

## BIBLIOGRAPHIC DATA SHEET

1. CONTROL NUMBER  
PN-AAH-3842. SUBJECT CLASSIFICATION (695)  
ASOO-0000-G732

## 3. TITLE AND SUBTITLE (240)

Applications of a field guide for evaluation of nutrition education to programs in the Philippines

## 4. PERSONAL AUTHORS (100)

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## 5. CORPORATE AUTHORS (101)

Synectics Corp.

## 6. DOCUMENT DATE (110)

1978

## 7. NUMBER OF PAGES (120)

80p.

## 8. ARC NUMBER (170)

RP613.2.J76

## 9. REFERENCE ORGANIZATION (130)

Synectics

## 10. SUPPLEMENTARY NOTES (500)

## 11. ABSTRACT (950)

## 12. DESCRIPTORS (920)

Philippines  
Nutrition  
Education  
Food habits  
Malnutrition

Program evaluation

## 13. PROJECT NUMBER (150)

## 14. CONTRACT NO.(140)

AID/csd-3358

## 15. CONTRACT

TYPE (140)  
GTS

## 16. TYPE OF DOCUMENT (160)

R.P  
613.2  
J76

PN-AAH-384

**APPLICATIONS OF A FIELD GUIDE  
FOR EVALUATION OF NUTRITION EDUCATION  
TO PROGRAMS IN THE PHILIPPINES**

**AN EXPERIMENTAL APPROACH TO DETERMINATION  
OF THE EFFECTS ON FOOD BEHAVIOR IN  
LESSER DEVELOPED COUNTRIES**

**AUGUST 1978**

**Office of Nutrition  
Development Support Bureau  
Agency for International Development  
Washington, D.C.**

## **ACKNOWLEDGEMENTS**

The Synectics project staff wishes to extend its sincere appreciation to a number of persons in the Philippines without whose interest, dedication to the field of nutrition education, and just plain hard work, this report of demonstrations of effective evaluation could never have come into being. We gratefully acknowledge the outstanding contributions of the following:

Ms. Margarita Fortuna, who ably directed the BAEx evaluation of the Malnutrition Prevention Project; her evaluation team--Honorata P. Velarde, Mrs. Sergui Lanuza, Mrs. Rosario R. Icarro, and Mrs. Consuelo C. Felix; the coordinator for the Malnutrition Prevention Project, Milagros Ingco; the Chief of BAEx Home Economics Division within which the program is operated, Flora G. Berio; and the many dedicated Home Management Technicians in the provinces, who ably carried out the field work.

Mrs. Maria Lourdes Conocono, who directed the NNS evaluation of the Mothercraft Nutrition Centers; the Executive Director of the National Nutrition Service, Dr. Trinidad Gomez; and the many nutrition students from the University of the Philippines who assisted in the data coding and analysis.

Mrs. Delfina Aguillon, Assistant Executive Director, National Nutrition Center, the Philippines, who served as technical monitor to both of the evaluation studies.

Dr. Reuben Engel, Nutrition Offices, United States Agency for International Development in Manila, who served as mentor to the activities throughout the project.

Finally, we would like to thank Andromache Sismanidis, who, as nutrition consultant to the Agency for International Development first perceived the need for the evaluation methodology and monitored the development of the Field Guide applied in the evaluation efforts reported here.

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TO PROGRAMS IN THE PHILIPPINES**

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**The Agency for International Development  
Under Contract AID/csd-3358**

**31 AUGUST 1978**

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## SECTION I

### INTRODUCTION

#### Background

This report is the fourth in a series sponsored by the Agency for International Development (AID) to evolve a methodology and usage models for evaluation of effects of nutrition education on food behavior. The first report in the series presented the findings from a review of the literature, conducted by Dr. Floy Eugenia Whitehead (1970). It identified many conditions under which nutrition education can be expected to be effective, but pointed out the lack of any proven methodology for evaluation of effects or for the comparison of alternative educational approaches and determination of which has greater cost-effectiveness.

The review of the literature was followed by the development of a methodology and Field Guide for experimental evaluation of effects of education on behavioral change (Jones, Munger, & Altman, 1975). The developmental effort was guided by an international panel of experts, representing the various disciplines concerned with nutrition and measurement. Developmental testing was carried out in the country of Brazil by nationals, through application of the methodology to three separate programs. The findings from the applications in Brazil (Jones & Munger, 1975) led to considerable simplification of the language in the Field Guide, to deletion of data forms for measurement of behaviors other than food consumption, and permitted inclusion of concrete examples of data handling in the Field Guide. It did not, however, result in any major changes in the basic methodology.

In their review and discussion of the developmental testing results, the international panel of experts recommended that further applications of the Field Guide should be encouraged, with technical support and training as needed to insure effective use of the methodology. Nurturing application of the Field Guide is intended to serve a variety of purposes: provide further assessment of the methodology; provide evaluations of the programs to which the methodology was applied; serve as a training medium for representatives of key agencies involved in nutrition education in the developing countries; and provide additional real-world models to the accumulating documentation of useful experiences in evaluation of different approaches to nutrition education.

The field application in Brazil confirmed that, with orientation and modest training in the methodology, field personnel could conduct evaluation. However, the context of the application did not permit demonstration of the utility of the methodology for comparison of either effectiveness or cost-effectiveness of different educational approaches--information essential to policy decisions and to national nutrition planning activities. The Brazilian programs to which the methodology was applied were targeted to teenagers and adults, and had widely differing educational objectives and modes of operation. Persons conducting the evaluations were judged to be more sophisticated

about measurement than might be expected for the average user for whom the Field Guide is intended. Thus, the international panel of experts which served as advisors to the developmental study recommended that sites for further field demonstration be in countries less developed than for . . . . The panel further recommended that, if feasible, at least two demonstrations be carried out, each in a different country to permit assessment of the utility of the methodology for cost-effectiveness comparisons across national and cultural boundaries.

Additional recommendations and/or questions which were to be addressed in further field application were:

- ✓ Determination of the need for alternative and less sophisticated methods and exploration of possible techniques.
- ✓ Determination of the need for supplemental information to provide procedural models for measures of additional behaviors such as food acquisition, storage, and preparation.
- ✓ Further exploration of the need for AID to provide technical assistance to governments and to voluntary and international organizations in application of the methodology and/or the provision of additional materials which would reduce the need for such technical assistance.

### Conditions for Field Demonstration

Pursuant to the guidelines set forth by AID, the demonstrations of use of the methodology and Field Guide were to be planned and carried out by nationals in the developing country. The role of Synectics personnel was strictly that of technical advisor, and the extent of on-site assistance by Synectics was not to exceed 45 work days. In querying the developing countries as to their interest in conducting a demonstration project, AID set forth the following conditions:

- ✓ The nutrition education programs to be evaluated must be in place and ongoing.
- ✓ The programs must be targeted to the low-income populations in both urban and rural area, with the primary objective of nutrition for the under-five age group.
- ✓ The study design must be such as to yield a sample size sufficiently large to satisfy research purposes.
- ✓ The host government or sponsoring agency for the project must be able to provide the resources for carrying out the evaluation through at least three measurement periods.

The Republic of the Philippines, which has in recent years exerted great effort to upgrade the nutritional status of its population, met these conditions.

An orientation and training workshop was given at the Nutrition Center of the Philippines by the Synectics representatives in January 1977. Participants were representatives from department and agencies of the government and from volunteer agencies concerned with the Philippine Nutrition Program. At the outset of this workshop no decision had been made as to which of the several nutrition programs in the Philippines would serve to demonstrate application of the evaluation methodology. Rather, selection of the programs and designation of demonstration project directors evolved as part of the workshop itself--through discussion among the voice vote by the participants. Pending their Agency's approval, subsequently given, the following were designated for the demonstrations:

- ✓ The Malnutrition Prevention Projects, carried out by the Home Economics Division of the Bureau of Agriculture Extension (BAEx). Evaluation Project Director: Margarita Fortuna.
- ✓ The Mothercraft Nutrition Centers, carried out by the Department of Health's National Nutrition Service (NNS). Evaluation Project Director: Ma. Lourdes Conocono.

Within a week following acceptance of the responsibility for conducting a demonstration, each of the project directors had put together a tentative plan sufficient to submit a proposal to the National Nutrition Council (NNC) and seek approval to proceed with the demonstrations. Partial funding for the evaluation projects was provided by the NNC; resources roughly equivalent to those funds were contributed by BAEx and NNS. The project directors assembled the needed project personnel; coordinated efforts in-house, at the field sites, and with other agencies; recruited and trained data collectors; analyzed data; and prepared interim reports for the sponsors as well as for their respective agency management personnel.

The Synectics technical representative visited the study site on three subsequent occasions, coincidental with completion of sequential measurements. The primary purposes of these visits were to verify that the methodology was understood, to validate data scoring and data treatment, to participate in discussions, and to determine the ease or difficulty with which the users could apply the methodology. While such assistance does not constitute a "hands off" demonstration, it does imply a minimal role by the Synectics technical representative. Given that a week of the allotted technical assistance time was devoted to a multiagency workshop and selection of demonstration programs, actual technical assistance to each of the two demonstration projects was limited to approximately 20 days each over a period of 18 months.

### Conclusions and Recommendations

Need for further simplification of the evaluation methodology is not indicated by the applications projects in the Philippines. Persons with no prior experience or academic training in evaluation demonstrated that they could, with minimal technical assistance, effectively apply the methodology and make practical use of the results.

Initial orientation to the methodology, and some technical resource to guide customizing to specific evaluation problems, will almost always be needed in the developing country setting. Such assistance can, in most situations, be dispensed with after a team has successfully completed an evaluation project. For example, the project director in the Philippines, who had no prior experience was in process of planning her next evaluation project before the one reported herein was fully completed.

Documentation of experiences in use of the methodology, such as is represented by this report, provides models for other users and facilitates their customizing the methodology to their particular program needs. Further applications projects should be encouraged and supported. Agreements to document and share the evaluation experiences should be sought.

The program conditions in the Philippines did not permit testing of the utility of the methodology for cross-cultural comparisons. Nor did they permit comparison of cost-effectiveness of alternative approaches to achievement of common objectives with a common target audience. These residual test needs should be considered in selecting sites for further demonstrations in use of the methodology and Field Guide.

There is interest in supplemental tools which would facilitate use of the methodology where education addresses objectives other than dietary behavior. Such interest was most frequently expressed by host government and volar personnel contacted during the orientation phase of the demonstration project. Generally, persons concerned with evaluation processes can recognize the generalizability of the methodology presented in the Field Guide, but are hesitant to undertake developmental work to provide the special forms and instructions for field use. The development required is not all that difficult. In fact, both of the projects described herein achieved this development to a degree by including the criterion variable of nutritional level. How it was achieved is not evident. A project should be undertaken to illustrate the process of adapting the methodology to an area other than dietary behavior--e.g., sanitation, family planning, or food production--with the objective of providing instructions and an example of how the Guide can be generalized to such fields, and as an incentive for broader use of the methodology.

SECTION II  
OVERVIEW OF THE DEMONSTRATIONS

The Programs Evaluated

Both of the programs which participated in the demonstration are an integral part of the national Philippine Nutrition Program. The brief summary of key dimensions of the two programs, presented in Table 1, demonstrates important differences. The programs address different age groups within the preschool population. The Mothercraft Nutrition Centers are concerned with children from age 6 to 72 months, and with the subpopulation within that age group which has been determined to be malnourished. The Malnutrition Prevention Program is concerned with the infant up to age 18 months, and with the total population in that age group regardless of nutritional status. There is also a somewhat subtle but important difference in the purposes of the two programs. The focal point of the MPP is "prevention" of malnutrition; the focal point of MNC operations is cure or "rehabilitation." The effect of these differences on the demonstration was to negate the possibility of using the methodology to compare the cost-effectiveness of two different approaches to nutrition education. For demonstration purposes, the two program evaluation projects were treated as independent studies, the processes and results of which are presented in Sections III and IV, respectively.

Table 1  
Summary of the Programs Evaluated

PROGRAM CHARACTERISTICS	PROGRAM	
	Malnutrition Prevention Projects (MPP)	Mothercraft Nutrition Centers (MNC)
Parent Agency	Bureau of Agriculture Extension (BAEx), Home Economics Division	Department of Health, National Nutrition Service (NNS)
Target Audience	All infants age 1 month through 18 months, and their mothers	Malnourished children ages 6 months to 72 months, and their mothers
Primary Purpose	Prevention of the regression in nutrition level which customarily occurs during the first 18 months of life	Identification and treatment of the malnourished child, education of the mother in care of malnourished and prevention of malnourishment
Length of Treatment	Twelve months, once a week for 3 to 4 hours, plus a monthly weighing session	Two months, 6 days a week, 6 hours a day

## The Evaluation Projects

Key characteristics of the two evaluation projects are summarized in Table 2. The BAEx team conducted a quasi-experiment in five provinces in which the MPP program was newly introduced. All five study provinces were on the island of Luzon. The NNS team conducted a case study in five widely separated provinces roughly representing cultural differences in the country. Figure 1 shows the locations of the study sites for the two projects.

Both the BAEx and NNS projects used nutritional level as a criterion measure, each defining malnourished conditions in the same manner. Both used supplemental feeding as a criterion of success. BAEx elected to consider any supplemental food at age four months or older as positive behavior. NNS, working with an older audience, did not consider the supplemental feeding appropriate unless it contained food from all three of the desired food groups. Only the BAEx project used the quality of the mother's diet as a criterion measure--a consideration here is that nearly all of the mothers in the MPP would be lactating. Only NNS used the economic factors such as the use of low cost nutrients as criterion measures.

The sampling approaches for the two projects are quite different. BAEx used random sampling to obtain subsamples of the MPP participants in the study sites and to obtain control groups in similar communities. NNS included total communities in the baseline and all MNC participants at the study sites for follow-up measures. In addition, NNS used a random sampling of the nonparticipants from the baseline survey to provide data in the second posttreatment measure to test for dispersion effects.

## Management of the Projects

From the standpoint of level of ease or difficulty of utilization of the methodology and Field Guide, backgrounds and use experiences of the project directors are of special interest. Both project directors were in a sense "elected" to the task during the multiagency workshop on evaluation which preceded the demonstrations. Fortunately, both had been willing candidates and willingly accepted the responsibility.

The director of the BAEx project was not a member of the MPP program staff, but was fully acquainted with the MPP program. Her assigned position was that of subject matter specialist in the 4-H division of the Bureau of Agriculture Extension. She holds a Master of Science degree in Home Economics. Prior to her assignment to the Central 4-H staff she had served for a number of years as a Provincial Home Demonstrator in Batangas and Cagayan Provinces and had taught home economics at the college level in Baguio, Mountain Province. She had had no formal training in research, statistics, or evaluation. Management of the evaluation project was a part-time assignment for her and she continued her work in the 4-H division throughout the 18-month project. At the direction of the coordinator of the MPP, key members of both the central and provincial MPP staffs were available on an *ad hoc* basis to assist

Table 2  
Summary of the Evaluation Projects

PROJECT CHARACTERISTIC	EVALUATION PROJECT													
	Malnutrition Prevention Projects (MPP)	Mothercraft Nutrition Centers (MNC)												
Type of Study	Quasi-experiment	Case study												
Measures	1 pretreatment	1 pretreatment												
	2 posttreatment	2 posttreatment												
Criterion Variables	Nutritional level Supplementar feeding Mother's diet	Nutritional level Balanced diet Meat substitutes Rice extenders Leafy green and yellow vegetables												
Study Sites	<table border="0"> <tr> <td><u>Region</u></td> <td><u>Province</u></td> </tr> <tr> <td>Luzon</td> <td>Pangasinan Isabela Rizal Ilocos Norte Pampanga</td> </tr> </table>	<u>Region</u>	<u>Province</u>	Luzon	Pangasinan Isabela Rizal Ilocos Norte Pampanga	<table border="0"> <tr> <td><u>Region</u></td> <td><u>Province</u></td> </tr> <tr> <td>Luzon</td> <td>Ilocos Norte Albay</td> </tr> <tr> <td>Visayas</td> <td>Iloilo</td> </tr> <tr> <td>Mindanao</td> <td>Zamboanga del Norte Bukidnon</td> </tr> </table>	<u>Region</u>	<u>Province</u>	Luzon	Ilocos Norte Albay	Visayas	Iloilo	Mindanao	Zamboanga del Norte Bukidnon
<u>Region</u>	<u>Province</u>													
Luzon	Pangasinan Isabela Rizal Ilocos Norte Pampanga													
<u>Region</u>	<u>Province</u>													
Luzon	Ilocos Norte Albay													
Visayas	Iloilo													
Mindanao	Zamboanga del Norte Bukidnon													
Sample Size	$M_1 = 532$ participants $M_2 = 415$ participants $M_3 = 405$ participants	$M_1 = 829$ surveyed $M_2 = 122$ participants $M_3 = 87$ participants 171 nonparticipants												
Sample Selection	Random sampling of participants for the experimental group; random sampling of those included in a community survey for the control group.	a. All participants included in a project. b. Nonparticipant subsample from baseline survey.												

