 (37.3, 31.3)	25.8 (28.6, 23.1)	27.6 (30.8, 24.5)
% Children fed for > 180 days during their participation in the program.	31.2 (34.1, 28.3)	45.4 (48.5, 42.3)	27.6 (30.8, 24.5)
Vitamin A (% covered) <sup>b</sup>	45.75 (0.731, 1438)	70.03 (0.616, 1510)	57.18 (0.867, 979)
Deworming (% covered) <sup>b</sup>	42.41 (0.695, 1453)	66.37 (0.617, 1513)	51.06 (0.958, 932)
Immunization (% completely immunized) <sup>c</sup>	62.69 (*65.38 to 59.90, 1600)	78.56 (*80.77 to 76.17, 1637)	83.11 (*85.36 to 80.61, 1291)
Growth monitoring (Proxy: N <sup>o</sup> times weighed)	17.553*** (0.213, 1600)	25.481*** (0.190, 1637)	15.565*** (0.263, 1291)
Number of health referrals <sup>d</sup>	0.928 (0.061, 1600)	1.209 (0.082, 1634)	0.686 (0.062, 1248)

Notes: a. Numbers in parentheses are standard errors of the mean and sample sizes, except where indicated by an \* in which case they indicate the 95% confidence intervals and sample sizes.

b. Coverage calculated at a maximum of six-monthly doses of Vitamin A and 4-monthly doses of deworming.

c. Complete primary dosage for DPT, OPV and BCG.

d. Data on health referrals believed to be of poor quality.

Table A-3. Changes in Nutritional Status (75% of NCHS Median)  
of Children 6-36 Month Old in TINP Areas<sup>a</sup>

	Total N	Percent Children Below 75% of NCHS Median Values	Percent Children Above 75% Of NCHS Median Values
<b>Stratum 1: Madurai &amp; Dindigul Anna Districts</b>			
June 1982	1106	67.36 (70.47, 64.07)	32.64 (35.88, 29.47)
June 1986	1159	58.41 (61.64, 55.07)	41.59 (44.87, 38.30)
June 1990	947	50.90 (54.55, 47.17)	49.10 (52.76, 45.38)
Drop (1982 To 1990)		16.46%	
<b>Stratum 2: Ramanathapuram &amp; Pudukottai DISTRICTS</b>			
June 1983	1116	62.46 (65.67, 59.09)	37.54 (40.85, 34.27)
June 1986	1029	52.09 (55.59, 48.52)	47.91 (51.42, 44.35)
June 1990	505	41.58 (46.59, 36.59)	58.42 (63.29, 53.28)
Drop (1983 to 1990)		20.88%	
<b>Stratum 3: Chengalput, Tirunelveli &amp; N. Arcot Districts</b>			
June 1985	1319	60.58 (63.57, 57.47)	39.42 (42.48, 36.38)
June 1986	1426	59.05 (61.95, 56.05)	40.95 (43.91, 38.01)
June 1990	996	46.18 (49.75, 42.58)	53.82 (57.36, 50.18)
Drop (1985 to 1990)		14.40%	

a. Figures in parentheses represent 95% confidence intervals.

*Table A-4. Changes in Nutrition Status (-2 Standard Deviations of NCHS)  
of Children 6-36 Month Old in TINP Areas*

	Total	Percent Children Below -2 Standard Deviations	Percent Children Above -2 Standard Deviations
<b>Stratum 1: Madurai &amp; Dindigul Anna Districts</b>			
1982	1106	77.39	22.61
1986	1159	72.56	27.44
1990	947	67.27	32.73
Decline (1982 TO 1990)		10.12%	
<b>Stratum 2: Ramanathapuram &amp; Pudukottai Districts</b>			
1983	1116	77.06	22.94
1986	1029	68.51	31.49
1990	505	60.39	39.61
Decline (1983 TO 1990)		16.67%	
<b>Stratum 3: Chengalput, Tirunelveli &amp; N. Arcot Districts</b>			
1985	1319	74.07	25.93
1986	1426	74.97	25.03
1990	996	62.05	37.95
Decline (1985 TO 1990)		12.02%	

Table A-5. Changes in Underweight Levels Over Time of TINP Children, (Stratum I)<sup>a</sup>

Indicator	June 1982	June 1986	June 1990
Weight-for-Age Z-Score (Difference) <sup>b</sup>	-2.909 (0.032)	-2.520 (0.026) (@d=.389) (@p<.000)	-2.356 (0.029) (#d=.164) (#p<.000)
Weight-for-Age Percentile (Difference) <sup>b</sup>	2.457 (0.202)	3.009 (0.239) (@d=.552) (@p<.078)	4.054 (0.296) (#d=1.045) (#p<.000)
Weight-for-Age Percent of Median (Difference) <sup>b</sup>	69.746 (0.331)	73.742 (0.267) (@d=3.996) (@p<.000)	75.413 (0.295) (#d=1.671) (#p<.006)

a. Figures in parentheses are standard errors of the mean or significance tests.

b. Figures given in June 1986 column is the difference between 1982 and 1986. Figure given in June 1990 column is difference between 1986 and 1990.

