

PD-AAT-643

45636

INV

17

CHILD FEEDING PROGRAMS IN DEVELOPING COUNTRIES:

A Comparative Evaluation of Ongoing Programs
in Colombia, Kenya, and the Philippines

INTERIM REPORT

July 1974

AGENCY FOR INTERNATIONAL DEVELOPMENT
DEPARTMENT OF STATE
WASHINGTON, D. C. 20523

CHILD FEEDING PROGRAMS IN DEVELOPING COUNTRIES:

**A Comparative Evaluation of Ongoing Programs
in Colombia, Kenya, and the Philippines**

INTERIM REPORT

**Richard Ellis
Diane Cleemput
Mark Cooper**

**Checchi and Company
Washington, D.C.**

in collaboration with

**Consultal, S.A., Bogota
The Institute of Philippine Culture, Manila
The Research Bureau (East Africa), Ltd., Nairobi**

July 1974

This report was prepared by the Development Research Group at Checchi and Company, under a contract with the Office of Nutrition of the U.S. Agency for International Development. Our acknowledgement and appreciation is due to many people who provided advice and assistance, especially the USAID mission staff in each of the three nations where the project was carried out; numerous representatives of the governments of those nations; representatives of the voluntary agencies and other organizations which operate food programs; and officials in AID's Washington headquarters, particularly those in the Office of Nutrition. The principal contributors to the project are:

Analysis and Writing.....Richard Ellis
Diane Cleemput
Mark Cooper

Research Design.....Richard Ellis

Project Management.....Diane Cleemput

Data Systems.....Harry C. Carr III

Country Project Direction.....Ernesto Molano Prado
(Colombia)
Patricia P. Tanco
(Philippines)
Clive Moon
(Kenya)
Chris B. Okemo
(Kenya)

Program Specialist.....Margot Higgins

Assistants.....Vicki Morey
Gladys Kuoksa

We want to thank Calvin Cowles of AID's Washington Office of Program Management and Evaluation, for his encouragement and sensible counsel. It is also an honorable custom in surveys to thank one's respondents, and so we do: children, their mothers, their teachers and all of the others who so patiently answered our questions. Finally, we want to call attention to the excellence and the diligence of our research colleagues abroad. Many of the ideas and observations in this report are theirs.