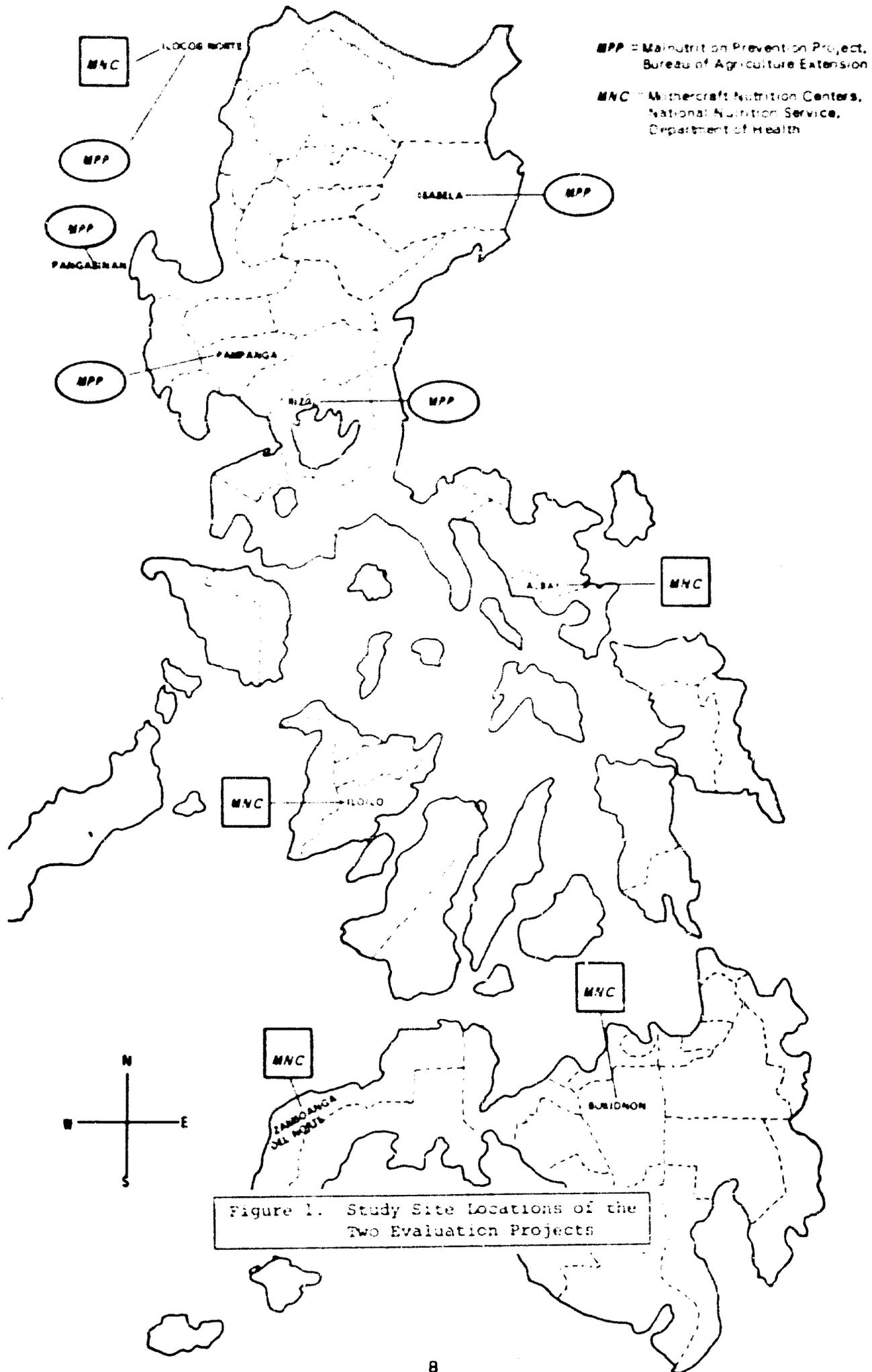


Figure 1. Study Site Locations of the Two Evaluation Projects

in the planning of the study, the design and pretest of data forms, training of data collectors, data collection, and the scoring and analysis of data.

The director of the NNS evaluation project had extensive training and experience for the assignment, including an intimate knowledge of the MNC program. She holds Baccalaureate degrees in both chemical engineering and food and nutrition science, and at the time of the evaluation was in the university program for the Master of Science degree in the latter discipline. She has been a member of the central NNS staff for a number of years and was currently assigned to the Research and Training Division, with responsibility for development of training for the MNC program. Prior to that assignment, she had served as a public health nutritionist, a technician in the mother-child health program, and as a member of the research staff for Proctor and Gamble Company of the Philippines. She has had extensive field work in nutrition, including work in Cebu, Indonesia, and India, under sponsorship of the World Health Organization. As with the BAEx project direction, the assignment to direct the NNS evaluation project was a part-time task concurrent with which the director continued her work in the Research and Training Division. She did not appear to involve other members of the NNS central staff in the evaluation activity, excepting to use the counsel and guidance of the Executive Director of NNS. Assistance of volunteer workers was successfully recruited for the tasks of scoring and tabulating the large amounts of field data.

### Estimated Costs of the Demonstration

The two demonstration projects were supported by the Philippine National Nutrition Council, and by the parent agencies of the programs being evaluated. Final cost data for the projects are not yet available, since the projects were not completed at the time of this report preparation. Data are available on the initial estimates of costs, submitted during the planning phases, and on the projected adequacy of funds available at the start of the third measurement, or about two-thirds of the way through the projects.

The MPP/BAEx study costs were initially estimated at U.S. \$6,438 (46,419 pesos), approximately half of which was contributed by BAEx in the form of personnel time. The cost estimate breakout was as follows: personnel, \$3,214 (23,173 pesos, contributed by BAEx); training sessions for data collectors, \$944 (6,800 pesos); travel and per diem, \$1,110 (8,000 pesos); supplies and materials including data forms, \$901 (6,500 pesos); and miscellaneous costs, including stipends for field workers, \$269 (1,940 pesos). With two-thirds of the project completed, the study team predicted that they had sufficient funds remaining to complete the study.

The MNC/NNS study costs were initially estimated at U.S. \$3,757 (27,086 pesos), about 60 percent of which was contributed by NNS. The cost breakout was as follows: personnel time, \$1,258 (9,068 pesos); training and payment of stipends to data collectors, \$735 (5,300 pesos); materials and supplies, \$180 (1,300 pesos); travel and per diem, \$1,096 (7,900 pesos); and miscellaneous costs including incentives for field personnel, \$488 (3,518 pesos).

With only two-thirds of the project completed, the NNS project staff had expended nearly all of the funds. A proposal was submitted to the National Nutrition Council for approximately \$499 (3,600 pesos) and the additional funding was provided. The project director predicted at this point that the study could be completed within the overall funding of \$4,256 (30,686 pesos).

SECTION III  
THE BAEX FIELD DEMONSTRATION

Background and Description of  
the Malnutrition Prevention Project

Studies have shown that infants generally grow normally during the first five months of life since they are usually breastfed and therefore their nutritional needs are adequately met. After the fifth month however, breast milk alone--even when the mother's milk production is maintained--is no longer sufficient to sustain the rapidly growing infant. Unless breast milk is supplemented by other foods, infants show a marked falling off in growth at about the sixth month of life, the retardation being accentuated during the child's second year. This finding has been substantiated by the results of a body weight survey of preschool children carried out by BAEx Home Management Technicians (HMTs) which shows that at one year of age infants, on the average, weigh only about 80 percent as much as they should and that the incidence of severe (third degree) malnutrition is highest among children 12 to 24 months old.

The seriousness of this malnutrition problem among the vulnerable group prompted the Bureau of Agricultural Extension, through its Home Economics Program Division, to undertake the Malnutrition Prevention Project. The project was undertaken in collaboration with NNC, NEDA, USAID, and UNICEF. It seeks to educate mothers, specifically those pregnant and lactating, through adequate information about good nutrition and infant feeding. The project was started in July 1975 in 390 barangays involving 130 Home Management Technicians in 24 provinces. In January 1977 it was expanded to 135 barangays in 10 additional provinces involving 45 additional Home Management Technicians.

The general objective of the Malnutrition Prevention Project is to "implement a Nutrition/Green Revolution/Family Planning campaign which will assure a nutritionally healthy infant population." Specific objectives include:

- ✓ For infants to maintain a progressive and satisfactory weight gain.
- ✓ For homemakers to introduce adequate supplementary foods to infants at the age of five months or earlier, using locally grown foods.
- ✓ For families to be encouraged to establish home food production projects such as community and backyard gardens and poultry, swine, and fish production.
- ✓ For mothers to be motivated to practice family planning.

Special emphasis is placed on the preparation and giving of supplementary foods to infants at the fifth month or earlier; maintaining a progressive weight gain for infants; and building up body reserves in infants against deficits in calories and proteins that result from the decreasing amount of breast milk. The infants are weighed every month.

Pregnant and nursing mothers are organized to form Homemakers' Classes wherein nutrition education is emphasized by the Home Management Technician along with the five phases of Home Economics--Foods and Nutrition, Home Management, Child Development and Family Life, Home Industry, and Clothing. Classes meet once a week for a period of one year. Through these classes, the mothers are taught how to prepare a variety of supplementary or weaning foods. Methods of instruction include lecture sessions, cooking, and feeding demonstrations, group discussions and field trips. Teaching is strengthened with the use of films or slides, posters, and other teaching aids. Resource persons may be invited from cooperating agencies.

### Description of the Evaluation Study

The evaluation attempted to determine some effects of nutrition education in changing food habits, and to assess the cost effectiveness of the Malnutrition Prevention Project in the five provinces of Ilocos Norte, Pangasinan, Isabela, Pampanga and Rizal. The evaluation methodology focused on food behavior to the exclusion of measures of knowledge, attitudes, and administrative efficiency. It was not a dietary survey which employs actual food quantity (weight and volume) measures. Such surveys are not only costly and time consuming but require techniques outside the Field Guide methodology being applied. Moreover, the three-pronged regional nutritional surveys undertaken by the Food and Nutrition Research Institute (formerly Food and Nutrition Research Centers) more than serve the purpose of the BAEx.

As a program activity, the evaluation was concerned with the achievement or nonachievement of program objectives. The evaluation information was to be used to modify program goals and strategies and to come up with a simple but reliable means of evaluating educational impact for continued use in the never ending cycle of "program building to meet current needs and situations."

### Objectives and Criteria for the MPP Evaluation

The evaluation objectives were directly tied to those MPP operational objectives deemed most critical. They concerned the nutritional level of the child, the practice of using weaning foods, and the dietary practices appropriate to the needs of lactating mothers.

- ✓ Child's Nutritional Level. The first objective of the evaluation was to determine if and to what extent the MPP had the desired effect of preventing a regression in nutritional level during the first 18 months of life. Nutritional levels used were those defined by the New Philippine Nutrition Program (NPNP).

Figure 2 illustrates the manner in which the NPNP definition translates weight for age and percent of standard to levels and degrees of malnutrition. Ten nutritional levels are possible under the scheme, only one of which is normal health. For purposes of the evaluation, the team elected to establish a cutoff point at midpoint of first degree malnutrition, or at level 3. A nutritional level of 3 or better (1, 2, or 3) was considered "appropriate" or a (+) condition; a nutritional level of 4 or worse (4 through 10) was considered "inappropriate" or a (-) condition.

**NUTRITIONAL LEVELS BY WEIGHT FOR AGE  
IN DEGREE OF MALNUTRITION, PERCENT OF STANDARD  
AND NUTRITIONAL LEVEL**

AGE IN MONTHS	THIRD DEGREE			SECOND DEGREE			FIRST DEGREE			NORMAL AND UP	
	Below to 50%	51% to 55%	56% to 60%	61% to 65%	66% to 70%	71% to 75%	76% to 80%	81% to 85%	86% to 90%		91% to 100%
	10	9	8	7	6	5	4	3	2		1
0	1.7	1.9	2.0	2.2	2.4	2.6	2.7	2.9	3.1	3.4	
1	2.1	2.3	2.5	2.7	2.9	3.2	3.4	3.6	3.8	4.2	
2	2.2	2.8	3.0	3.2	3.5	3.6	4.0	4.2	4.5	5.0	
3	2.9	3.1	3.4	3.7	4.0	4.3	4.6	4.8	5.1	5.7	
4	3.2	3.5	3.8	4.1	4.4	4.7	5.0	5.4	5.7	6.3	
5	3.4	3.8	4.1	4.5	4.8	5.2	5.5	5.9	6.2	6.9	
6	3.7	4.1	4.4	4.8	5.2	5.6	5.9	6.3	6.7	7.4	
7	4.0	4.3	4.7	5.0	5.4	5.9	6.3	6.7	7.1	7.9	
8	4.3	4.7	5.0	5.4	5.8	6.3	6.7	7.1	7.5	8.4	
9	4.6	5.0	5.4	5.8	6.2	6.7	7.1	7.6	8.0	9.0	
10	4.9	5.3	5.7	6.1	6.5	7.0	7.4	7.8	8.3	9.4	
11	5.2	5.6	6.0	6.4	6.8	7.3	7.7	8.1	8.6	9.8	
12	5.5	5.9	6.3	6.7	7.1	7.6	8.0	8.4	8.9	10.2	
13	5.8	6.2	6.6	7.0	7.4	7.9	8.3	8.7	9.2	10.6	
14	6.1	6.5	6.9	7.3	7.7	8.2	8.6	9.0	9.5	11.0	
15	6.4	6.8	7.2	7.6	8.0	8.5	8.9	9.3	9.8	11.4	
16	6.7	7.1	7.5	7.9	8.3	8.8	9.2	9.6	10.1	11.8	
17	7.0	7.4	7.8	8.2	8.6	9.1	9.5	9.9	10.4	12.2	
18	7.3	7.7	8.1	8.5	8.9	9.4	9.8	10.2	10.7	12.6	
19	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	11.0	13.0	
20	7.9	8.3	8.7	9.1	9.5	10.0	10.4	10.8	11.3	13.4	
21	8.2	8.6	9.0	9.4	9.8	10.3	10.7	11.1	11.6	13.8	
22	8.5	8.9	9.3	9.7	10.1	10.6	11.0	11.4	11.9	14.2	
23	8.8	9.2	9.6	10.0	10.4	10.9	11.3	11.7	12.2	14.6	
24	9.1	9.5	9.9	10.3	10.7	11.2	11.6	12.0	12.5	15.0	
25	9.4	9.8	10.2	10.6	11.0	11.5	11.9	12.3	12.8	15.4	
26	9.7	10.1	10.5	10.9	11.3	11.8	12.2	12.6	13.1	15.8	
27	10.0	10.4	10.8	11.2	11.6	12.1	12.5	12.9	13.4	16.2	
28	10.3	10.7	11.1	11.5	11.9	12.4	12.8	13.2	13.7	16.6	
29	10.6	11.0	11.4	11.8	12.2	12.7	13.1	13.5	14.0	17.0	
30	10.9	11.3	11.7	12.1	12.5	13.0	13.4	13.8	14.3	17.4	
31	11.2	11.6	12.0	12.4	12.8	13.3	13.7	14.1	14.6	17.8	
32	11.5	11.9	12.3	12.7	13.1	13.6	14.0	14.4	14.9	18.2	
33	11.8	12.2	12.6	13.0	13.4	13.9	14.3	14.7	15.2	18.6	
34	12.1	12.5	12.9	13.3	13.7	14.2	14.6	15.0	15.5	19.0	
35	12.4	12.8	13.2	13.6	14.0	14.5	14.9	15.3	15.8	19.4	
36	12.7	13.1	13.5	13.9	14.3	14.8	15.2	15.6	16.1	19.8	
37	13.0	13.4	13.8	14.2	14.6	15.1	15.5	15.9	16.4	20.2	
38	13.3	13.7	14.1	14.5	14.9	15.4	15.8	16.2	16.7	20.6	
39	13.6	14.0	14.4	14.8	15.2	15.7	16.1	16.5	17.0	21.0	
40	13.9	14.3	14.7	15.1	15.5	16.0	16.4	16.8	17.3	21.4	
41	14.2	14.6	15.0	15.4	15.8	16.3	16.7	17.1	17.6	21.8	
42	14.5	14.9	15.3	15.7	16.1	16.6	17.0	17.4	17.9	22.2	
43	14.8	15.2	15.6	16.0	16.4	16.9	17.3	17.7	18.2	22.6	
44	15.1	15.5	15.9	16.3	16.7	17.2	17.6	18.0	18.5	23.0	
45	15.4	15.8	16.2	16.6	17.0	17.5	17.9	18.3	18.8	23.4	
46	15.7	16.1	16.5	16.9	17.3	17.8	18.2	18.6	19.1	23.8	
47	16.0	16.4	16.8	17.2	17.6	18.1	18.5	18.9	19.4	24.2	
48	16.3	16.7	17.1	17.5	17.9	18.4	18.8	19.2	19.7	24.6	
49	16.6	17.0	17.4	17.8	18.2	18.7	19.1	19.5	20.0	25.0	
50	16.9	17.3	17.7	18.1	18.5	19.0	19.4	19.8	20.3	25.4	
51	17.2	17.6	18.0	18.4	18.8	19.3	19.7	20.1	20.6	25.8	
52	17.5	17.9	18.3	18.7	19.1	19.6	20.0	20.4	20.9	26.2	
53	17.8	18.2	18.6	19.0	19.4	19.9	20.3	20.7	21.2	26.6	
54	18.1	18.5	18.9	19.3	19.7	20.2	20.6	21.0	21.5	27.0	
55	18.4	18.8	19.2	19.6	20.0	20.5	20.9	21.3	21.8	27.4	
56	18.7	19.1	19.5	19.9	20.3	20.8	21.2	21.6	22.1	27.8	
57	19.0	19.4	19.8	20.2	20.6	21.1	21.5	21.9	22.4	28.2	
58	19.3	19.7	20.1	20.5	20.9	21.4	21.8	22.2	22.7	28.6	
59	19.6	20.0	20.4	20.8	21.2	21.7	22.1	22.5	23.0	29.0	