Table A-6. Changes in Nutrition Status of TINP Children by Gender, Caste & Age-Group, Stratum, I<sup>a</sup>

Indicator of Nutritional Status	June 1982		June 1986		June 1990	
	Male	Female	Male	Female	Male	Female
Weight-for-Age Z-Score (Difference) <sup>b</sup>	-3.011	-2.797 (d=.214) (p<.001)	-2.650	-2.383 (d=.267) (p<.000)	-2.448	-2.250 (d=.198) (p<.001)
Caste	Scheduled	Non scheduled	Scheduled	Non Scheduled	Non Scheduled	Non scheduled
Weight-for-Age Z-Score (Differences) <sup>b</sup>	-3.084	-2.805 (d=.279) (p<.000)	-2.660	-2.434 (d=.226) (p<.000)	-2.480	-2.267 (d=.213) (p<.000)
Months of Age	6-18	19-36	6-18	19-36	6-18	19-36
Weight-for-Age Z-Score (Differences) <sup>b</sup>	-2.949	-2.926 (d=.023) (p<.724)	-2.409	-2.638 (d=.229) (p<.000)	-2.368	-2.404 (d=.036) (p<.539)

a. Figures in parentheses are standard errors of the mean or significance tests.

b. Figures given in June 1986 column is the difference between 1982 and 1986. Figure given in June 1990 column is difference between 1986 and 1990.

**Table A-7. Changes in Nutrition Status -2 Standard Deviations of NCHS Standards of Children 6-36 Months Old by Income Category, Stratum I**

	Percent Below -2 Standard Deviations	Percent Above - 2 Standard Deviations	Mean Z-Score
<b>Less than Ra. 3,000 per year</b>			
1982	82.45	17.55	-3.053
1986	77.66	22.34	-2.658
1990	78.42	21.58	-2.545
Decline (1982-1990)			
	4.03		0.508
<b>Ra. 3000 - 6500 per year</b>			
1982	79.34	20.66	-2.982 (p < .416) <sup>a</sup>
1986	75.40	24.60	-2.588 (p < .303) <sup>a</sup>
1990	69.55	30.45	-2.430 (p < .120) <sup>a</sup>
DROP (1982-1990)			
	9.79		0.552
<b>More than Ra. 6500 per year</b>			
1982	69.89	30.11	-2.656 (p < .000) <sup>a</sup>
1986	64.64	35.36	-2.322 (p < .000) <sup>a</sup>
1990	56.13	43.87	-2.090 (p < .000) <sup>a</sup>
DROP (1982-1990)			
	13.76		0.566

<sup>a</sup>: Differences between income categories 1 and 2  
by Differences between income categories 2 and 3

Table A-8. Program Participation (Number Times Weighed)  
Regressed on Non-Program Variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	B Estimate	P-Value	B Estimate	P-Value	B Estimate	P-Value	B Estimate	P-Value
Gender (2:Female)			-0.704	.058				
Caste (1: Non SC/ST/MBC)	-1.151	.013	-1.247	.002			-0.754	.005
Household occupation: 1. Cultivator	+2.337	.000	+2.522	.000	+2.391	.002	+2.651	.000
2. Labourer	-0.480		-0.041		+0.802		0.196	
3. Other								
Income Category 1: <Rs3000			+0.108	.000				
2: 3000-6500			+1.607					
3: >=6500								
Household size	+0.474	.000	+0.528	.000	-0.592	.000		
Parity			+0.458	.011	+1.787	.000	+0.863	.000
Whether Noon-Meal Program@ operating in village (1:No)	+0.195	.663	-0.472	.241	+0.871	.112		
Year 1982							+1.669	.000
1986							+9.685	
1990								
Intercept	15.026		21.218		12.846		12.999	
R-Squared	.030		.080		.063		0.233	
N	1594		1612		1274		4506	

Notes: 1. @ Forced in to equation even when not significant.  
2. Statistical significance assumed at P < .05

Table A-9. Program Participation (Number of Times Weighed)  
Regressed on Non-Program and Program Variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value
Gender (2:Female)			-0.473	.059				
Caste (1: Non SC/ST/MBC)							+0.514	.010
Household occupation: 1. Cultivator 2. Labourer 3. Other	+1.147 +0.112	.004			+1.412 +0.397	.022	+1.029 +0.248	.000
Income Category 1:<Rs3000 2:3000-6500 3:>=6500								
House hold size	+0.192	.032			-0.269	.058		
Parity			+0.382	.000	+0.822	.000	+0.380	.000
Whether Noon-Meal Program@ operating in village (1:No)	+1.685	.000	+0.263	.317	+1.214	.004	+1.125	.000
Year 1982 1986 1990							+1.916 +5.322	.000
<i>Program-Related Variables</i>								
No. doses Vitamin A recd.	+1.472	.000	+1.755	.000	+0.432	.000	+1.074	.000
No. times dewormed	+0.721	.000	+0.684	.000	+1.255	.000	+1.001	.000
No. days fed (total)	+0.025	.000	+0.011	.000	+0.032	.000	+0.020	.000
Whether immunization complete (2:Yes)	+1.281	.000	+2.039	.000	-1.091	.047	+0.947	.000
Intercept	4.999		10.529		5.488		3.953	
R-Squared	0.520		0.501		0.506		0.592	
N	1454		1551		1164		4181	

Notes: 1. @ Forced in to equation even when not significant.  
2. Statistical significance assumed at P < .05