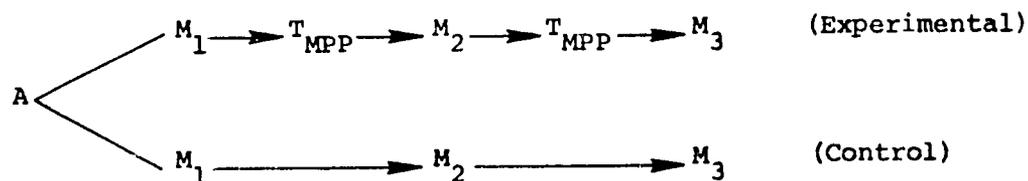
*Weights have been rounded to the nearest 1/10 kg.  
Figures indicate upper limit of nutritional level.*

Figure 2. Nutritional Levels as Defined by the  
New Philippine Nutrition Program (NPNP)

- ✓ Supplementary or Weaning Food. The second objective was to determine if and to what extent the MPP is effective in leading mothers to feed infants supplementary foods commencing at age four months or earlier. This objective is closely related to the preceding one in that failure to introduce nutritious supplementary feeding in early months is a direct cause of malnutrition. For purposes of the evaluation, any of a variety of foods--cereal, fruit, cooked vegetables, mungo or other dry beans, the MPP mix, the FNRI mix, etc.--was deemed appropriate, a (+) effect. Concern was not with amounts, but simply that the practice of supplementary feeding had been initiated.
- ✓ Mother's Diet. This objective was to determine if and to what extent the MPP was effective in encouraging mothers of infants to consume foods rich in animal or vegetable protein, fats, and leafy green or yellow vegetables. Again, the concern was not with amounts of food but with variety and richness of diet in nutrients appropriate to nursing mothers. Only if all three food groups were included in a mother's diet was it considered an appropriate diet, a (+) effect.

### Evaluation Study Design

From the outset, the BAEx staff decided upon an experimental type study using a control group. They were able to do this by selecting the control sample from a nonproject location near the project location. Their design is identified as a quasi-experimental design since it was not possible for subjects to be assigned to the experimental or control group on a random basis. The BAEx study design is shown as:



Where:

- A = assignment of subjects to the experimental and control groups.
- M<sub>1</sub> = the first or baseline measure.
- M<sub>2</sub> = a second measure, in this instance six months after the first measure.
- M<sub>3</sub> = a third measure, in this instance six months after the second measure.
- T<sub>MPP</sub> = exposure to the MPP educational program.

## Study Sites and Samples

A primary consideration in the selection of study sites was the need for one or more provinces where pre-MPP baseline data could be obtained. In early 1977, the expanding MPP was to be initiated in 10 additional provinces, five on the Island of Luzon and an additional five in the Visayas and Mindanao. In order to reduce travel costs, to facilitate monitoring of activities, and for reasons of general accessibility, it was decided to restrict the evaluation project to the Island of Luzon. All five expansion provinces on Luzon--and 25 barangays, equally distributed among the five provinces--were included in the project.

Each province is staffed by five Home Management Technicians (HMT) and a supervising HMT. Each HMT, excluding the supervisor, works with three barangays (barrios, or small communities). The sample of 25 MPP barangays for inclusion in the study was chosen by random selection of one barangay each for each of the 5 HMTs in each of the 5 provinces.

The subjects for the experimental group were the mothers and their infants enrolled in the Homemaker Classes set up by MPP. The experimental group consisted of 250 mother-infant combinations, 10 drawn randomly from each of the Homemaker Classes in the 25 randomly selected barangays. The control group was drawn from more or less the same general population as the experimental group taking into consideration age, socio-economic, educational, and cultural background. A non-MPP barangay proximal to each MPP barangay was used in order to minimize travel costs and time for the HMTs who did the field work.

## The Data Collection Instruments

The data collection instruments designed by the BAEx team for the MPP evaluation were patterned closely after those presented in the Field Guide. The MPP evaluation questionnaire formats are shown in Appendix A.

## Schedule of Project Activities

At the outset, the evaluation team prepared a week-by-week schedule of activities, identifying for each activity its purpose, the resource personnel who would be involved, and any logistical problems which needed to be resolved. The schedule was divided into three phases for each of which a narrative description was prepared. These phases were: (1) the baseline survey to establish comparability of the experimental and control groups and a basis for measuring effects of the MPP; (2) evaluation of the program after six months of operation to determine if expected changes had taken place in the behavior of the experimental group; and (3) evaluation of the program after its full year of operation. The schedule is shown in Table 3.

Table 3

## Schedule of MPP Project Activities

Activity Sequence (Tentative Date)	Activity	Purpose	Personnel Involved	Logistics
PHASE I Feb. 77 - 3rd week	W/HED Chief, confer with HEES I involved in the evaluation project	To orient on the purpose and mechanics of evaluation study	Project Leader Action Officers	
4th week	Review estimate cost of program operation  Finalize Project Proposal  Representation of Project Plan to the Commissioner  Preparation for training of data collectors	To obtain official approval	Project Leader Action Officers	
Mar. 77 - 3rd week	Each Action Officer to have a look see of respective MPP expansion provinces  Pre-test data collection forms  Selection of study site  Review of evaluation plans and forms  Multiplication of data form	To orient PA & SHED on the mechanics of the project and obtain support  To refine data instrument	Project Leaders Action Officers  SHMT, HEES I	NNC Fund
Apr. 77 - 2nd week	Training of data collec- tors (2 days)	To obtain an accurate and complete data	Project Leader Action Officers Clerk/typist  Resource persons 25 MPP Expansion HMTs	NNC Fund

Table 3 (Continued)

Activity Sequence (Tentative Date)	Activity	Purpose	Personnel Involved	Logistics
PHASE I (Cont.)				
Apr. 77 - 3rd week	Do first measurement (M <sub>1</sub> ) (15 days)	To obtain baseline data	25 data collectors (HMTs)	NNC Fund
4th week	Do first measurement (M <sub>1</sub> ) (15 days)	To obtain baseline data	25 data collectors	NNC Fund
May 77 - 1st week	Quantification and pre- liminary analysis of data	Use Field Guide pp. 50-64  Use worksheet	Synectics Consul- tants  Action Officers Statistician	NNC Fund
May to October	Homemakers' Classes (6 months)  HMT to record agency inputs and community resources utilized for MPP implementation esti- mate monetary value of above. Record all expens- es incidental to MPP implementation in the barangay with the experimental group.	For evaluation and documenta- tion  For cost effectiveness	25 MPP HMTs  25 HMTs of the 5 expansion provinces	
Oct. 77 - 3rd week	Preparation of M <sub>2</sub> Evalua- tion Tool  Training of Data Collec- tors for second measure- ment		Project Leader Action Officer 25 Data Collectors	NNC Fund

Table 3 (Continued)

Activity Sequence (Tentative Date)	Activity	Purpose	Personnel Involved	Logistics
PHASE I (Cont.) Oct. 77 - 4th week	Second Measurement ( $M_2$ ) (15 days)	To measure educational impact after 6 months treatment	Statistician/ Analyst New set of trained HMT data collector	NNC Fund
Nov. 77 - 1st week	(Same as above)	(Same as above)	(Same as above)	
2nd week	Quantification and Analysis	Use Field Guide pp. 64	Action Officers	
3rd week	(Same as above)	(Same as above)	(Same as above)	
Nov. 77 to March 78	Homemakers' Classes (T2) (5 months)  HMT to record all expense incidental to the MPP implementation in the barangay with the experi- mental group. HMT to give an estimate of monetary value donated resources utilized with experimental group.	For evaluation and documenta- tion	25 MPP HMTs of the 5 MPP expansion provinces	
Mar. 78 - 3rd week 4th week	Third Measurement ( $M_3$ ) (10 days)	To measure educational impact after one year treatment to determine cost effectiveness of Malnutrition Prevention Project	25 data collectors Action Officers	NNC Fund
Apr. 78 - 1st week 2nd week 3rd week 4th week	Quantification and analysis Writing Report	Use Field Guide p. 64 to draw possible conclusions from study and make recommendations based on study	Statistician Project Leader Action Officers Synectics Consu- tants	NNC Fund

## Findings from the BAEx Evaluation of the MPP

### : The Baseline Measure

The MPP was initiated in the expansion provinces in late February 1977. While the evaluation team made a heroic effort to get a baseline measure taken before the educational aspects of the program were underway, they were not completely successful. The administrative time required to arrange funding, and the need to plan the project and train the data collectors led to the baseline measure being initiated in April and completed in May 1977. By May, the MPP educational activity was already underway in most locations.

For the baseline measure, data were obtained from 250 mother-child combinations for the experimental group and for 233 in the control group. The analysis for these two groups on this first measure is shown in Figure 3. The data demonstrate that the experimental and control groups are essentially comparable in terms of nutritional level for the infants' and mothers' dietary patterns ( $p > .10$ ). There is, however, a highly significant difference on the practice of supplemental feeding for the infants ( $p < .001$ ). It was judged this difference could be a direct result of the exposure of the experimental group to the beginning of the MPP education. Supplemental feeding would logically be the first of the three criterion variables to be effected by the MPP. The chi square analysis was done separately for the first three provinces in which data collection was completed and is shown in Figure 4. This analysis shows no significant difference between experimental and control groups and appears to confirm that the sharp difference demonstrated in Figure 3 is likely the result of exposure to the MPP project during the latter part of baseline data collection.

### Comparison of the Experimental and Control Groups on the Second Measure

Measurement 2 data were collected six months after the initiation of the MPP in the expansion provinces. The chi square analysis of these data is shown in Figure 5. The findings on each of the three criterion variables are presented below.

- ✓ Nutritional Level. Patterns of behavioral shift data for the experimental and control groups are highly similar, and do not demonstrate a significant difference one from the other ( $p > .10$ ). There is no evidence that MPP is having a positive impact on nutritional level over the first six months of operation.
- ✓ Supplemental Foods. The experimental and control groups continue to demonstrate a significant difference on this variable, with the experimental group maintaining its appropriate (+) behavior and the control group more frequently shifting from inappropriate (-) to appropriate (+) behavior than the experimental group. Since the two groups were not comparable on this variable on the first measure, the result here is difficult to

ANALYSIS FOR TWO GROUPS WITH ONE MEASURE

WORKSHEET NUMBER 2

GROUP 1 Experimental GROUP 2 Control

Enter the totals from the bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through f and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES					
		1 Nutritional Level		2 Supplement Foods		3 Moture Die	
		N	%	N	%	N	%
a: (+) Behavior		204	81.6	120	80.0	198	17.2
b: (-) Behavior		46	18.4	30	20.0	52	20.8
c: TOTAL (a + b)		250	100.0	150	100.0	250	100.0
d: (+) Behavior		189	82.9	62	57.9	168	72.1
e: (-) Behavior		39	17.1	45	42.1	65	27.9
f: TOTAL (d + e)		228	100.0	107	100.0	233	100.0
g: a + d		393		182		366	
h: b + e		85		75		117	
i: g + h		478		257		483	
j: c x g ÷ i		205.54		106.23		189.44	
k: c x h ÷ i		44.46		43.77		60.56	
l: f x g ÷ i		187.46		75.77		176.56	
m: f x h ÷ i		40.54		31.23		56.44	
n:  a - j  - .5		1.04		13.27		8.06	
o:  b - k  - .5		1.04		13.27		8.06	
p:  d - l  - .5		1.04		13.27		8.06	
q:  e - m  - .5		1.04		13.27		8.06	
r: n <sup>2</sup>		1.08		176.09		64.96	
s: o <sup>2</sup>		1.08		176.09		64.96	
t: p <sup>2</sup>		1.08		176.09		64.96	
u: q <sup>2</sup>		1.08		176.09		64.96	
v: r ÷ j		0.01		1.66		0.34	
w: s ÷ k		0.02		4.02		1.07	
x: t ÷ l		0.01		2.32		0.37	
y: u ÷ m		0.03		5.64		1.15	
z: Degrees of freedom		1		1		1	
A: Chi Square (v+w+x+y)		0.07		13.64		2.93	
B: Significance of difference		> 0.10		< 0.001		> 0.10	
C: Degrees of freedom (Sum of row "z" for Categories used)						3	
D: Chi Square (Sum of row "A" entries)						16.64	
E: Significance of difference						< 0.001	

Figure 3. Comparison of Pretreatment Scores for the MPP Experimental and Control Groups

ANALYSIS FOR TWO GROUPS WITH ONE MEASURE

WORKSHEET NUMBER 2

GROUP 1 Experimental GROUP 2 Control

Enter the totals from the bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through f and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES					
		1 Nutrition Level		2 Supplement Food		3 Mother's Diet	
		N	%	N	%	N	%
a:	(+) Behavior	27	21.3	17	27.0	24	20.7
b:	(-) Behavior	100	78.7	46	73.0	92	79.3
c:	TOTAL (a + b)	127	100.0	63	100.0	116	100.0
d:	(+) Behavior	14	12.4	24	39.3	26	23.4
e:	(-) Behavior	99	87.6	37	60.7	83	76.6
f:	TOTAL (d + e)	113	100.0	61	100.0	111	100.0
g:	a + d	41		41		50	
h:	b + e	199		83		177	
i:	g + h	240		124		227	
j:	c x g ÷ i	21.70		20.83		25.55	
k:	c x h ÷ i	105.30		42.17		90.45	
l:	f x g ÷ i	19.30		20.17		24.45	
m:	f x h ÷ i	93.70		40.83		86.55	
n:	a - j  - .5	4.80		3.53		1.05	
o:	b - k  - .5	4.80		3.53		1.05	
p:	d - l  - .5	4.80		3.53		1.05	
q:	e - m  - .5	4.80		3.53		1.05	
r:	n <sup>2</sup>	23.04		12.46		1.10	
s:	o <sup>2</sup>	23.04		12.46		1.10	
t:	p <sup>2</sup>	23.04		12.46		1.10	
u:	q <sup>2</sup>	23.04		12.46		1.10	
v:	r ÷ j	1.06		0.60		0.04	
w:	s ÷ k	0.22		0.30		0.01	
x:	t ÷ l	1.19		0.62		0.04	
y:	u ÷ m	0.25		0.31		0.01	
z:	Degrees of freedom	1		1		1	
A:	Chi Square (v+w+x+y)	2.72		1.83		0.10	
B:	Significance of difference	> 0.10		> 0.10		> 0.10	
C:	Degrees of freedom (Sum of row "z" for Categories used)					3	
D:	Chi Square (Sum of row "A" entries)					4.65	
E:	Significance of difference					> 0.10	

Figure 4. Comparison of Pretreatment Scores for the MPP Experimental and Control Groups at Three Locations (Isabela, Pampanga, and Pangasinan only)