Table A-10. Nutrition Status (Z-Score) Regressed on Non-Program Variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	§ Estimate	P-Value	§ Estimate	P-Value	§ Estimate	P-Value	§ Estimate	P-Value
Gender (2:Female)					+0.127	0.003		
Caste (1: Non SC/ST/MBC)	+0.115	0.008			+0.267	0.000	+0.130	0.000
Household occupation:								
1. Cultivator	-0.190	0.005	-0.128	0.000	-0.326	0.000	-0.214	0.000
2. Labourer	-0.152		-0.245				-0.208	
3. Other					-0.235			
Annual Income Category 1:<Rs3000	-0.421	0.000	-0.361	0.000	-0.444	0.000	-0.393	0.000
2:3000-6500	-0.215		-0.322		-0.286		-0.271	
3:> =6500								
House hold size	+0.030	0.045			+0.043	0.003	+0.031	0.000
Parity	-0.054	0.003	-0.048	0.000	-0.120	0.000	-0.078	0.000
Whether Noon-Meal Program@ operating in village (1:No)	+0.397	0.000	+0.298	0.000	+0.278	0.000	+0.325	0.000
Age	-0.052	0.072	-0.067	0.003	-0.095		-0.084	0.000
Age <sup>2</sup>	+0.001	0.016	+0.001	0.002	+0.002		+0.002	0.000
Year 1982							-0.193	0.000
1986							-0.240	
Intercept	-2.122		-1.431		-1.200		-1.292	
R-Squared	0.109		0.141		0.197		0.141	
N	1584		1617		1274		4470	

Notes: 1. @ Forced in to equation even when not significant.

2. Statistical significance assumed at P < .05

Table A-11. Nutrition Status (Z-Score) Regressed on Non-Programs and Program Variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value
Gender (2:Female)								
Caste (1: Non SCST/MBC)	+0.106	.006			+0.164	.000	+0.080	.000
Household occupation: 1. Cultivator	-0.249	.000	-0.150	.000	-0.305	.000	-0.215	.000
2. Labourer	-0.148		-0.189		-0.222		-0.181	
3. Other								
Income Category 1: <Rs3000	-0.221	.001	-0.278	.000	-0.339	.000	-0.276	.000
2:3000-6500	-0.123		-0.306		-0.238		-0.226	
3: >=6500								
House hold size					+0.039	.004	+0.028	.000
Parity					-0.094	.000	-0.046	
Whether Noon-Meal Program@ operating in village (1:No)	+0.324	.000	+0.260	.000	+0.282	.000	+0.295	.000
Age	+0.010	.011	-0.067	.004	-0.070	.000	-0.056	.000
Age <sup>2</sup>			+0.001	.056	+0.001	.009	+0.001	.000
Year 1982							-0.059	.000
1986							-0.268	
<i>Program-Related Variables</i>								
No. times weighed in TINP (W)	+0.016	.000	+0.037	.000	+0.043	.000	+0.029	.000
No. doses Vitamin A recd.	+0.027	.036						
No. times dewormed								
No. days fed (total) (F)	-0.006	.000	-0.004	.000	-0.006	.000	-0.006	.000
Whether immunization complete (1: Yes; 2:No)	+0.093	.025	+0.131	.004	+0.133	.039	+0.111	.000
Age at first weighing			+0.022	.010	+0.025	.032	+0.013	.021
W * F	+0.000	.000	+0.000	.000	+0.000	.000	+0.000	.000
Intercept	-2.625		-1.813		-1.621		-1.699	
R-Squared	0.299		0.261		0.305		0.283	
N	1471		1629		1274		4470	

Notes: 1. @ Forced in to equation even when not significant.  
2. Statistical significance assumed at P < .05

Table A-12. Age of Entry Regressed on Program and Non-Program variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value
Gender (2:Female)								
Caste (1: Non SC/ST/MBC)								
Household occupation: 1. Cultivator 2. Labourer 3. Other	-3.466 -4.015	.000					-0.932 -1.366	.000
Income Category 1: <Rs3000 2: 3000-6500 3: >=6500			-1.119 -0.806	.007				
Household size								
Parity			-0.215	.047	-0.285	.022	-0.236	.012
Whether Noon-Meal Program@ operating in village (1:No)	-0.726	.248	-0.295	.275	+0.987	.002	+0.006	.983
Year 1982 1986 1990							+7.680 -0.232	.000
<i>Program-Related Variables</i>								
No. times weighed in TINP								
No. doses Vitamin A recd.								
No. times dewormed								
No. days fed (total)								
DPTI/OPVI (2:Yes)	-6.157 (OPVI)	.000	-3.474	.000	-10.708	.000	-6.132 (DPTI)	.000
No. months Post natal feeding	-0.722	.045	-0.262	.003	-0.245	.015	-0.279	.001
Intercept	31.383		16.048		29.465		21.750	
R-Squared	.092		.073		0.239		0.373	
N	726		897		727		2347	

Notes: 1. @ Forced in to equation even when not significant.  
2. Statistical significance assumed at P < .05

Table A-13. Age of Entry Regressed on Program and Non-Program Variables

Independent Variables	Model 1: 1982		Model 2: 1986		Model 3: 1990		Model 4: Years Combined	
	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value	β Estimate	P-Value
Gender (2:Female)								
Caste (1: Non SC/ST/MBC)								
Household occupation: 1. Cultivator 2. Labourer 3. Other								
Income Category 1:<Rs3000 2:3000-6500 3:>=6500								
Household size	+0.248	.001			-0.074	.031		
Parity					+0.142	.001		
Whether Noon-Meal Program@ operating in village (1:No)	-0.895	.001	+0.272	.006			+0.241	.000
Year 1982 1986 1990							+0.657 +0.463	.000
<i>Program-Related Variables</i>								
No. times weighed in TINP	+0.235	.000	+0.897	.000	+1.012	.000	+0.961	.000
No. doses Vitamin A recd.			+0.099	.012				
No. times dewormed					+0.057	.008	+0.078	.000
No. days fed (total)			-0.001	.009	-0.002	.000	-0.001	.000
Whether immunization complete (2:Yes)			-0.607	.000	-0.336	.010	-0.555	.000
Age at first weighing			+0.883	.000	+0.981	.000	+0.934	.000
Intercept	28.922		3.353		-0.226		+0.829	
R-Squared	.155		0.897		0.972		0.956	
N	1595		1564		1176		4239	