ANALYSIS FOR TWO GROUPS WITH TWO MEASURES

GROUP 1 Experimental

GROUP 2 Control

WORKSHEET NUMBER 3

Enter the totals from the bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through j and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES					
		Nutr. Level		Suppl. Food		Mother's diet	
		N	%	N	%	N	%
a:	(-) + (+)	13	6.0	28	22.6	33	15.1
b:	(+) + (-)	54	24.8	0	0	32	14.7
c:	(+) + (+)	124	56.8	96	77.4	146	67.0
d:	(-) + (-)	27	12.4	0	0	7	3.2
e:	Total (a + b + c + d)	218	100.0	124	100.0	218	100.0
f:	(-) + (+)	7	3.6	35	36.5	32	16.2
g:	(+) + (-)	59	30.7	3	3.1	55	27.9
h:	(+) + (+)	103	53.7	53	55.2	91	46.2
i:	(-) + (-)	23	12.0	5	5.2	19	9.7
j:	Total (f + g + h + i)	192	100.0	96	100.0	197	100.0
k:	a + f	20		63		65	
l:	b + g	113		3		87	
m:	c + h	227		149		237	
n:	d + i	50		5		26	
o:	(e x k) ÷ (e + j)	10.63		35.51		34.14	
p:	(e x l) ÷ (e + j)	60.08		1.69		45.70	
q:	(e x m) ÷ (e + j)	20.70		83.98		124.50	
r:	(e x n) ÷ (e + j)	26.59		2.82		13.66	
s:	(j x k) ÷ (e + j)	9.37		27.49		30.86	
t:	(j x l) ÷ (e + j)	52.92		1.31		41.30	
u:	(j x m) ÷ (e + j)	106.30		65.02		112.50	
v:	(j x n) ÷ (e + j)	23.41		2.18		12.34	
w:	a - o  <sup>2</sup> ÷ o	0.53		1.59		0.04	
x:	b - p  <sup>2</sup> ÷ p	0.62		1.69		4.11	
y:	c - q  <sup>2</sup> ÷ q	0.09		1.72		3.71	
z:	d - r  <sup>2</sup> ÷ r	0.01		2.82		3.25	
A:	f - s  <sup>2</sup> ÷ s	0.60		2.05		0.04	
B:	g - t  <sup>2</sup> ÷ t	0.70		2.18		4.54	
C:	h - u  <sup>2</sup> ÷ u	0.10		2.22		4.11	
D:	i - v  <sup>2</sup> ÷ v	0.01		3.65		3.59	
E:	Degrees of freedom	3		3		3	
F:	Chi Square $\frac{(w+x+y+z+A+B+C+D)}{A+B+C+D}$	2.66		17.92		23.39	
G:	Significance of difference	> 0.10		< 0.001		< 0.001	
H:	Degrees of freedom (Sum of row "E" for Categories used)	9					
I:	Chi Square (Sum of row "F" entries)	43.97					
J:	Significance of difference	< 0.001					

Figure 5. Comparison of First Posttreatment Scores for the IIPP Experimental and Control Groups.

evaluate. The meaning of the result is further obscured by the fact that the criterion of supplemental feeding did not apply for infants under four months of age at the time of the first measure. All of those infants would be of an age at which supplemental foods would be appropriate at a measure taken six months later, but no initial measure for comparison is available. It is interesting to note that by Measure 2, all of the experimental group and 91.7 percent of those in the control group were receiving supplemental foods.

- ✓ Mother's Diet. These data demonstrate a significant difference between the experimental and control groups ( $p < .001$ ). The difference, however, is not related to improvement in diets. About the same percentage (15.1%) of the experimental group shifted from inappropriate to appropriate diets as did in the control group (16.2%). The difference lies in the fact that more of the control subjects who were eating an appropriate diet at the outset, shifted to inappropriate diets at Measurement 2 than did in the experimental group. Of the 146 control group subjects who demonstrated appropriate behavior (+) at Measurement 1, 55 mothers (or 37.7%) shifted to inappropriate behavior at Measurement 2; of the 178 experimental subjects who demonstrated appropriate behavior (+) at Measurement 1, only 32 infants (or 18.0%) shifted to inappropriate behavior (-). Since the second measure was taken during the rainy season, the data can be interpreted as a positive effect for the MPP.

#### Comparison of the Experimental and Control Groups on the Third Measure

Measurement 3 was taken during April and May 1978, approximately one year after the pretreatment measure was taken. The raw data were scored and quantified in the same manner as for the preceding measure, using the criteria described on pages 12 and 13. Worksheet Number 1 was used to demonstrate changes in behavior over the year of program operation by comparing behavior at  $M_1$  with that observed at  $M_3$  for each individual in the sample. The worksheets are too voluminous to reproduce in this report. The tallies from the worksheets for each province, and for the total experimental and control groups are presented in Figures 6 and 7. These data provide direct inputs to the chi square tests of difference between the experimental and control groups on respective criterion variables and determination of effects of the MPP.

The chi square analysis is shown in Figure 8. It demonstrates a significant difference ( $p < .001$ ) between the experimental and control groups on the data category, nutritional level. To determine whether this difference is in the desired direction, i.e., demonstrates positive effects of the program, one needs to examine the data on how many of the babies in each group were well before the program was implemented, and what percentage of those well babies were still well babies after the one-year period of MPP operation. The answer to these questions can be seen in steps b, c, g, and h of the formula presented in Figure 8.

SUMMARY SHEET FOR RECORDING SEQUENTIAL MEASURES AND CHANGES IN DIETS FOR INDIVIDUALS IN A GROUP

GROUP: <u>m.p.p.</u> <u>Experimental</u>	DIETARY MEASURES												DIRECTION OF CHANGE IN DIETS OVER TIME											
	DATA CATEGORIES												DATA CATEGORIES											
	1				2				3				1				2				3			
	Nutr. Level				Suppl. Food				Mothers Diet				Nutr. Level				Suppl. Food				Mothers Diet			
PROVINCES	Measure 1		Measure 2		Measure 1		Measure 3		Measure 1		Measure 3		-	+	+	-	-	+	+	-	-	+	+	-
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
<u>Pampanga</u>	43	7	24	18	21	10	42	0	41	8	41	1	1	14	23	4	9	0	19	0	6	0	34	1
<u>Pangasinan</u>	33	17	22	22	29	3	43	1	47	3	44	0	3	6	23	12	2	0	26	0	3	0	40	0
<u>Izabela</u>	44	6	21	23	19	6	44	0	34	16	44	0	0	19	22	3	5	0	19	0	13	0	31	0
<u>Rizal</u>	37	13	22	9	26	10	29	2	37	13	30	1	3	6	19	3	6	1	15	0	7	1	23	0
<u>Ilocos Norte</u>	45	5	24	21	25	5	45	0	38	12	38	8	2	19	23	1	4	0	22	0	6	3	31	6
a. Total Number in Each Column	202	48	113	93	120	34	203	3	197	52	197	10	9	64	110	23	26	1	101	0	35	4	159	7
b. Total Number of Individuals in Group *	250		206		154		206		249		207		206				128				205			
c. Percent: (a ÷ b) x 100	80.8	19.2	54.9	45.1	77.9	22.1	98.5	1.5	79.1	20.9	95.2	4.8	4.4	31.1	53.4	11.1	20.3	.8	78.9	0	17.1	2.0	77.6	3.3

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\*NOTE: The number of individuals in a group may differ for sequential measures.

Figure 6. Summary of Experimental Group Behavioral Shifts from First to Third Measure, by Province

SUMMARY SHEET FOR RECORDING SEQUENTIAL MEASURES AND CHANGES IN DIETS FOR INDIVIDUALS IN A GROUP

GROUP: <i>mop</i> <i>Control</i>	DIETARY MEASURES												DIRECTION OF CHANGE IN DIETS OVER TIME																							
	DATA CATEGORIES												DATA CATEGORIES																							
	1				2				3				1				2				3															
	<i>Nutr. Level</i>				<i>Suppl. Food</i>				<i>Mother's Diet</i>				<i>Nutr. Level</i>				<i>Suppl. Food</i>				<i>Mother's Diet</i>															
PROVINCES	Measure 1		Measure 3		Measure 1		Measure 3		Measure 1		Measure 3		-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-			
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-				
<i>Pampanga</i>	45	5	21	23	11	10	43	1	43	7	41	3	2	21	19	2	8	0	10	0	6	2	35	1												
<i>Pangasinan</i>	42	6	9	28	17	8	36	1	37	11	32	5	0	22	9	6	8	0	12	0	9	3	23	2												
<i>Isabela</i>	38	12	6	31	14	15	36	1	30	20	14	22	1	22	6	8	13	0	11	0	3	17	10	5												
<i>Rizal</i>	29	13	15	22	16	9	37	0	38	9	32	5	4	9	12	8	9	0	12	0	4	6	25	4												
<i>Ilocos Norte</i>	42	3	14	23	11	6	35	1	26	20	28	9	0	18	13	2	1	0	10	0	10	3	18	6												
a. Total Number in Each Column	196	39	65	127	69	48	187	4	174	67	147	44	7	92	59	26	39	0	55	0	32	31	111	18												
b. Total Number of Individuals in Group *	235		192		116		191		241		191		184				94				192															
c. Percent: (a - b) x 100	83.4	16.6	33.9	66.1	59.6	41.4	97.9	2.1	72.2	27.8	77.0	23.0	3.8	58.0	32.1	14.1	41.5	0	58.5	0	16.7	16.1	57.8	9.4												

\*NOTE: The number of individuals in a group may differ for sequential measures.

Figure 7. Summary of Control Group Behavioral Shifts from First to Third Measure, by Province

ANALYSIS FOR TWO GROUPS WITH TWO MEASURES

GROUP 1 Experimental GROUP 2 Control

WORKSHEET NUMBER 3

Enter the totals from the bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through j and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES					
		1 <u>Nutri. Level</u>		2 <u>Suppl. Food</u>		3 <u>Restrict. Diet</u>	
		N	%	N	%	N	%
a:	(-) → (+)	9	4.4	26	20.3	35	17.1
b:	(+) → (-)	64	31.1	1	0.8	4	2.0
c:	(+) → (+)	110	53.4	101	78.9	159	7.4
d:	(-) → (-)	23	11.1	0	0	7	3.4
e:	Total (a + b + c + d)	206	100.0	128	100.0	205	100.0
f:	(-) → (+)	7	3.8	39	41.5	32	16.7
g:	(+) → (-)	92	50.0	0	0	31	16.1
h:	(+) → (+)	59	32.1	55	58.5	111	57.8
i:	(-) → (-)	26	14.1	0	0	18	9.4
j:	Total (f + g + h + i)	184	100.0	94	100.0	192	100.0
k:	a + f	16		65		67	
l:	b + g	156		1		35	
m:	c + h	169		156		270	
n:	d + i	49		0		25	
o:	(e x k) ÷ (e + j)	8.45		37.48		34.60	
p:	(e x l) ÷ (e + j)	82.40		0.58		18.07	
q:	(e x m) ÷ (e + j)	89.27		89.95		139.42	
r:	(e x n) ÷ (e + j)	25.88		0		12.91	
s:	(j x k) ÷ (e + j)	7.55		27.52		32.40	
t:	(j x l) ÷ (e + j)	73.60		0.42		16.93	
u:	(j x m) ÷ (e + j)	79.73		66.05		130.58	
v:	(j x n) ÷ (e + j)	23.12		0		12.09	
w:	a - o  <sup>2</sup> ÷ o	0.04		3.52		0.00	
x:	b - p  <sup>2</sup> ÷ p	4.11		0.30		10.96	
y:	c - q  <sup>2</sup> ÷ q	4.81		1.36		2.75	
z:	d - r  <sup>2</sup> ÷ r	0.32		0		2.71	
A:	f - s  <sup>2</sup> ÷ s	0.04		4.79		0.00	
B:	g - t  <sup>2</sup> ÷ t	4.60		0.42		11.69	
C:	h - u  <sup>2</sup> ÷ u	5.39		1.85		2.94	
D:	i - v  <sup>2</sup> ÷ v	0.36		0		2.89	
E:	Degrees of freedom	3		3		3	
F:	Chi Square $\frac{wix+y+z}{A B C+D}$	19.67		12.24		33.94	
G:	Significance of difference	< 0.001		< 0.01		< 0.001	
H:	Degrees of freedom (Sum of row "E" for Categories used)					9	
I:	Chi Square (Sum of row "F" entries)					65.85	
J:	Significance of difference					< 0.001	

Figure 8. Comparison of Second Posttreatment Scores for the MPP Experimental and Control Groups

In the control at M<sub>1</sub> there were 151 (92+59) well babies; by M<sub>3</sub>, 92 babies or 60.9 percent [ $92 \div (92+59) = 60.9$ ] had become malnourished. In the experimental group at M<sub>1</sub> there were 174 (64+110) well babies; 64 or 37.0 percent [ $64 \div (64+110) = 36.7$ ] had become malnourished by M<sub>3</sub>. The difference between the experimental and control groups is 24.2 percent (60.9-36.7) in favor of the effectiveness of MPP. This suggests that MPP can save 632 out of every 1,000 babies from becoming malnourished during the first 18 months of life while those babies not receiving the MPP program would be saved from malnutrition at only a rate of 391 out of each 1,000.

Although all five provinces studied demonstrated MPP effectiveness, diagnostic analyses were made to determine if there were differences in performance among the five provinces. The differences proved to be dramatic, as is shown in Table 4, Pangasinan and Isabela were most effective among the provinces; Rizal, Pampanga, and Ilocos Norte were less effective. Examining the two extremes, one finds:

- ✓ Pangasinan demonstrated a difference of 50.3 percent between the experimental and control groups, in favor of the experimental group. This means that MPP in Pangasinan would save 79 out of every 100 children from malnutrition while those not receiving the MPP treatment would be saved from malnutrition only at the rate of 29 out of 100, a difference of 50 (79-29).
- ✓ Ilocos Norte demonstrated a difference of only 12.9 percent between the experimental and control groups. Here, MPP would save 55 out of 100 children from malnutrition; those not receiving the MPP treatment would be saved from malnutrition at the rate of 42 out of 100, a difference of 13 (55-42).

The analyses in Figure 8 show less dramatic effects for the second data category, supplemental food. The difference between the experimental and control groups is significant at the .01 level and relates to the longer time required for the control group to achieve a level of behavior equal to that of the experimental group. The difference between the two groups on the third variable, mother's diet, is significant at the .001 level and is not related so much to the rate at which diets are improved but to the high rate of retention of good diets by the experimental group and the higher rate of deterioration in diet by the control group. Overall, the MPP has had a dramatic positive effect when data from the three criterion variables are combined ( $p < .001$ ).

### Cost-Effectiveness of the MPP

The BAEx evaluation team and the MPP management accepted the basic concept of the unit measure of cost-effectiveness (UMCE), presented in the Synectics methodology and Field Guide. Because of the peculiar nature of the MPP objective, however, they believed it appropriate to make some adjustments in the formula. Whereas most programs have as their objective the improvement of nutritional status or the changing of negative conditions to positive ones--the objective assumed by the Field Guide--the MPP focuses on preventing the positive condition of a new born baby well nourished at the mother's breast from becoming a negative condition or malnourished baby.

Table 4

MPP Performance on the Criterion Variable  
Nutrition Level, by Province

Provinces	a Well Babies in Pretest [(+)→(+)]+[ (+)→(-)]	b Babies Regressing (+)→(-)	c Percent Regressing (b÷a)	d Percent Difference Experimental vs. Control
Pangasinan				
Experimental	29	6	20.6	50.3
Control	31	22	70.9	
Isabela				
Experimental	41	19	46.3	32.2
Control	28	22	78.5	
Rizal				
Experimental	25	6	24.0	18.8
Control	21	9	42.8	
Pampanga				
Experimental	37	14	37.8	14.7
Control	40	21	52.5	
Ilocos Norte				
Experimental	42	19	45.2	12.9
Control	31	18	58.1	
All Five Provinces				
Experimental	174	64	36.7	24.2
Control	151	92	60.9	

Thus, from MPP's view, the instances in which it is able to sustain a positive condition over time is equal in importance to another program's effecting a change from malnourished to nourished. In order to take account of this factor, they adjusted the formula for cost-effectiveness measurement as follows:

$$UMCE = \frac{cpo}{\left[ N_{(+)\rightarrow(+)} + N_{(-)\rightarrow(+)} \right] - N_{(+)\rightarrow(-)}}$$

Where--

- UMCE = Unit measure of cost effectiveness.
- cpo = Cost of program operation.
- $N_{(+)\rightarrow(+)}$  = The number of babies who were healthy at  $M_1$  and remained healthy at  $M_3$ .
- $N_{(-)\rightarrow(+)}$  = The number of babies who were malnourished at  $M_1$  but shifted to healthy status by  $M_3$ .
- $N_{(+)\rightarrow(-)}$  = The number of babies who were healthy at  $M_1$  but became malnourished by  $M_3$ .

#### MPP's Unit Measure of Cost-Effectiveness (UMCE)

The UMCE concerns only the experimental or MPP babies. It is calculated by dividing the total cost of program operation by the net number of infants positively affected by the program. Thus, UMCE for the MPP in the five expansion provinces is ₱190.85 (₱42369:222). Converting to U. S. dollars at the exchange rate of 7.21, the UMCE=\$26.60. This finding suggests that the cost of preventing malnutrition during the first 18 months of life through the MPP approach can be as little as \$26.60.

The calculation of the UMCE is presented in Figure 9. Column 1 shows the calculation for the program as it performed in all five provinces in the study sample. The manner in which cost-effectiveness varies with differences in performance among separate program elements is demonstrated by columns 2 and 3. In the province of Ilocos Norte, which had the least effective program, the UMCE was ₱392.30 (US \$54.41); the UMCE for Pangasinan, which had the best performance among the five provinces studied, was only ₱111.49 (US \$15.46), or less than a third as high a cost for preventing malnutrition. Sources of data for calculating these UMCEs are described below.

Cost of MPP Operation. Cost information for program operation in the five provinces was extracted directly from program planning and management records. The total cost for the one year program was \$42,369. Using the then current rate of exchange of 7.21, this cost converts to US \$5,876. The breakout of costs is shown in Table 5. Staff field workers were assigned to the MPP full time for the year of program operation. Supervisory personnel devoted about a fourth of their time to their regular duties in provincial Extension work. Hence, only 75 percent of their annual salaries was charged

Cost-Effectiveness Analysis			
	All Provinces	Pangasinan	Ilocos Norte
a. Number of enrollees in five Extension Provinces	945	945	945
b. Number of "Dropouts"	109	109	109
c. Net number of MPP participants	836	836	836
d. Percent of participants positively affected by MPP (-) → (+) and (+) → (+) cases	57.7%	59.1%	55.1%
e. Percent of participants regressing from (+) → (-)	<u>31.1%</u>	<u>13.6%</u>	<u>42.2%</u>
f. Net percent positively affected (d - e)	26.6%	45.5%	12.9%
g. Net number of participants positively affected [(c x f) ÷ 100]	222	380	108
h. Cost of operation of MPP in the five Extension Provinces	₱ 42,369	₱ 42,369	₱ 42,369
i. Unit measure of cost effectiveness (h ÷ g)	₱ 190.85 \$ 26.47	₱ 111.49 \$ 15.46	₱ 392.30 \$ 54.41

Figure 9. Calculations of MPP Cost-effectiveness

Table 5  
Breakout of Costs for the MPP  
Operation Over Period of One Year

<u>Salaries and Honoraria</u>		
Home management technicians		
Supervisors @ .75 time	20,416	
Staff workers	<u>19,800</u>	\$40,216
 <u>Equipment</u>		
Weighing scales	553	
(5 @ 553.50 = 2767.50 ÷ 5 years life)		
Grinders	<u>350</u>	
(5 @ 350 - 1,750 ÷ 5 years life)		903
 <u>Food Commodities for Demonstrations</u>		
(5 provinces x \$150 each)		750
 <u>Office Supplies</u>		
(5 provinces x ₱ 25 each)		125
 <u>Travel and Per Diem</u>		
(5 provinces x ₱ 100 each x .75)		<u>375</u>
	Total Cost	\$42,369

to the MPP. Similarly it was estimated about 25 percent of the travel and per diem funds were used for Extension activities outside the MPP requirements and only 75 percent were charged to the program. The weighing scales and the grinder equipment were estimated to have a life of five years. They would be used by the MPP as it implemented the program in other locations or continue to be used by Extension at the study sites. Hence only one-fifth of their cost was charged against the year of MPP at the study sites.

Net Numbers of Infants Positively Affected by MPP. Program records showed that a total of 945 mother/infant participants enrolled in the program in the five expansion projects. Of this number, 109 dropped out of the program. Major reason for dropout was the transfer of residence from the area of program operation. The highest percentage of such transfers was in the province of Rizal, which is proximal to metropolitan Manila. The residual number of participants in the program at M<sub>3</sub> was 836. Effectiveness measures were extrapolated from the sample studied to the total number of participants by use of the percentage data in Worksheet Number 2. The worksheet, shown in Figure 8, demonstrates that in the data category for nutrition level: 4.4 percent shifted from (-)→(+); 53.4 percent remained well babies (+)→(+); giving a total of 57.8 percent positively effected. However, 31.1 percent regressed from (+)→(-). Hence, the "net" percent which were positively affected by MPP is 26.7 percent. Using this "net percent," it was estimated that 222 of the program participants in the five study provinces were positively affected by the MPP (836 net participants X 26.6 percent positively affected = 222).

### Conclusions from the BAEx Evaluation of the MPP

The MPP is achieving its objectives, but there are wide differences in program performance among the provinces. If all provinces had performed as well as the best of the five provinces studied, effectiveness would have been much higher and, assuming the same operating costs, the UMCE would be reduced by about 40 percent.

The reasons for wide differences in performance need to be determined as soon as possible and corrective actions taken to upgrade performance. Areas which should be explored with provincial staffs include: training needs, teaching materials, procedures design, motivation, record keeping.

Positive feedback should be provided to the HMTs in the provinces and they should be encouraged to share the information about good effects of the program with leaders in the barangays and with participating mothers.

Evaluation should be made an integral part of the record keeping system for the MPP so as to permit monitoring of the effects of any corrective actions taken and identification of areas needing improvement.

## SECTION IV

### EVALUATION OF MOTHERCRAFT AS AN APPROACH TO NUTRITION EDUCATION

#### Description of the Mothercraft Program

Since 1968, the Mothercraft Nutrition Center (MNC) has been used for maternal education and nutrition rehabilitation in the Philippines by the National Nutrition Service, Department of Health. Under a five-year program agreement with National Economic Development Authority and USAID for technical and budgetary support, the mothercraft program was designed to reach the malnourished preschool children through their mothers in order to prevent debilitating effects of malnutrition on the future human resources of the country. The Philippines government has continued the funding of the centers. The primary mothercraft centers are operated in the rural areas where two-thirds of the population are located. The NNS also provides assistance to other agencies which operate mothercraft centers in both urban and rural communities. In 1976, the NNS operated 64 primary centers, generated 369 secondary centers funded by other sponsors, 10 of which were "targeted" or TMCH units utilizing donated foods, and reached a total of 60,930 mothers throughout the country.

A Mothercraft Nutrition Center is defined by NNS as a "practical school operated by a professionally trained nutrition worker, where mothers learn the basic arts and meaning of proper child feeding for health through the show-and-tell method and the 'learning by doing' principle; a nutrition recovery station to rehabilitate malnourished children, with basic cooking and serving facilities for 30 to 40 children, and potable water and sanitary facilities." The MNC provides continued contact of center staff with mothers and children after training is over. It is an extension of rural health preventive services which affords medical attention to malnourished children and helps solve problems in sanitation and child care. It demonstrates the use of familiar local foods which satisfy the daily nutrition needs of children at low cost and is suited to local habits.

The general objective of a Mothercraft Nutrition Center is preventive and rehabilitative treatment, and maternal education. The educational objective is directed to improving the capability of the mothers on proper child rearing, through good nutrition and child care. The specific objectives of the education include:

- ✓ To help mothers understand the relationship between appropriate feeding and good health.
- ✓ To teach mothers to plan meals in terms of the three basic food groups.

- ✓ To encourage the mother to procure, from whatever resources available to her, those foods which permit her to feed children a nutritious diet.
- ✓ To have mothers prepare food for small children in ways which make foods palatable and digestible and conserve natural nutrients.
- ✓ To have mothers handle and store foods in ways to avoid contamination.
- ✓ To have mothers substitute inexpensive foods of equal nutritional value for foods which are expensive and difficult to obtain.

The front-line worker in the mothercraft program is a dietary nutritionist. A dietary nutritionist is a graduate in Foods and Nutrition, or Home Economics with a major in food and nutrition. In addition, she has generally finished or undergone one year dietetic internship in an accredited hospital, or had experience in food service and/or community nutrition work. Commonly, the nutritionist has civil service eligibility as "Nutritionist" or has passed the Dietetic Board Examination.

The dietary nutritionist typically works with local health field personnel in the municipality or barangay to accomplish three phases of the MNC activity: the preimplementation activity, implementation, and postmothercraft activity. Preimplementation includes promotional meetings with local leaders, the baseline survey of the community and analysis and reporting of findings, selection of the MNC participants, and the furnishing of the center in preparation for implementation. Provision of a satisfactory facility with a sanitary toilet, furniture, food for demonstration and feeding, and a potable water supply is generally the responsibility of community persons. However, NNS will, under extreme circumstances, provide furnishings and foodstuff.

Implementation begins with a physical and medical examination of participating children and mothers; cooking and feeding demonstrations, meal planning, marketing trips, serving of food, housekeeping, gardening, etc., are all a part of the educational program which is carried out six days a week over a period of two months. Individual counseling--usually in matters such as personal hygiene and family planning--is also provided. Postmothercraft activity includes the monthly weighing of children, by the nutritionist or by the Rural Health Unit, an Agriculture Extension worker, or other community workers involved in the national nutrition program.

### Purpose of the Evaluation

The dietary nutritionist is tasked with evaluating her project and is provided with data forms for that purpose. It was the belief of the director of the NNS evaluation demonstration that the methods in use by NNS were too burdensome and provided only descriptive information rather than evaluative data diagnostic of performance. It was her expressed hope that the experimental

method presented in the Field Guide might be adopted for field use in NNS. In addition, while two outside organizations had conducted evaluations of the national MNC program, neither had touched upon cost-effectiveness, and their data on effectiveness had, according to the Executive Director of NNS, been inconclusive. Thus, the evaluation project director sought to provide conclusive data on cost-effectiveness of the MNC approach, and concurrently to evolve an improved self-assessment methodology for field use.

## Description of the NNS Evaluation Study

### Objectives of the NNS Evaluation

The objectives of the evaluation project were to determine whether and to what extent:

- ✓ Infants and children of mothers exposed to mothercraft experiences demonstrate improved nutrition levels as defined by weight for age tables used in the National Philippine Nutrition Program.
- ✓ Mothers exposed to the mothercraft experience will, over time, improve their practices of feeding their children balanced diets.
- ✓ Mothers who have been exposed to mothercraft will substitute inexpensive foods of equal nutritional value for foods which are expensive and difficult to obtain.
- ✓ The effects of the MNC are dispersed beyond the population enrolled, and into the general community in which the centers are implemented.

### Criteria for Determining Effectiveness of MNCs

The director of the NNS evaluation established five criteria for determining whether or not the objectives were being achieved.

- ✓ Criterion #1. Nutrition level. Based on the Philippine scale of nutrition levels and weight for age, illustrated in Figure 2, a nutrition level  $\geq 3$  was defined as appropriate; a level,  $\leq 4$ , as inappropriate or malnourished.
- ✓ Criterion #2. Supplemental feeding. Teaching objectives dictate that any child over age six months should be getting food in addition to milk. Absence of solid foods representing all three basic food groups is inappropriate dietary practice for any child in the MNC program.
- ✓ Criterion #3. Meat extenders. If the child's diet included meat substitutes it was scored plus; failure to include a less

costly but available protein substitute was judged inappropriate behavior and scored a minus.

- ✓ Criterion #4. Rice Extenders. If the child's diet included rice substitutes it was scored a plus; failure to include a substitute such as root foods was judged inappropriate behavior and scored a minus.
- ✓ Criterion #5. Vitamin A. Inclusion of any Vitamin A foods, e.g., leafy green and yellow vegetables, was scored a plus; failure to include such food was scored a minus.

### The Evaluation Study Design

The basic design chosen was that of a case study with one baseline or pretreatment measure, and two posttreatment measures taken at three and six months following the baseline measure. The basic design is summarized by:



where:

$M_1$  is the pretreatment or baseline measure.

T is the two months of mothercraft treatment.

$M_2$  is the first posttreatment measure taken immediately following the mothercraft treatment.

$M_3$  is the second posttreatment measure taken six months following  $M_2$ .

### Sampling Procedure

Five provinces were chosen, roughly representative of the dietary patterns associated with regional differences in the Philippines. Two provinces, Ilocos Norte and Albay, were selected for the main Island of Luzon where the staple food is rice. One, the province of Iloilo, was selected to represent the Visayas where the staple food is corn. And the provinces of Zamboanga del Norte and Bukidnon were selected for the Mindanao region where the staple food is a combination of corn and cassava. Within each province, one MNC site was randomly selected from among the sites in which the MNC were programmed at the time the study was being initiated.

In accordance with normal procedures for initiating an MNC in a community, all of the children ages six months to six years, and their mothers, were included in the baseline measure. The total number of subjects in the baseline was 829. The sample for the first posttreatment measure included all of the children who had participated in the sample MNCs, or 122 cases.

At the time of the second posttreatment measure, a subsample of 171 cases was randomly selected from the population children for whom a baseline

measure was available but who had not participated in the MNCs. The purpose of this sample was to determine whether or not effects of the treatment were dispersed beyond the population of mothers and children enrolled in the MNC program.

### The Data Classes and Data Collection Instruments

The NNS had already developed and placed in field use a number of data forms for conducting surveys and for evaluation. These included at least the following:

- ✓ The Nutrition Assessment Schedule. This form was designed for use by the local medical team during the community survey which precedes the implementation of an MNC. It contains:
  - Date of survey.
  - Location (province, barangay, street address).
  - Identifiers for the child (name, age, sex, birth order, etc.).
  - Parents' socioeconomic characteristics.
  - Mother's health condition.
  - Anthropometrics for the child.
  - Biochemistry for child and mother.
  - Results of clinical examination of child and mother.
- ✓ The Household Survey which, in addition to the identifier/location data, contained:
  - Family descriptions (ages of adults, educational levels, occupations, incomes, ages, sex and chronology of children, ages and causes of death of deceased children).
  - Questions about:
    - Nutrition practices in the household.
    - Food production.
    - Sanitation.
    - Family planning practices.
- ✓ The Daily Food Intake Record, standardly used for children in the MNCs during the first two weeks of operation of the center.

- ✓ The Growth Chart, which is used to record weight of the participating child every two weeks while child is in the MNC program.
- ✓ Semimonthly Summary of weight records, which presents weights of all children at the center.
- ✓ Semimonthly Nutrient Intake Record, which reports the nutritive value of foods ingested by each child participating in the MNC.

Two additional data forms were added for purposes of the evaluation study. These forms were the "Individual Data: Infant or Child" and the "Family Profile"--both of which are presented in the Field Guide. The forms are presented in Appendix B.

There is considerable overlap of data elements among the several forms. The intent of the director of the project was to use the data standardly gathered for MNC operation as backup information as needed in interpretation of findings in the evaluation. In any instance, it was judged inappropriate for this evaluation study to make changes in existing forms which serve the national MNC program monitoring system.

### The Data Collectors

Collection of the survey data was a part of the standard procedures for setting up an MNC. The added task of collecting posttreatment measures for the evaluation study could not be assumed by the MNC team since the MNC would have been disbanded after the two months of operation. Therefore, the director of the evaluation project recruited and trained recently graduated dietary nutritionists who had not yet been gainfully employed, to serve as data collectors. The data collectors were paid minimal pay, plus travel and per diem costs.

Training of data collectors was done by the evaluation project director. It was directed to "standardization of the data collection, control over the movement of data collectors, and insuring complete and reliable data for the evaluation." Methods of instruction included: lecture and discussion, mock interviews and role-playing, group analysis of sources of errors, and on-the-job training under close supervision. Four days of training preceded the baseline data collection; two days were used for update training before each of the posttreatment measures.

### Controls to Maximize Valid Inference

The director of the NNS evaluation project reported the following actions on her part to insure that observed effects could be attributed to MNC operations:

- ✓ Although supplementation of family and resources is a part of selected mothercraft operations, such supplementation was to be provided in the study communities during the period of the evaluation study.

- ✓ Based on her observations and discussions in the communities, there appears to have been no significant changes in socio-economic conditions in any of the study communities.
- ✓ The only special activities in the communities at time of study were planning and implementation of the MNCs and Rural Health Units (RHUs) which work in concert with the MNCs.
- ✓ While the RHUs commonly distribute CARE commodities to the pregnant and lactating mothers, such distribution was not made during the data collection periods.