Notes: 1. @ Forced in to equation even when not significant.  
2. Statistical significance assumed at P < .05

*Figure A-1*

*Percent TINP Children Weighed  
Project Monitoring Date*

Percentage

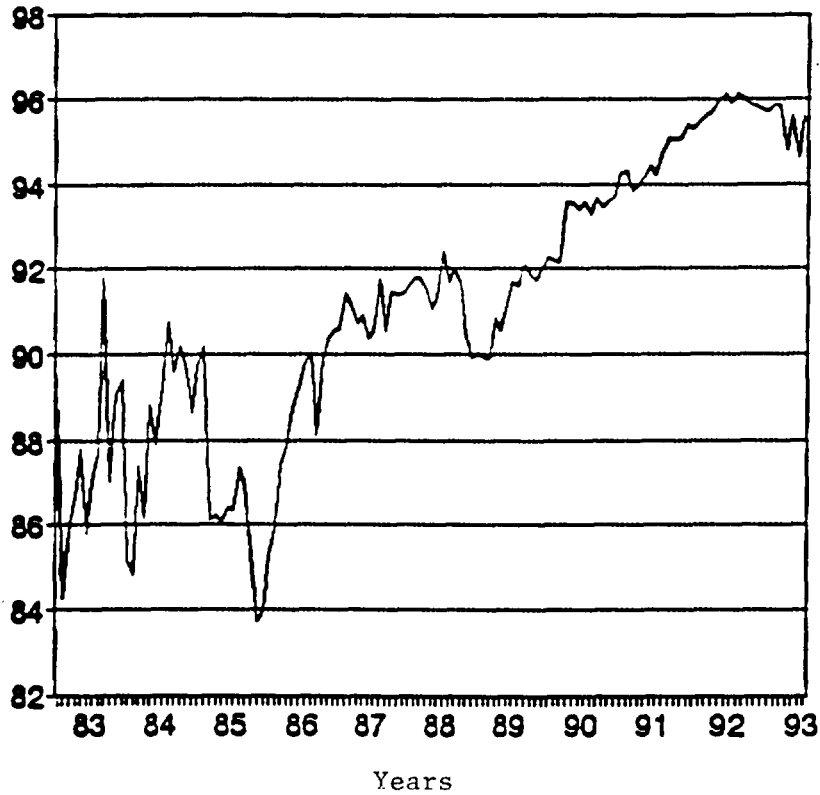


Figure A-2

Annual Decline in Malnutrition Rates  
(*<75% NCHS Median*) in TINP & Non-TINP Areas