### Summary of Plan and Schedule for the MNC Evaluation

At the outset, the director for the evaluation project outlined a plan and schedule to guide the project. The plan is summarized in Table 6. The schedule of events was essentially adhered to--the minor slippage which did occur being attributed to difficulties in maintaining the rigorous travel schedules to monitor activities in such widely scattered study sites.

### Findings from the NNS Evaluation of the MNC Program

#### The Baseline Survey

Baseline measures were taken for all children between the ages of 6 and 72 months in the study sites for all five provinces. Each data form was scored on the basis of appropriate (+) or inappropriate (-) behavior on each of the five criterion variables. The results by province and for the sample as a whole are summarized in Table 7. The variable of interest in this data set is the nutrition level or data category 1, for, theoretically, it is on the basis of nutrition levels that the participant for the MNC is selected.

As can be seen by the combined totals at the bottom of column one of Table 7, 393 or 47.4 percent of the survey sample were deemed malnourished in terms of the study definition of nutrition level  $\bar{5}$  4 on the Philippine scale. Further examination of the data revealed that only 3.4 percent were suffering severe or third-degree malnutrition. Theoretically, it is from this population of malnourished children that the participants for the MNCs would be drawn. Subsequent measures revealed that such was not the case.

From a practical view many factors conspire to involve well children in programs for the malnourished. A mother who has two or three small children only one of which is malnourished would be reluctant to participate in a program as onerous as the MNC unless she could bring all of her children. There are, in addition, persons of influence in the community who--for the prestige and opportunity to learn--wish to be included even though their

Table 6

## Plan and Schedule for Implementation of the NNS Evaluation Project

Phase of the Project	Target Date	Activity	Purpose/Justification	Personnel Involved	Logistics Required
PHASE I Pre- Implementation	1st week from start date (Estimated May '77)	Representation of the Project Plan for approval of NNS Director	To implement the Evaluation Project Plan	Project Leader (M.L.A. Conocono)	Issuance of a Department Order from the Secretary of Health to get budgetary support and cooperation of field personnel
	2nd week	Meeting with the Technical Staff	To discuss the mechanics of the evaluation project. To select five primary MNC for the Pilot Study. Criteria to be set: 1. MNC to be opened simultane- ously during 9th week 2. No other feeding or Food Assistance Program to be staged in the area during the duration of the study 3. Full complement of local health personnel 4. Accessibility to data collections within commut- able distance from Provincial Health Office		
	3rd week	Recall of Senior or Regional Dietary Nutrition- ists (3)	To orient them on purpose and mechanics of the Evaluation and discuss their involvement in the project	(M.L.A. Conocono) Project Leader 2 Research Assis- tants	Personnel -clerical Staff

Table 6 (Continued)

Phase of the Project	Target Date	Activity	Purpose/Justification	Personnel Involved	Logistics Required
PHASE I (Cont.)	4th week	Recruitment and training of Data Collectors and Regional Dietary Nutritionists	To orient them on their duties and responsibilities in the Project  To familiarize them on the use of new data forms (Instructions P. A-2, F.G.)  To drill them on the techniques of interviewing for the new forms		
	5th week through 8th week	Procurement of M <sub>1</sub> or baseline data in 5 MNC's -Luzon -Visayas -Mindanao	To be programmed according to the schedule set by the participating nutritionists	Project Leader Medical Nutritionist Regional Senior Dietary Nutritionist Data Collectors	Traveling expenses Cash advance for training and recruitment of investigators (50) Data Forms NNC Funds
	9th week	Quantification of M <sub>1</sub> and Data Analysis	Use of Field Guide pp. 50-64 Worksheet No. 4 P.A. 21 Food Guide -Preparation of report for baseline data	Project Leader 2 Research Assistants	Statistical table Worksheets
PHASE II Implementation	10th week through 16th week	Mothercraft Nutrition Center Demonstration	For evaluation and documentation -Old forms to be accomplished conscientiously by the participating D.N.'s -All expenses incidental to MNC implementation will be recorded -All community support and agency inputs will be recorded	5 Participating primary Mothercraft Nutrition Centers w/5 Dietary Nutritionists under the supervision of 5 Senior D.N.	Cash advance from NNS All vouchers for replenishment and reimbursements of actual expenses will be taken care of, ATTN: Acctg. Div. & Cashier

Table 6 (Continued)

Phase of the Project	Target Date	Activity	Purpose/Justification	Personnel Involved	Logistics Required
PHASE III Evaluation	17th week through 19th week	Procurement of $M_2$	To measure educational impact after one month of demonstration  To measure cost effectiveness of mothercraft based on set of criteria	4-5 Data Collectors Project Leader	NNC Funds
	20th week	Data Quantification and Analysis	(Same as above)	Project Leader	NNC Funds
	45th week	Procurement of $M_3$	To measure educational impact, over time (9 months after $M_1$ )	4-5 Data Collectors Project Leader	NNC Funds
PHASE IV Final Reporting	50th week (Estimated Mar '78)	Writing-up of Report	To draw possible conclusions and recommendations, based on evaluation study	Project Leader	

Table 7  
Baseline Measures for the MNC Study Sample, by Province

PROVINCE	CRITERION 1		CRITERION 2		CRITERION 3		CRITERION 4		CRITERION 5	
	Nutrition Level		Nutrition Level		Nutrition Level		Nutrition Level		Nutrition Level	
	+	-	+	-	+	-	+	-	+	-
Ilocos Norte	48	19	52	15	20	47	7	60	41	26
	67		67		67		67		67	
	71.6	28.4	77.6	22.4	29.9	70.1	10.4	89.6	67.2	38.8
Albay	114	132	99	145	0	244	53	191	99	145
	246		244		244		244		244	
	46.3	53.7	40.6	59.4	0	100.0	21.7	78.3	40.6	59.4
Iloilo	101	82	76	90	10	153	6	157	76	87
	183		166		163		163		163	
	55.2	44.8	45.8	54.2	6.1	93.9	3.7	96.3	46.6	53.4
Bukidnon	118	80	80	115	2	193	19	176	168	27
	198		195		195		195		195	
	59.6	40.4	41.0	59.0	1.0	99.0	9.7	90.3	86.2	13.8
Zamboanga del Norte	55	80	79	58	10	127	10	127	85	52
	135		137		137		137		137	
	40.7	59.3	57.7	42.3	7.3	92.7	7.3	92.7	62.0	38.0
All Five Provinces Combined	436	393	386	423	42	764	95	711	469	337
	829		809		806		806		806	
	52.6	47.4	47.7	52.3	5.2	94.8	11.8	88.2	58.2	41.8

children are not malnourished. Failure to involve them would be detrimental to the program. In matters of record keeping, it simply is much easier and less confusing for program persons in the field to treat the participants who are not truly in need of the service as part of the group. Indeed, they are a part of it, often contributing to the effectiveness of the program.

### Results of the First Posttreatment Measure

The first posttreatment measurement was taken approximately three months following completion of the MNC's operation. It included only those children who were enrolled in the MNCs at the study sites. Measures on each of the five criterion variables were compared with similar measures taken for the same children during the baseline survey, to determine the nature of behavioral change. The analysis is presented in Figure 10. Data entries for steps b and c, column 1 of the worksheet, indicate that 25.6 percent (1.7+23.9) of the children were not malnourished according to the baseline survey or pretreatment measure. The analyses of shift for each of the five criterion variables and for all variables combined are discussed below.

- ✓ Nutritional Level--as defined in weight for age tables used in the Philippines. Of the 117 cases in the sample, 87 cases or 74.4 percent were malnourished when entering the MNC; 30 cases or 25.6 percent were not malnourished. Over the five months between the baseline and the first posttreatment measures, 26 of the 117 cases shifted levels--they either changed from malnourished to well nourished or regressed from well nourished to malnourished.

The case study analysis in Worksheet Number 4 is concerned with the population of 26 cases which changed behavior. While one does not attend to the NO-change data in the chi square analysis on Worksheet Number 4, one does not ignore it in the further analysis of the data--particularly the descriptive data. If only a small part of the sample changes as a result of the program, the evaluator would be remiss for failure to search all data available, including the instructional content of the program, to discern why there were no effects.

Of those 26 cases where change occurred, 24 or 92.3 percent shifted from malnourished to normal; only 2 cases or 7.7 percent shifted from normal to malnourished. The difference is highly significant (chi square value 16.96;  $p < .001$ ) and could represent positive effect of the educational program.

As was pointed out in the Field Guide, the weakness of the case study design is absence of a control group, without which there is less confidence that observed changes are directly related to the MNC program.

ANALYSIS FOR ONE GROUP WITH TWO MEASURES (CASE STUDY)

GROUP All Five Provinces Combined

WORKSHEET NUMBER 4

Enter the totals for dietary change data from the bottom of Worksheet 1

Use the N's in rows a and b and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES									
		Fruit Veg.		All 3 Foods		Meat Sub.		Rice Ext.		Fruit + Veg. 2/3	
		N	%	N	%	N	%	N	%	N	%
a:	(-) - (+)	24	20.5	57	30.3	9	15.5	16	13.1	35	25.7
b:	(+) - (-)	2	1.7	8	6.0	11	9.0	9	7.4	21	17.2
c:	(-) - (-)	28	23.9	65	53.3	1	1.0	2	1.6	51	41.8
d:	(-) - (-)	63	53.9	12	9.8	41	74.5	95	77.9	15	12.3
e:	TOTAL (a + b - c + d)	117	100.0	122	100.0	122	100.0	122	100.0	122	100.0
f:	a + b	26		45		30		25		56	
g:	a - b	22		29		8		7		14	
h:	g - 1	21		28		7		6		13	
i:	h <sup>2</sup>	441		784		49		36		169	
j:	Degrees of freedom	1		1		1		1		1	
k:	Chi Square = i ÷ f	16.96		17.42		1.63		1.44		3.01	
l:	Significance of difference	< .001		< .001		> .10		> .10		< .05	
m:	Degrees of freedom (Sum of row j for Categories used)	5									
n:	Chi Square (Sum of row k entries)	40.47									
o:	Significance of difference	< .001									

Figure 10. Comparison of NNS' Pretreatment and First Posttreatment Measures

- ✓ Balanced diet--inclusion of all three food groups in the diet. Of the 122 cases in the MNC data sample for this data category, 49 cases or 40.2 percent demonstrated inappropriate behavior on Measurement 1; 73 cases or 59.8 percent demonstrated appropriate behavior. In the interim between pretreatment and first post-treatment measures, 45 subjects changed behavior. A total of 37 cases or 82.2 percent of those changing behavior shifted from negative to positive; 8 cases or 17.8 percent regressed, shifting from positive to negative behavior. This finding suggests a highly significant (chi square value is 17.42;  $p < .001$ ) positive effect of the educational program.
  
- ✓ Use of meat substitutes. In the pretreatment measure, 110 cases or 90.2 percent of the cases demonstrated inappropriate behavior; 12 cases or 9.8 percent were appropriate. The first posttreatment measure revealed that 30 cases had changed behavior. Of these, 19 cases or 63.3 percent changed from negative to positive; 11 cases or 36.7 percent shifted from positive to negative. The latter shift suggests a regression in behavior, offsetting to a large extent the positive shifts. However, the chi square test reveals no significant impact of the program. Chi square value is 1.63;  $p > .10$ .
  
- ✓ Use of rice extenders. In the pretreatment measure, 111 cases or 91.0 percent exhibited inappropriate behavior; 11 cases or 9.0 percent of the cases exhibited appropriate behavior. The first posttreatment measure revealed that 25 cases had changed behavior. Of these, 16 cases or 64.0 percent had changed from negative to positive behavior; 9 cases or 36.0 percent had shifted from positive to negative. There is no significant difference (chi square is 1.44;  $p > .10$ ) in the directions of shift. As with the preceding data category, the opportunity for change is there. In the preceding category there were 90.2 percent negative cases on the first measure; in this category there are 91.0 percent negative cases on the first measure. The evaluator's analysis should focus on what could possibly be done in the education program to effect positive change in behavior.
  
- ✓ Inclusion of leafy green and yellow vegetables in the diet. In the pretreatment measure, 50 cases or 41.0 percent in the MNC sample were inappropriate behavior; 72 cases or 59.0 percent were appropriate. The posttreatment measure reveals that 56 cases shifted behavior--35 cases or 62.5 percent changed from negative to positive and 21 cases or 37.5 percent changed from positive to negative. No significant effect of the program is suggested (chi square is 3.02;  $p > .05$ ).
  
- ✓ Overall program effectiveness. The evaluation methodology permits examination of overall program effects across the set of criteria of effectiveness by accumulating the individual chi squares and assigning one degree of freedom for each category included. Thus, for the data presented in Figure 10, we find a summary chi square of 40.47. With five degrees of

freedom, this finding is highly significant ( $p < .001$ ) and suggests that, overall, the MNC program is having significant positive effects. But because it is not demonstrating significant positive effects on all criteria, program planners should look for ways to improve effectiveness with respect to the use of meat substitutes, rice extenders, and leafy green and yellow vegetables in particular.

### Results of the Second Posttreatment Measure

The second posttreatment measure was taken nine months after the completion of the MNC activity. Comparisons were made with the baseline measures for the same subjects. The analyses of change-over-time, demonstrated by the two measures, are shown for each of the criterion variables and for all variables combined in Figure 11. (Note that these analyses do not include data for the province of Bukidnon, data for which had been temporarily missing from the project files at time of the preparation of notes for this report.) The data continue to demonstrate significant positive effects of the MNC on the nutrition levels of the children, and on the practice of feeding the children a balanced diet. They also demonstrate a positive, although less impressive, effect on the feeding of leafy green and yellow vegetables to the children. Effectiveness is still not demonstrated for data category 3, use of meat extenders, or for data category 4, use of rice extenders.

### Demonstration of Dispersion Effects

Determination of whether and the extent to which MNC effects are dispersed in the community was assessed through comparison of behavioral changes in MNC participants with behavioral changes in a selected sample of nonparticipants in the study communities. Tables 8 and 9 summarize the measures of change occurring between  $M_1$  and  $M_3$  for the respective groups.

The evaluation study director first combined the data for the MNC and the non-MNC groups, and did the case study analysis for one group with two measures to compare pretreatment and posttreatment conditions. The analysis is shown in Figure 12. The data pattern is quite similar to that shown in Figure 11 for MNC participants alone, with the exception of the variable of meat substitutes.

The study director judged this condition to indicate strong dispersion effects for the MNC program--assuming that improvements in the nonparticipant group were the result of informal communication about the program among the women in the community. One could, however, be equally justified in interpreting the data as indicative of no effects of the program on participants, on the assumption that had there been no MNC the participant group would have performed the same as the nonparticipant group. To explore this possibility a second series of analysis was done to compare performance of the MNC participants with that for the nonparticipants. That is, the baseline and second posttreatment data were used in a quasi-experiment, the design of which is represented by:

Table 8  
 Summary of Changes in Dietary Behavior  
 M<sub>1</sub> → M<sub>3</sub> NNS

SUMMARY SHEET FOR RECORDING SEQUENTIAL MEASURES AND  
 CHANGES IN DIETS FOR INDIVIDUALS IN A GROUP

WORKSHEET NUMBER 1

GROUP: <u>n n s.</u> <u>Participants</u>	DIRECTION OF CHANGE IN DIETS OVER TIME																			
	DATA CATEGORIES																			
	1				2				3				4				5			
	nutrition Level				all three Foods				meat Substitute				Rice Extender				yellow and green veg.			
PROVINCES	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-
	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
<u>Zamboanga del Norte</u>	8	0	7	6	7	0	16	0	5	2	0	16	2	0	1	20	7	1	13	2
<u>Albay</u>	3	0	0	12	6	3	4	3	0	0	0	16	2	2	0	12	3	0	5	8
<u>Iloilo</u>	12	0	7	10	16	2	11	1	6	1	2	21	0	1	0	29	7	5	11	7
<u>Bukidnon</u> **																				
<u>Ilocos Norte</u>	1	1	11	3	2	2	14	0	0	3	1	14	2	1	0	15	6	3	8	1
a. Total Number in Each Column	24	1	25	31	31	7	45	4	11	6	3	67	6	4	1	76	23	9	37	18
b. Total Number of Individuals in Group *	81				87				87				87							
c. Percent: (a - b) x 100	29.6	1.2	30.9	38.3	35.4	8.1	51.7	4.6	12.6	6.9	3.5	72.0	6.9	4.6	1.1	82.4	26.4	10.4	42.5	29.7

\*NOTE: The number of individuals in a group may differ for sequential measures.