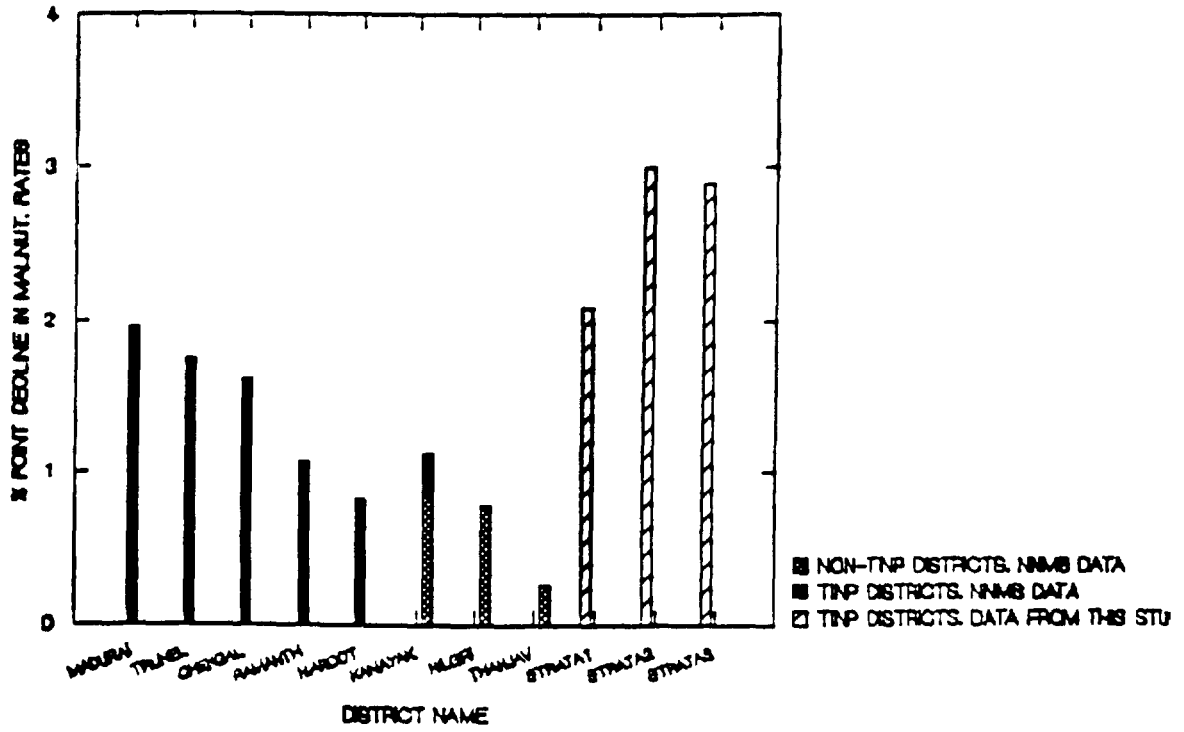


Figure A-3

*Gender Shifts in Program Participation Over Time*

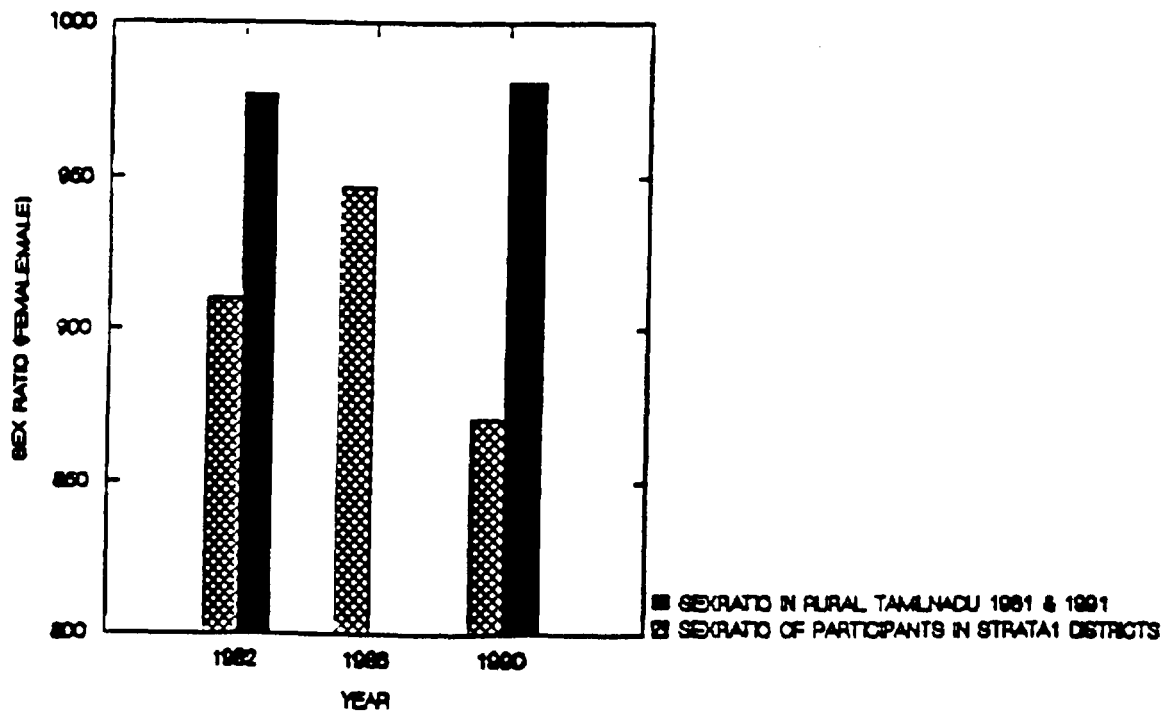


Figure A-4

*Caste Shifts in Program Participation Over Time*

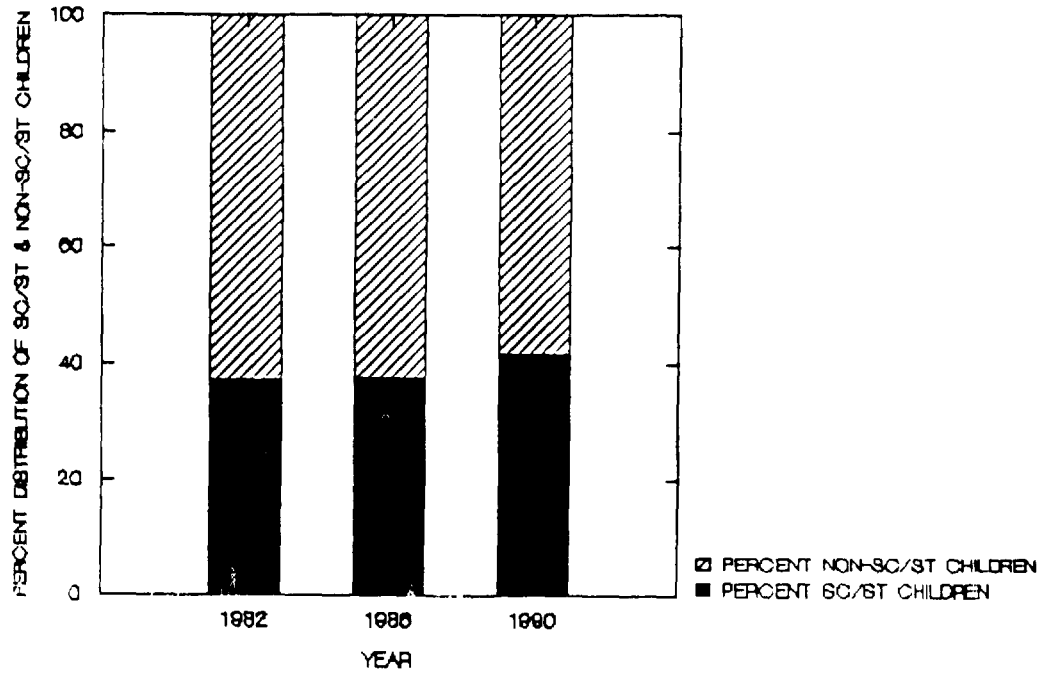
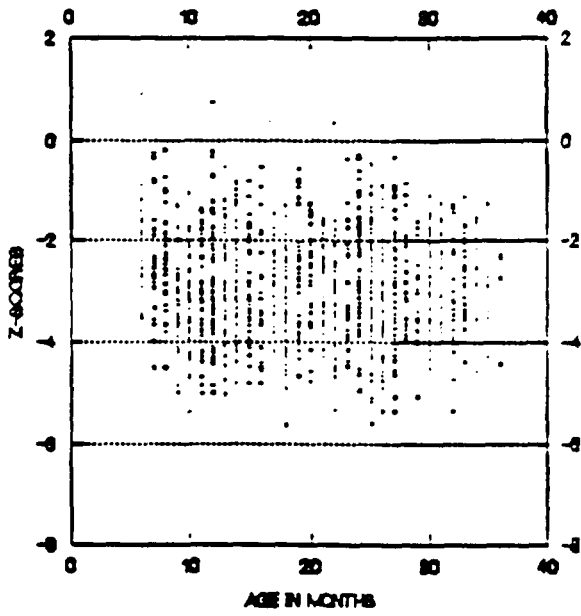




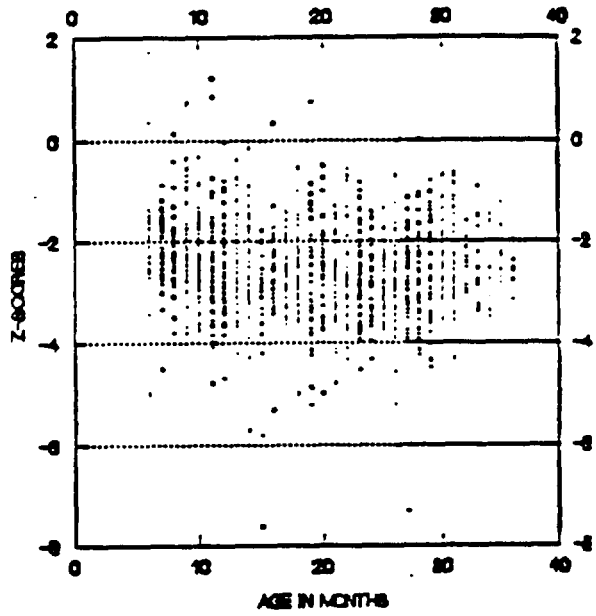
Figure A-5

Z-Score Distribution: Weight-for-Age

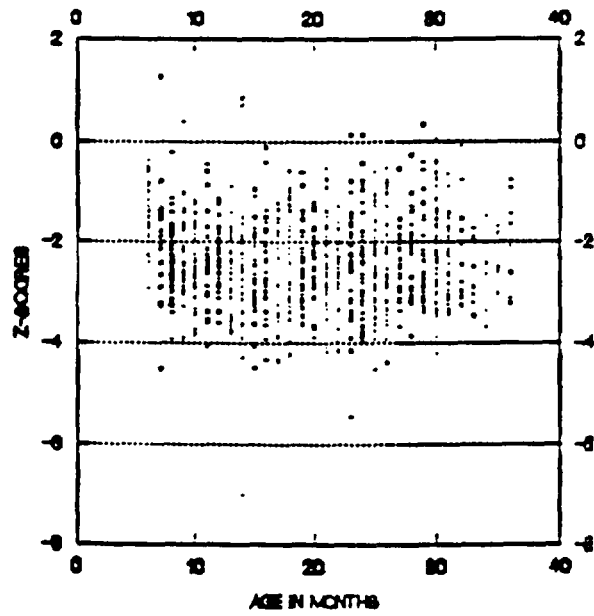
a. June 1982



b. June 1988



c. June 1990





## 1. The primary data-set:

1.1 The primary data used for this report was derived from the 100-CNC data set collated by the TINP Monitoring office. This data set was collected from 1100 Community Nutrition Centers (CNCs) -- 100 CNCs per district, a total of 11 districts where the TINP-I has been operational. These are service-delivery data extracted from the records/registers of the field-level CNC worker. The data cover all children ever enrolled in the selected CNCs over the life of the CNCs (over 200,000 children), and includes the monthly weights on each child (longitudinal data to that effect), as also service delivery/utilization indicators, and socio-economic data. Morbidity and mortality data are included in the survey instruments, but their completeness and reliability is suspect, and hence have not been analyzed here. Instead, area statistics such as those obtained from SRS, NSSO and Directorate of Public Health have been explored for assessing effects on mortality. In addition, the report draws upon relevant published/unpublished narratives on the TINP.

1.2 The 100-CNC data set described above covers approximately 10% of all TINP-I centers (about 1100 CNCs) randomly (approximately 200,000 children) spread over eleven districts. A One hundred CNCs were sampled from each district. This study selected a representative sample from this data set.

1.3 All districts in which the TINP-I operated were divided into three strata -- Stratum 1 includes all districts where TINP was initiated in 1982, Stratum 2 covers districts where TINP started in 1983, and Stratum 3 includes districts where the TINP was initiated in end 1984/early 1985. All the blocks (in each district) were ranked on a socio-economic status (SES) index comprising four indicators: percent scheduled caste population, percent scheduled tribe population, and male and female literacy rates.

$$SES = \frac{\sum x_i}{\sigma}$$

where  $x_i$  = value of the  $i$ th variable and  $\sigma_i$  = standard deviation for the  $i$ th variable

Within each stratum, blocks were arranged in ascending SES order, and ten blocks selected per stratum using systematic random proportionate probability sampling (PPS) based on the number of beneficiaries covered. Two CNCs were then selected from each designated block, using the same PPS technique. This procedure ensures adequate spread of the sample as well as representativeness by allowing blocks/CNCs with larger coverage a higher probability of being included in the sample. All children enrolled in the sampled CNCs were included in the final sample.

1.4 The sub-set of the 100-CNC data set described above was extracted, cleaned, and entered in to a D-base compatible data format. Data were subject to rigorous logic, range and consistency checks in addition to the usual double entry and verification procedures. The individual child is the unit of analysis for most procedures. Data was analyzed using the SYSTAT statistical package for most analyses except for estimation of nutritional status where the CDC-supported CASP

anthropometric software package was used. Both bivariate and multivariate statistical procedures have been used.