\*\* no data

Table 9  
 Summary of Changes in Dietary Behavior  
 M<sub>1</sub> → M<sub>3</sub>--Nonparticipant Sample

SUMMARY SHEET FOR RECORDING SEQUENTIAL MEASURES AND  
 CHANGES IN DIETS FOR INDIVIDUALS IN A GROUP

WORKSHEET NUMBER 1

GROUP: <i>Non-Participants</i>	DIRECTION OF CHANGE IN DIETS OVER TIME																			
	DATA CATEGORIES																			
	1				2				3				4				5			
	<i>nutrition Level</i>				<i>all three Foods</i>				<i>meat Substitute</i>				<i>Rice Extender</i>				<i>yellow and Green Veg</i>			
PROVINCES	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-
	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
<i>Zamboanga del Norte</i>	2	0	4	3	3	2	4	2	1	1	2	7	1	1	0	9	4	4	1	2
<i>Albay</i>	12	5	12	20	12	13	19	5	0	1	0	48	7	6	3	33	26	7	10	12
<i>Iloilo</i>	7	3	27	14	25	9	26	4	9	2	1	52	1	4	0	59	20	13	16	15
<i>Bukidnon</i>	4	2	14	10	10	5	9	6	3	0	0	27	2	2	1	25	4	4	22	0
<i>Ilocos Norte</i>	5	2	8	0	2	5	8	2	1	1	3	12	1	3	0	13	1	5	7	4
a. Total Number in Each Column	30	12	65	47	52	34	66	19	14	5	6	146	12	16	4	139	49	33	56	33
b. Total Number of Individuals in Group *	154				171				171				171							
c. Percent: (a ÷ b) x 100	19.5	7.8	42.2	30.5	30.9	19.9	38.6	11.1	8.2	2.9	3.5	85.9	7.0	9.4	2.3	81.3	28.7	19.3	32.7	19.3

\*NOTE: The number of individuals in a group may differ for sequential measures.

ANALYSIS FOR ONE GROUP WITH TWO MEASURES (CASE STUDY)<sup>1</sup>

GROUP All Provinces Combined

WORKSHEET NUMBER 4

Enter the totals for dietary change data from the bottom of Worksheet 1

Use the N's in rows a and b and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES-	DATA CATEGORIES									
		Milk Level		All Foods		Meat Sub		Rice Eat		5 green yellow veg	
		N	%	N	%	N	%	N	%	N	%
a: (-) + (+)		24	29.6	31	35.6	11	12.6	6	6.9	23	26.4
b: (+) + (-)		1	1.2	7	8.1	6	6.9	4	4.6	9	10.4
c: (+) + (+)		25	30.9	45	51.7	3	3.5	1	1.1	37	42.5
d: (-) + (-)		31	38.3	4	4.6	67	77.0	76	87.4	18	20.7
e: TOTAL (a + b + c + d)		81	100.0	87	100.0	87	100.0	87	100.0	87	100.0
f: a + b		25		38		17		10		32	
g:  a - b		23		24		5		2		14	
h: g -		22		23		4		1		13	
i: h <sup>2</sup>		484		529		16		1		169	
j: Degrees of freedom		1		1		1		1		1	
k: Chi Square = i ÷ f		19.36		13.92		0.94		0.10		5.28	
l: Significance of difference		< .001		< .001		> .10		> .10		< .05	
m: Degrees of freedom (Sum of row j for Categories used)		5									
n: Chi Square (Sum of row k entries)		39.60									
o: Significance of difference		< .001									

<sup>1</sup>Exclusive of the participant data for the province of Bukidnon, which data were not available by time of visit by Synectics' representative.

Figure 11. Comparison of the NNS Pretreatment and Second Posttreatment Measure:

ANALYSIS FOR ONE GROUP WITH TWO MEASURES (CASE STUDY)

GROUP Participant and Non-participant Combined

WORKSHEET NUMBER 4

Enter the totals for dietary change data from the bottom of Worksheet 1

Use the N's in rows a and b and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

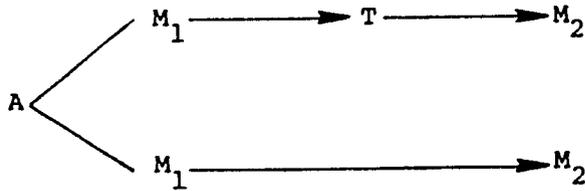
NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES									
		1 Nutrition Level		2 add Foods		3 Meat Substit.		4 Rice Extend		5 Green & Yellow Veg	
		N	%	N	%	N	%	N	%	N	%
a: (-) → (+)		54	23.0	83	32.2	25	9.7	18	7.0	72	27.9
b: (+) → (-)		13	5.6	41	15.8	11	4.3	20	7.8	42	16.3
c: (+) → (+)		90	38.2	111	43.0	9	3.5	5	1.9	93	36.1
d: (-) → (-)		78	33.2	23	9.0	213	82.5	215	83.3	51	19.7
e: TOTAL (a + b + c + d)		235	100.0	258	100.0	258	100.0	258	100.0	258	100.0
f: a + b		67		124		36		38		114	
g:  a - b		41		42		14		2		30	
h: g - 1		40		41		13		1		29	
i: h <sup>2</sup>		1600		1681		169		1		841	
j: Degrees of freedom		1		1		1		1		1	
k: Chi Square = i ÷ f		23.88		40.02		4.69		.026		7.37	
l: Significance of difference		<.001		<.001		<.05		>.10		<.05	
m: Degrees of freedom (Sum of row j for Categories used)		5									
n: Chi Square (Sum of row k entries)		75.98									
o: Significance of difference		<.001									

Figure 12. Participant and Non-participant Groups Combined



where:

A represents assignment to groups.

M<sub>1</sub> represents the baseline measure.

T represents participation in MNC treatment.

M<sub>2</sub> represents the second posttreatment measure.

Two analyses were required. The first was a comparison of the two groups on M<sub>1</sub> to determine if they are drawn from a common sampling space or population. The analysis is shown in Figure 13. It demonstrates that the groups are comparable on all variables excepting that for nutrition level, and for that variable the difference is not dramatic (p<.05). This condition could be expected since, as was pointed out in the earlier discussion on sampling for the NNS study, a substantial number of the participants in the MNCs were not malnourished children. Conversely, the baseline survey had identified 393 malnourished children, about 85 percent of which did not participate in the MNC program.

Given that the two groups were fairly comparable at the outset, the analysis for two groups with two measures was undertaken. The analysis is shown in Figure 14. It demonstrates some but not dramatic difference between the participants and nonparticipants on the first and second data categories (p<.05); there is no difference in the three remaining data categories (p>.10). The differences are in the general direction of positive effects for the MNC on the nutrition levels and on the ability to improve the diets of children in the program. In both groups more of the children improved in these two areas than regressed. The data appear to support the case study findings that the program has a positive effect on participants and may have dispersal effects in the community at large. But, the nature of the secondary manipulation of the data suggest much caution in interpretation and use of these findings.

### NNS Cost-Effectiveness Analysis

The preceding discussion of the need for caution in the use of the effectiveness data obtained in the case study applies to the question of cost-effectiveness measures. Under ordinary circumstances one would not perform the analysis since the results, taken out of context, could be very misleading. Given that one of the purposes of the demonstration was to provide examples of procedures for evaluation, the project director completed the cost-effectiveness analysis. It is presented here only to illustrate the

ANALYSIS FOR TWO GROUPS WITH ONE MEASURE

WORKSHEET NUMBER 2

GROUP 1 Participants GROUP 2 Non-Participants

Enter the totals from bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through f and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES									
		1 <u>Initial</u> Level		2 <u>All</u> Folds		3 <u>most</u> Subo.		4 <u>Rec</u> Extend		5 <u>Green</u> & yellow tags	
		N	%	N	%	N	%	N	%	N	%
a:	(+) Behavior	26	32.1	52	59.8	9	10.3	5	5.7	46	52.9
b:	(-) Behavior	55	67.9	35	40.2	78	89.7	82	94.3	41	47.1
c:	TOTAL (a + b)	81	100.0	87	100.0	87	100.0	87	100.0	87	100.0
d:	(+) Behavior	77	50.0	100	58.5	11	6.4	20	11.7	89	52.0
e:	(-) Behavior	77	50.0	71	41.5	160	93.6	151	88.3	82	48.0
f:	TOTAL (d + e)	154	100.0	171	100.0	171	100.0	171	100.0	171	100.0
g:	a + d	103		152		20		25		135	
h:	b + e	132		106		238		233		123	
i:	g + h	235		258		258		258		258	
j:	$c \times g \div i$	35.50		51.26		6.74		8.43		45.52	
k:	$c \times h \div i$	45.50		35.74		80.26		78.57		41.48	
l:	$f \times g \div i$	67.50		100.74		13.26		16.57		89.48	
m:	$f \times h \div i$	86.50		70.26		157.74		154.13		81.52	
n:	$ a - j  - .5$	9.0		0.24		1.76		2.93		0	
o:	$ b - k  - .5$	9.0		0.24		1.76		2.93		0	
p:	$ d - l  - .5$	9.0		0.24		1.76		2.93		0	
q:	$ e - m  - .5$	9.0		0.24		1.76		2.93		0	
r:	$n^2$	81.0		0.06		3.10		8.58		-	
s:	$o^2$	81.0		0.06		3.10		8.58		-	
t:	$p^2$	81.0		0.06		3.10		8.58		-	
u:	$q^2$	81.0		0.06		3.10		8.58		-	
v:	$r \div j$	2.28		0.00		0.46		1.02		-	
w:	$s \div k$	1.78		0.00		0.04		0.11		-	
x:	$t \div l$	1.20		0.00		0.23		0.52		-	
y:	$u \div m$	0.94		0.00		0.02		0.06		-	
z:	Degrees of freedom	1		1		1		1		1	
A:	Chi Square (v+w+x+y)	6.20		0.00		0.75		1.71		0	
B:	Significance of difference	< 0.05		> 0.10		> 0.10		> 0.10		> 0.10	
C:	Degrees of freedom (Sum of row "z" for Categories used)	5									
D:	Chi Square (Sum of row "A" entries)	8.66									
E:	Significance of difference	> 0.10									

Figure 13. Comparison of Baseline Measures for Participants and Nonparticipants

ANALYSIS FOR TWO GROUPS WITH TWO MEASURES

WORKSHEET NUMBER 3

GROUP 1 *Participants* GROUP 2 *Non-Participants*

Enter the totals from the bottom of Worksheet 1 for Experimental Group

Enter the totals from the bottom of Worksheet 1 for the Control Group

Use the N's in rows a through j and calculate the Chi Squares

NOTE: If any entry in this block is less than 10, see instructions

NOTE: Disregard plus or minus signs of subtraction within

Chi Square for Individual Data Categories

Chi Square for Combined Data Categories

STEPS	PROCEDURES	DATA CATEGORIES									
		1 <i>Inter Level</i>		2 <i>All 3 Foods</i>		3 <i>Front Subs.</i>		4 <i>Rice Extent</i>		5 <i>Green Yellow Veg.</i>	
		N	%	N	%	N	%	N	%	N	%
a:	(-) → (+)	24	29.6	31	35.6	11	12.6	6	6.9	23	26.4
b:	(+) → (-)	1	1.2	7	8.1	6	6.9	4	4.6	7	8.1
c:	(+) → (+)	25	30.9	45	51.7	3	3.5	1	1.1	27	31.0
d:	(-) → (-)	31	38.3	4	4.6	67	77.0	76	87.4	18	20.7
e:	Total (a + b + c + d)	81	100.0	87	100.0	87	100.0	87	100.0	87	100.0
f:	(-) → (+)	30	19.5	52	30.4	14	8.2	12	7.0	49	28.7
g:	(+) → (-)	12	7.8	34	19.9	5	2.9	16	9.4	33	19.3
h:	(+) → (+)	65	42.2	66	38.6	6	3.5	4	2.3	56	32.7
i:	(-) → (-)	47	30.5	19	11.1	146	85.4	139	81.3	33	19.3
j:	Total (f + g + h + i)	154	100.0	171	100.0	171	100.0	171	100.0	171	100.0
k:	a + f	54		83		25		18		72	
l:	b + g	13		41		11		20		42	
m:	c + h	90		111		9		5		93	
n:	d + i	78		23		213		215		51	
o:	(e x k) ÷ (e + j)	18.61		27.99		8.43		6.07		24.28	
p:	(e x l) ÷ (e + j)	4.48		13.83		3.71		6.74		14.16	
q:	(e x m) ÷ (e + j)	31.02		37.43		3.03		1.69		31.36	
r:	(e x n) ÷ (e + j)	26.89		7.76		71.83		72.50		17.20	
s:	(j x k) ÷ (e + j)	35.39		55.01		16.56		11.93		47.72	
t:	(j x l) ÷ (e + j)	8.52		27.17		7.29		13.26		27.84	
u:	(j x m) ÷ (e + j)	58.98		73.57		5.97		3.31		61.64	
v:	(j x n) ÷ (e + j)	51.11		15.24		141.17		142.50		33.80	
w:	a - o  <sup>2</sup> ÷ o	1.56		0.32		0.78		0		0.07	
x:	b - p  <sup>2</sup> ÷ p	2.55		3.37		1.41		1.11		1.88	
y:	c - q  <sup>2</sup> ÷ q	1.17		1.53		0.71		0.28		1.01	
z:	d - r  <sup>2</sup> ÷ r	0.63		1.45		0.32		0.17		0.04	
A:	f - s  <sup>2</sup> ÷ s	0.82		0.16		0.40		0		0.03	
B:	g - t  <sup>2</sup> ÷ t	1.42		1.72		0.72		0.57		0.96	
C:	h - u  <sup>2</sup> ÷ u	0.61		2.78		0.00		0.14		0.52	
D:	i - v  <sup>2</sup> ÷ v	0.33		1.18		0.17		0.09		0.02	
E:	Degrees of freedom	3		3		3		3		3	
F:	Chi Square $\frac{(w+x+y+z+A+B+C+D)}{E}$	9.09		10.51		4.51		2.36		4.53	
G:	Significance of difference	< 0.05		< 0.05		> 0.10		> 0.10		> 0.10	
H:	Degrees of freedom (Sum of row "E" for Categories used)	15									
I:	Chi Square (Sum of row "F" entries)	31.00									
J:	Significance of difference	< 0.01									

Figure 14. Comparison of Behavioral Change for Participants and Nonparticipants from M<sub>1</sub> to M<sub>3</sub>

procedure and should not be interpreted or used as a finding from the case study performed.

The calculations were made in accordance with the formula suggested by Worksheet Number 5 "Cost Effectiveness Analysis" contained in the Field Guide. The basic formula is as follows:

$$UMCE = \frac{cpo}{N_{(-)\rightarrow(+)} - N_{(+)\rightarrow(-)}}$$

Where:

UMCE = Unit measure of cost-effectiveness.

cpo = Cost of program operation.

$N_{(-)\rightarrow(+)}$  = Number of children changing from malnourished to healthy.

$N_{(+)\rightarrow(-)}$  = Number of children changing from healthy to malnourished.

Program costs at study sites were estimated at 6000 pesos. This estimate included salaries for the dietary nutritionists for the two months of MNC, ₱1600; travel costs, ₱775; food for demonstrations in the centers, ₱3400; fuel, ₱135; and miscellaneous costs, ₱90. No account was taken of personnel services at the MNCs other than that of the dietary nutritionist. In truth the MNCs make use of medical and health teams drawn from the local areas. Cost of the services of team members other than the dietary nutritionist--persons who assist in the standard survey and do the physical examinations--do not show in records of operating expenses. Neither do the "costs" of the facility, the equipment, the provision of sanitary latrines, etc., all of which are generally donated by the local community. No attempt was made to estimate the monetary value of these items.

There were 156 children enrolled in the mothercraft centers following the baseline surveys at the five study sites. Of this number, 12 voluntarily dropped out of the program before it was completed, leaving a net number of 144 MNC participants. Note that this number is higher than the number shown in the worksheets for "analyses of one group with two measures." Not all 144 enrollees who finished the program were available for data collection. In addition, analyses of the second posttreatment measure did not include data from Bukidnon, which was not available at the time of Synectics final visit.

The "effectiveness" measure used for determination of cost-effectiveness was that shown for nutrition level in Figure 10. At  $M_3$ , the percent showing  $(-)\rightarrow(+)$  behavior was 29.6; the percent showing  $(+)\rightarrow(-)$  behavior was 1.2. The net percent positively effected was 28.4 (29.6-1.2); and the net number of children positively affected was 41 (144 x 28.4 percent).

The UMCE calculations are presented in Figure 15. Using the estimated operation cost of 6000 pesos, the unit measures of cost-effectiveness was estimated at 150 pesos (US \$20.80).