1.5 From the above sub-sample, analyses presented here are limited to children who participated in the TINP program in the following years:

	Stratum 1 <sup>a</sup>	Stratum 2 <sup>b</sup>	Stratum 3 <sup>c</sup>
<b>Base Year:</b>	1982	1983	1985
(*Sample size for all children enrolled in reference year)	(1600)	(1609)	(1291)
(**Sample size for June)	(1106)	(1159)	(947)
<b>Mid-Point Follow-up:</b>	1986	1986	1986
(**Sample size for June)	(1116)	(1029)	(505@)
<b>After Project-Closing</b>	1990	1990	1990
(**Sample size for June)	(1319)	(1426)	(996)

*Notes:*

- a. Program started in 1982; Districts covered: Madurai & Dindigul-Anna.
  - b. Program started in 1983; Districts covered: Ramanathapuram composite & Pudukottai.
  - c. Program started in late 1984/early 1985; Districts covered: Tirunelveli, North Arcot & Chengalpattu.
- \* This represents the basic sample used for all regression analyses presented in section 4. Since data were not available for all variables for each case, sample sizes varied some what depending on which variables were included in the regressions.
  - \*\* For measurement of malnutrition prevalence, a cross-section of the sample in June was analyzed for each year. See also section 1.3.5. below.
  - @ Sample sizes dropped from earlier years because the TINP was replaced by the ICDS project in Pudukottai district in 1987.

Data for the month of June for all three strata have been used to estimate malnutrition rates in each of the three strata separately. This represents a cross-section of all children enrolled in the program in June for each reference year. Data for strata one have been subject to more detailed multivariate analyses to answer questions about program inputs that contribute to the observed impact, and program participation factors. These data for detailed analysis cover all children who passed through the program in the reference year, with program input data recorded for the entire period of participation, subject to a maximum of 31 months between 6 to 36 months of age.

1.6 Sample size estimations detailed below are based on the power of detection of 100-300 gram differences in weights of young children. The following tables include sample size estimations for the sample sizes (numbers of children) required for statistical testing, under different sets of assumptions.

Here,  $\sigma$  is the standard deviation of the weights of children,  $\alpha$  is the level of statistical significance,  $\beta$  is the power of the test,  $d$  is the difference in weights that is to be detected, and  $n$  is the sample size requirement under each of these conditions.

$SD(\sigma)$	$\alpha$	$1-\beta$	$d$	$n$	$SD(\sigma)$	$\alpha$	$1-\beta$	$d$	$n$
1200	0.05	0.9	100	3732	1200	0.05	0.8	100	3023
1200	0.05	0.9	200	933	1200	0.05	0.8	200	756
1200	0.05	0.9	300	415	1200	0.05	0.8	300	336
1100	0.05	0.9	100	3136	1100	0.05	0.8	100	2540
1100	0.05	0.9	200	784	1100	0.05	0.8	200	635
1100	0.05	0.9	300	348	1100	0.05	0.8	300	282
1000	0.05	0.9	100	2592	1000	0.05	0.8	100	2100
1000	0.05	0.9	200	648	1000	0.05	0.8	200	525
1000	0.05	0.9	300	288	1000	0.05	0.8	300	233
800	0.05	0.9	100	1659	800	0.05	0.8	100	1344
800	0.05	0.9	200	415	800	0.05	0.8	200	336
800	0.05	0.9	300	184	800	0.05	0.8	300	149
600	0.05	0.9	100	933	600	0.05	0.8	100	756
600	0.05	0.9	200	233	600	0.05	0.8	200	189
600	0.05	0.9	300	104	600	0.05	0.8	300	84
500	0.05	0.9	100	648	500	0.05	0.8	100	525
500	0.05	0.9	200	162	500	0.05	0.8	200	131
500	0.05	0.9	300	72	500	0.05	0.8	300	58

## 2. Qualifications/Limitations

2.1 This report was commissioned to be completed within twenty weeks from start to finish including planning, data-extraction, computerization, cleaning, analysis, literature review and report writing. Time, thus, was a severe constraint.

2.2 A major limitation of the study is the lack of primary data from non-TINP areas, that is, lack of a "true control". This limitation is offset in two ways : First, these data are supplemented with secondary data on nutritional changes in TINP and non-TINP areas. Secondary data sources include previous aggregate evaluation reports, as well as independent data from the National Nutrition Monitoring Bureau. Second, because the project was introduced in different districts in a phased manner, "time-controls" have been used to trace project history; that is, the situation at the start of the project in each district is used as an estimator of the nutrition situation without project inputs.

2.3 The lack of reliable and extensive data on health inputs and outputs is another limitation of this data-set. This gap is compensated to some extent with supplementary data from secondary sources. Furthermore, all data-availability was constrained within the set of variables included in the 100-CNC data-set, over which this researcher had no control.

2.4 This report attempts to compare data compiled and extracted from service delivery statistics over the life of the project. One obvious limitation of this approach is the changes in data reporting and recording quality (by TINP functionaries) over this period, which could bias results. To minimize these effects, the measurements used for comparison of nutritional status are for June in each year. Since the program started in January/February 1982, the period until June allows for time for attaining better data-quality, as well as for stabilization of participation profiles. Generally, TINP monitoring data have been commended to be of high quality<sup>1,2</sup>, and improvements in data-quality within a few months of program initiation (as indicated by declining standard errors around the mean) has been noted in other reports.<sup>3</sup>

2.5 Notwithstanding all of the above, this study will serve as a launching pad for future research in two ways. First, it contributes the first computerized, cleaned, geographically diverse and representative data-set from TINP-I project areas. Second, it aims to explore new areas of TINP program evaluation, and raise (and catalogue) some relevant questions that need to be addressed through future work.