COST-EFFECTIVENESS ANALYSIS

WORKSHEET NUMBER 5

*mnc Participants*

I. SEQUENTIAL TIME PERIOD	<i>at M<sub>3</sub></i>					
a: Number of new participants	<i>156</i>					
b: Number of dropouts	<i>12</i>					
c: Net number of new participants (a - b)	<i>144</i>					
d: Percent of new participants showing (-) → (+) behavior	<i>29.6 %</i>	%	%	%	%	%
e: Percent of new participants showing (+) → (-) behavior	<i>1.2 %</i>	%	%	%	%	%
f: Net percent positively affected (d - e)	<i>28.4 %</i>	%	%	%	%	%
g: Net number positively affected [(c x f) ÷ 100]	<i>41</i>					
h: Cost of program operation	<i>6000 pesos</i>					

II. CUMULATIVE TIME PERIOD						
i: Net number of participants to date (add all "c" entries)	<i>144</i>					
j: Cumulative number positively affected (add all "g" entries)	<i>41</i>					
k: Net percent positively affected to date [(j ÷ i) x 100]	<i>28.4 %</i>	%	%	%	%	%
l: Cumulative cost of program operation (add all "h" entries)	<i>6000 pesos</i>					

III. UNIT MEASURE OF COST-EFFECTIVENESS, PROGRAM COSTS ONLY (l ÷ j)	<i>150 pesos</i>					
---------------------------------------------------------------------	------------------	--	--	--	--	--

IV. DESCRIPTION OF DONATED SERVICES, MATERIALS, EQUIPMENT:					
m: Equivalent monetary value of donated goods and services					
n: Program and donated costs (h + m)					
o: Cumulative program and donated costs (add all "n" entries)					

V. UNIT MEASURE OF COST-EFFECTIVENESS, INCLUDING PROGRAM AND DONATED COSTS (o ÷ j)					
------------------------------------------------------------------------------------	--	--	--	--	--

NOTE: Calculations in rows *i*, *j*, and *o* are made across row entries. All other calculations are made within the column.

Figure 15. NNS Cost-effectiveness Analysis (Illustrations of Calculation Processes)

Conclusions from the NNS  
Evaluation of the MNC Program

The findings from the case study of the MNC program in five provinces indicate:

- ✓ The program appears to have a positive effect on the nutrition level and dietary practices of the participating children.
- ✓ No clear effects are demonstrated for the objectives related to practices for low-cost provision of nutritious foods, and actions should be taken to improve program performance in these areas.
- ✓ The numbers of cases representing the different regions were too small to permit analysis of differences in program performance among the provinces studied.
- ✓ No conclusions about cost-effectiveness of the program are supported by this case study.

It is recognized that of the several study designs presented in the Field Guide, the case study is the least reliable basis for cost-effectiveness determination. In the NNS study, the design suffered the added problem of extremely limited ability to control the assignment of subjects for the participant group--many of which were not malnourished children. No attempt was made to sort out and examine changes in the subpopulation of participants who were malnourished. The conclusion does not imply that the case study is not a useful instrument for evaluation. It can be very useful in analysis of the operational aspects of a program, in identifying strengths and weaknesses of program processes, and determining areas in need of improvement.

In discussion of the findings and of the overall study experience with the project director and the Executive Director of the NNS, it was concluded that a subsequent evaluation should be undertaken--using a quasi-experiment if feasible.

## REFERENCES

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APPENDIX A

DATA FORMS USED FOR EVALUATION OF  
MALNUTRITION PREVENTION PROJECT



Codes for source:

- 1 - grown at home
- 2 - gathered from field, forest or waterway
- 3 - purchased
- 4 - gift or donation
- 5 - others

Codes for food type:

- 1 - protein-rich foods
- 2 - rice and other starchy foods
- 3 - fat rich foods
- 4 - green leafy and yellow vegetables
- 5 - vitamin C - rich fruits

F. Is there any reason to think that the types and amounts of food are not typical for this household?

Yes       No

If yes, select one reason from list below: (cols 77)

- 1  Somebody in the family was sick
- 2  Special occasion
- 3  Gift or donation
- 4  Market day
- 5  Others

III. Card Code: '06' (cols 1-2)

Control No.: (cols 3-16)

<u>Relationship to Head</u>	<u>Sex</u>	<u>Age</u>	<u>Educational Level</u>	<u>Physiological State</u>	<u>Type of Work If Employed</u>
1 Father	1 M		1 no schooling	1 Pregnant	1 Executive level
2 Mother	2 F		2 primary level	2 Lactating	2 Middle Mgmt. Level
3 Brother			3 elem. level		3 Clerical
4 Sister			4 high school level		4 Skilled laborer
5 Son			5 college level		5 Semi-skilled laborer
6 Daughter			6 vocational level		6 Unskilled laborer
7 Cousin			7 advance studies		7 Utility
8 In-Law					8 Teaching
9 Others					9 Others
(cols 17-18)	(col 19)	(col 20-21)	(col 22)	(col 23)	(col 24-25)

Name of Interviewer: \_\_\_\_\_

Date of Interview: \_\_\_\_\_



B. If the infant or child was bottle fed, what type of milk was given? (cols 34-35)

- |    |                          |                       |    |                          |                        |
|----|--------------------------|-----------------------|----|--------------------------|------------------------|
| 01 | <input type="checkbox"/> | fresh carabac's       | 02 | <input type="checkbox"/> | fresh cow's            |
| 03 | <input type="checkbox"/> | fresh goat's          | 04 | <input type="checkbox"/> | condensed milk         |
| 05 | <input type="checkbox"/> | powdered whole milk   | 06 | <input type="checkbox"/> | powdered skim milk     |
| 07 | <input type="checkbox"/> | evaporated whole milk | 08 | <input type="checkbox"/> | evaporated filled milk |
| 09 | <input type="checkbox"/> | recombined milk       | 10 | <input type="checkbox"/> | reconstituted          |

C. Formula given:

- How many cups of water? \_\_\_\_\_ (col 36-38)
- How many cups of milk? \_\_\_\_\_ (col 39-41)
- How many teaspoons of sugar? \_\_\_\_\_ (col 42-44)

D. Did the infant consume any food other than milk yesterday?

- Yes                       No

If yes, select the food from list below. (cols 45-52)

1.  Cereal
2.  Fruit - mango, banana, papaya, avocado
3.  Vegetables (cooked)
4.  Egg (boiled)
5.  Mango or other dried beans
6.  Meat, liver, fish or poultry
7.  Fat (cooking oil, butter, margarine)
8.  Root crops

E. At what age were those foods first taken? (cols 53-76)

Code	Age												
------	-----	------	-----	------	-----	------	-----	------	-----	------	-----	------	-----

F. Was the food given to the infant yesterday typical?

- Yes                       No

If no, why was it not typical? Select only one reason from the list below (col 77)

- |                             |                      |                             |                  |
|-----------------------------|----------------------|-----------------------------|------------------|
| 1. <input type="checkbox"/> | Baby was sick        | 2. <input type="checkbox"/> | Special occasion |
| 3. <input type="checkbox"/> | Gift or donation     | 4. <input type="checkbox"/> | Market day       |
| 5. <input type="checkbox"/> | Mother not available | 6. <input type="checkbox"/> | Others           |

III. Card Code: '03' (cols 1-2)

Control No.: (cols 3-16)

Mother Characteristics:

A. Age      '      '      (cols 17-18)

B. Educational level (col 19)

- |                                              |                                               |
|----------------------------------------------|-----------------------------------------------|
| 1. <input type="checkbox"/> no schooling     | 2. <input type="checkbox"/> primary level     |
| 3. <input type="checkbox"/> elementary level | 4. <input type="checkbox"/> high school level |
| 5. <input type="checkbox"/> college level    | 6. <input type="checkbox"/> vocational level  |
| 7. <input type="checkbox"/> advance studies  |                                               |

C. Physiological state (col 20)

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1 <input type="checkbox"/> pregnant | 2 <input type="checkbox"/> lactating |
|-------------------------------------|--------------------------------------|

Participation Data:

A. How many sessions of Nutrition Education Class have you attended to date:      '      '      (cols 21-22)

Food Consumed Yesterday: (cols 23-28)

- A. 1  Protein - rich foods - meat/poultry, fish, dried beans or nuts, eggs, milk, cheese & other milk products
- 2  Rice and other starchy foods - rice, corn, root crops, sugar
- 3  Fat - rich foods - butter, margarine, lard, coconut oil, coconut milk
- 4  Green leafy and yellow vegetables
- 5  Vitamin C - rich fruits
- 6  Other fruits and vegetables

B. Was the food you ate yesterday typical?

- Yes  No

If No, why was it not typical? (col 29)

Select one reason why.

- |                                                            |                                             |
|------------------------------------------------------------|---------------------------------------------|
| 1 <input type="checkbox"/> Mother was sick                 | 2 <input type="checkbox"/> Special occasion |
| 3 <input type="checkbox"/> Gift or donation                | 4 <input type="checkbox"/> Market day       |
| 5 <input type="checkbox"/> Somebody in the family was sick | 6 <input type="checkbox"/> Others           |

Home Food Production

A. Do you have a vegetable garden in your backyard now?

Yes  No

Vegetables planted (cols 30-34)

- 1  Green leafy and yellow vegetables
- 2  Succulent vegetables
- 3  Vitamin C - rich vegetables
- 4  Beans and legumes
- 5  Root crops
- 6  Others

B. Are you raising poultry and livestock in your backyard now?

Yes  No

Check the animals raised for food consumption and indicate how many. (cols 35-78)

- |    |                                  |       |    |                                   |       |
|----|----------------------------------|-------|----|-----------------------------------|-------|
| 01 | <input type="checkbox"/> pigs    | _____ | 02 | <input type="checkbox"/> cows     | _____ |
| 03 | <input type="checkbox"/> goats   | _____ | 04 | <input type="checkbox"/> carabaos | _____ |
| 05 | <input type="checkbox"/> sheep   | _____ | 06 | <input type="checkbox"/> rabbits  | _____ |
| 07 | <input type="checkbox"/> chicken | _____ | 08 | <input type="checkbox"/> ducks    | _____ |
| 09 | <input type="checkbox"/> turkeys | _____ | 10 | <input type="checkbox"/> geese    | _____ |
| 11 | <input type="checkbox"/> pigeon  | _____ | 12 | <input type="checkbox"/> pugos    | _____ |
| 13 | <input type="checkbox"/> dogs    | _____ | 14 | <input type="checkbox"/> others   | _____ |

Name of interviewer: \_\_\_\_\_

Date of interview: \_\_\_\_\_

**APPENDIX B**

**NNS DATA FORMS USED FOR EVALUATION OF  
MOTHERCRAFT NUTRITION CENTERS**

Republic of the Philippines  
 Department of Health  
 NATIONAL NUTRITION SERVICE  
 Manila

NUTRITION ASSESSMENT SCHEDULE

A. \_\_\_\_\_  
 Date of Survey

B. LOCATION 1. Region \_\_\_\_\_ 2. Prov./City \_\_\_\_\_  
 3. Municipality \_\_\_\_\_ 4. Barangay \_\_\_\_\_ 5. HH No. \_\_\_\_\_

C. IDENTIFICATION AND CHARACTERISTICS OF CHILD SUBJECT (0-6 yrs.)  
 1. Name \_\_\_\_\_ 2. Sex \_\_\_\_\_ 3. Birthorder \_\_\_\_\_  
 4. Date of Birth \_\_\_\_\_ 5. Source of (4) \_\_\_\_\_  
 6. Age in years \_\_\_\_\_ 7. Birthweight \_\_\_\_\_ Kg. 8. Source of (7) \_\_\_\_\_

D. PARENT'S SOCIO-ECONOMIC CHARACTERISTICS:  
 Name of 3. Educ. Attainment 4. Occupation 5. Estimated Income  
 1. Father \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : (Monthly)  
 2. Mother \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_  
 \*In cash and in kind

E. MOTHER'S PHYSIOLOGICAL CONDITION AND FERTILITY (15-44 Years)  
 1. Mother's age \_\_\_\_\_ 2. Pregnant \_\_\_\_\_ mos. 3. Lactating/lactated \_\_\_\_\_ mos.  
 4. Age at 1st child birth \_\_\_\_\_ 5. Interval bet. marriage and 1st birth  
 \_\_\_\_\_ mos. 6. Total no. of pregnancies \_\_\_\_\_ 7. No. of live births \_\_\_\_\_  
 8. No. dead/miscarried \_\_\_\_\_ 9. No. of living children \_\_\_\_\_ 10. Interval  
 bet. delivery & present one \_\_\_\_\_

F. ANTHROPOMETRY  
 SUBJECT Wt. (Kg.) : Ht. (cms.) : AC (cm.) : FF (cm.) : HC (cm.) : Chest (cm.)  
 1. CHILD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_  
 2. MOTHER \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_  
 \*\*For children below 5 years only

G. BIOCHEMICAL  
 SUBJECT (a)Hb. : (b)Serum Vit.A : (c)Total Proteins : (d)Albumin : (e)Globulin  
 1. CHILD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_  
 2. MOTHER \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_

H. CLINICAL EXAMINATION: 1. CHILD 2. MOTHER

	: Sparse	01. **	Pigmentation at knuckles/	
: Hair	: Discolored	02. **	fingers/toes	24.
	: Easily plucked	03. **	Phrynoderma	25.
	Moonface	04. **	Koilonychia	26.
	Parotid enlargement	05.	Gums-spongy bleeding	27.
	(bilateral painless)		Craniotabes	28.
	Oedema	06.	Epihyseal enlargement	29.
	Emaciation	07.	Beading of ribs	30.
	Marasmus	08.	Knock-Knees/bow legs	31.
	Conjunctival xerosis	09.	Frontal parietal bossing	32.
	Bitot's spots	10.	Teeth : Caries	33.
	Corneal xerosis/ Keratomalacia	11.	: Mottled enamel	34.
	Corneal opacity	12.	Enlargement of Spleen	35.
	Night Blindness	13.	Enlargement of liver	36.
	Photophobia	14.	soft	
	Anaemis	15.	firm	
	Nasolabial dyssebacea	16.	hard	
	Angular stomatitis	17.	Thyroid enlargement	37.
	Cheilosis	18.	Others (specify)	38.
	: Red and raw	19.		
Tongue	Papillao-atropic	20.		
	: Papillao-hypertropic	21.		
	Pellagra	22.		
	Crazy pavement dermatosis	23.		

**INDIVIDUAL DATA**  
**Infant or Child - 0-6 years of age**

**A. IDENTIFICATION**

1. Group \_\_\_\_\_
2. Name of infant or child \_\_\_\_\_ Code No. \_\_\_\_\_
3. Address/location \_\_\_\_\_

**B. INFANTS CHARACTERISTICS:**

4. Age (months) \_\_\_\_\_ 5. Sex \_\_\_\_\_ 6. Weight (Kg.) \_\_\_\_\_
7. Degree of malnutrition/nutritional level \_\_\_\_\_

**C. PARTICIPATION DATA: (Respondent: Mother or mother substitute)**

8. Has this family member participated in the Mothercraft Program?  
 Yes \_\_\_\_\_ No \_\_\_\_\_
9. Who is this participant? \_\_\_\_\_ Position in the Family \_\_\_\_\_
10. How many meeting has the participant attended to date? \_\_\_\_\_

**D. FOODS CONSUMED YESTERDAY:**

11. The infant or child was breastfed? Fully \_\_\_\_\_ Partially \_\_\_\_\_  
 Not at all \_\_\_\_\_. Number of breastfeedings yesterday \_\_\_\_\_
12. Is the infant or child bottlefed? Fully \_\_\_\_\_ Partially \_\_\_\_\_  
 Not at all \_\_\_\_\_. Number of bottlefeedings yesterday \_\_\_\_\_
13. Did the infant or child consume any foods other than that from breast  
 or bottle? Yes \_\_\_\_\_ No \_\_\_\_\_. If yes, list below and
14. Check if: \_\_\_\_\_ individual preparation \_\_\_\_\_ family food.

15. FOOD	16. HOW PREPARED	17. AMT./NO. OF TIMES	18. FOOD GROUPS

19. Age when supplementary feeding was first introduced \_\_\_\_\_ mos.

**E. REPORTING CONDITIONS: (For the interviewer only)**

20. Who is the source of information for this report? \_\_\_\_\_
21. What is the relationship to the infant or child whose diet is described?  
 \_\_\_\_\_
22. Are there any reasons to think the diet reported is not typical?  
 Yes \_\_\_\_\_ No \_\_\_\_\_. If yes, give reason \_\_\_\_\_

Name of Interviewer: \_\_\_\_\_

Date of Interview: \_\_\_\_\_