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From: Dr. M. Chandrakapure

To: Mr. Graham Donaldson (Dept.Code) OEDD1 Room No. T 9045

CC: Mr. David Klaus , SA2PH Room No. G 3091  
(522-3123)

Fax Number: 2095

Subject: TINF (Cr. 1003-IN) - Draft Report on Impact Evaluation Report

**COMMENTS:**

Please see the attached letter received from Mrs. Meenaxi Chaudhry.

Regards.

Dr. Chandrakapure

\_\_\_\_\_  
Authorized by  (Signature)  
Dr. M. Chandrakapure (Name)

MC:ee

Telegrams : WOMEN &amp; CHILD



**S. MISHRA**  
Project Manager (PSE)  
Tele. 3733980, 311520

D.O.No. 6-1/94-WBP/543

महाराष्ट्र सरकार  
मानव संसाधन विकास विभाग  
(महिला एवं बाल विकास विभाग)  
GOVERNMENT OF INDIA

MINISTRY OF HUMAN RESOURCE DEVELOPMENT  
(DEPARTMENT OF WOMEN & CHILD DEVELOPMENT)  
Jeevan Deep Building, Mezzanine Floor,  
Parliament Street, New Delhi-110001.

10001, Delhi 1.9.1994

Dear Dr. Chandrakapure,

I shall be grateful if you kindly arrange to send the enclosed letter to Mr. Graham Donaldson, Chief, Agriculture & Human Development Division, Operations Evaluation Department, World Bank, Washington, U.S.A.

With kind regards,

Yours sincerely,

*S. Mishra*  
(S. Mishra)

Dr.(Mrs.) Malati Chandrakapure,  
Public Health Specialist,  
The World Bank,  
55, Lodi Estate,  
New Delhi - 110 003.

Telegrams : WOMEN CHILD

भारत सरकार

मानव संसाधन विकास मंत्रालय  
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GOVERNMENT OF INDIA

MINISTRY OF HUMAN RESOURCE DEVELOPMENT  
(DEPARTMENT OF WOMEN & CHILD DEVELOPMENT)MEENAXI ANAND CHAUDHRY  
JOINT SECRETARY  
TEL.No.386227

शास्त्री भवन, नई दिल्ली-110001, शक 1 Sept., 94

Shastri Bhavan, New Delhi-110001, Dated

Dear Mr. Donaldson,

Thank you for forwarding Draft Report on Impact Evaluation Report of First Tamil Nadu Integrated Nutrition Project (Credit 1003)IN dated July 19,94 as drafted by the Operations Evaluation Department, based on their research sample in respect of 1100 Community Nutrition Centres in 11 districts of Tamil Nadu. It is indeed heartening to note that the TINP-I Project contributed significantly in reducing the levels of malnutrition amongst the target population. It is also satisfying to note that the project has been able to achieve our basic objective of reducing the levels of malnutrition among the target group in a cost effective manner.

2. May I also invite your attention to some of the observations included in the Report and based largely on a set of assumptions. These observations, which I am briefly indicating below, you would appreciate, are not supported by sufficient empirical evidence and thus,perhaps, require reconsideration before taking out the final version of the Report.

3. One such observation as included in Para 1.9 on page 5 relates to identification of factors responsible for limited success of other feeding programmes in the country prior to year 1980. The other observations which require reconsideration are reflected in Para 1.13 on page 8, Para 2.12 on page 13, Lines 6 and 7 on page 27, Para 2.52 on page 29, Para 2.54 on page 30 and Para 3.10 on page 37 of the Report.

4. I am sure, you would agree with me that in the absence of strong empirical evidence, it may not be desirable to presume factors responsible for little impact of nutritional programmes prior to the year 1980 or in making subjective assessment of the impact of Noon Meal Programme in Tamil Nadu. I also wish to mention that malnutrition in India is a result of a host of factors including inequality in distribution of income and wealth, recurrence of natural calamities and related health problems and not inappropriate child care practices alone. Similarly, including a comparison of TINP costs and benefits with ICDS Scheme in Tamil Nadu may not be very relevant in the absence of supporting empirical evidence.

5. In addition to the above, I wish to mention that under the ICDS Scheme, the anganwadi worker forms the grass root functionary and the guidelines under the Scheme clearly provide for appointment of an anganwadi worker directly from the local village and acceptable to the to the local community. Regarding Tamil Nadu Government's alleged reluctance to expand the ICDS Scheme in Tamil Nadu, I may add that we are consistently getting written requests for expansion of ICDS Scheme in Tamil Nadu. TINP basically represents supplementation of national efforts in ameliorating the conditions of vulnerable groups in Tamil Nadu. Again, it may be too early to record strengths of TINP II.

6. It is also observed that category of children 6-36 months belonging to families living below the poverty line and coming to nutrition centres which formed a part of the agreed minutes on TINP II has somehow not been reflected in the features distinguishing in TINP II from TINP I. Further more, Line 2 on page 5 needs to be substituted by "ICDS which operated in 28 rural blocks and 37 major urban slums".

7. I am sure, our comments on the Report will, therefore, be kept in view while drafting the final version of the Report.

*With best regards,*

Yours sincerely,



(MEENAXI ANAND CHAUDHRY)

Mr. Graham Donaldson, Chief  
Agriculture & Human Resource Development Division  
Operations Evaluation Development  
World Bank  
1818 H Street, N.W.  
Washington, D.C. 20433