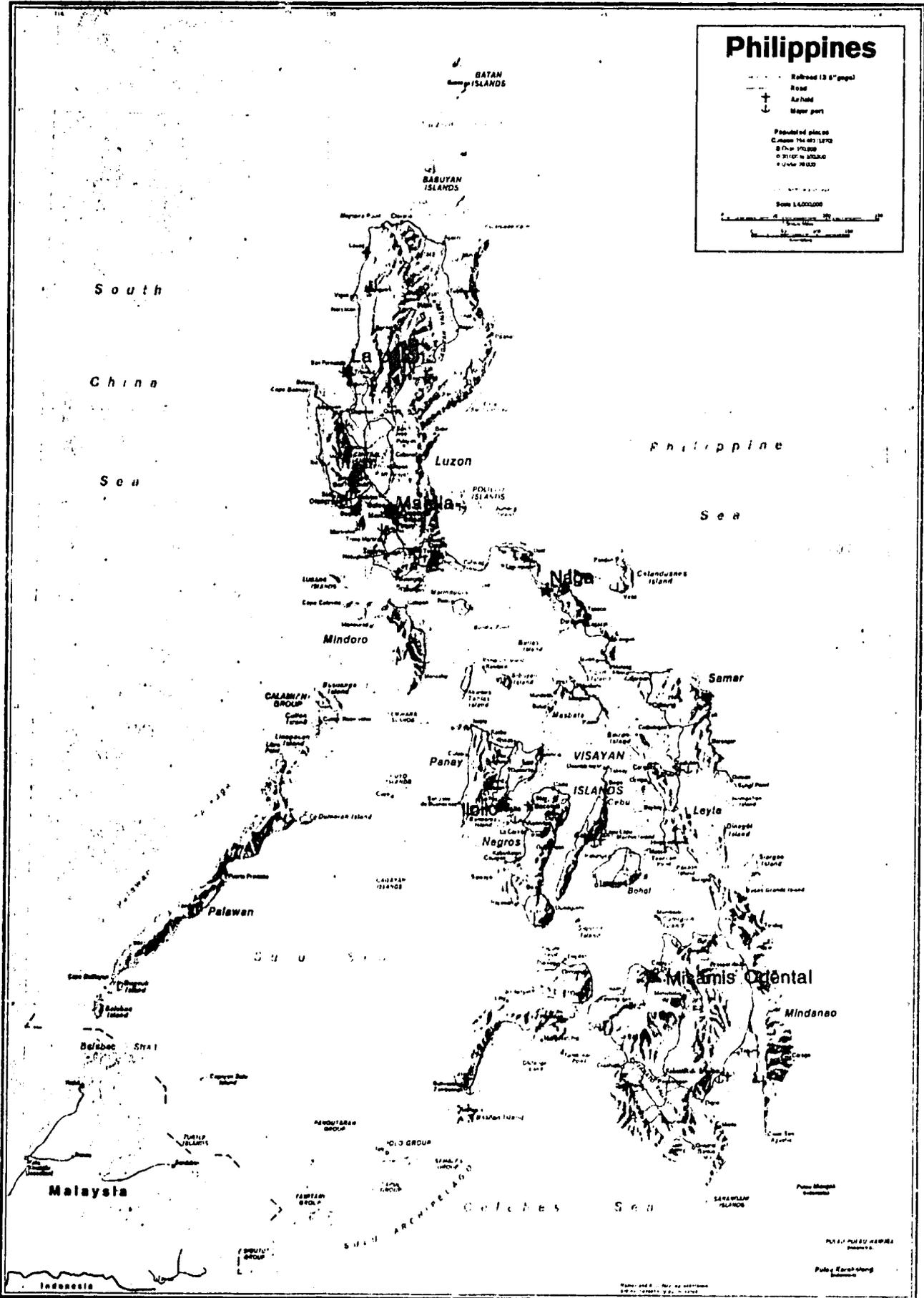
00
CL

INTRODUCTION	1
1. The study and its readers	2
2. Why an evaluation?	2
3. An example of policy uncertainty	3
4. Research requirements	4
5. The objectives of the programs	5
6. Present conclusions	6
I. THE EVALUATION IN MINIATURE: TWO SCHOOL FEEDING PROGRAMS	7
1. The setting	8
2. The program	8
3. The schools	9
4. Assessing the impact of the program	11
5. A preliminary analysis.....	13
6. A more complicated analysis	14
7. The effect of site factors.....	16
8. An evaluation strategy	16
9. Final assessment: Nakuru	19
10. A Philippine case	22
11. The Philippine case: conclusions.....	24
12. Illustrating the effect of a complex analysis of the La Union school program	26
13. Summary	27
II. A COMPARISON OF THE IMPACT OF FIFTEEN SCHOOL PROGRAMS	26
1. Criteria and general conclusions	29
2. Attendance benefits	34
3. Nutrition effects	36
4. Diet	37
5. Academic performance	38
6. Summary	39
III. EVALUATING MCH: A COLOMBIAN CASE STUDY AND A COMPARATIVE ANALYSIS	40
1. The setting in Neiva.....	40
2. The MCH operation	41
3. Conclusions for the Neiva case	42
4. Comparative criteria and general outcomes for the MCH sites.....	45

IV. DETERMINING IMPACT DIFFERENCES	50
1. A classification of differences	50
2. School feeding program differences	51
3. MCH program differences	54
4. Cost differences	57
5. Site distinctions	60
6. Target population differences	66
7. A summary of some of the important differences	71
8. Some further evidence, and a note on the validity of the conclusions	72
SOME OBSERVATIONS AND SUGGESTIONS.....	78
1. Observations about the programs	78
2. Specific suggestions for improving school and MCH programs	79
3. Larger suggestions	82

TABLES

1. Comparative Ranking of School Feeding Programs.....	30
2. Comparative Ranking of MCH Feeding Programs...	46
3. School Feeding Program Characteristics Which Relate to Nutrition Effectiveness.....	52
4. MCH Feeding Program Characteristics Which Relate to Nutrition Effectiveness.....	55
5. Annual Cost Estimates Per Recipient for School and MCH Programs, by Effectiveness.....	58
6. Site Characteristics Which Relate to School Program Nutrition Effectiveness.....	64
7. Site Characteristics Which Relate to MCH Program Nutrition Effectiveness.....	65
8. School and MCH Programs: Rankings of the Importance of Different Variables on Nutritional Impact.....	68
9. Percent of Variation in Nutritional Status Explained in the Analysis, by Program Effectiveness.....	77

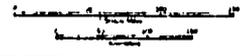


Philippines

- +—+—+— Railroad (12 1/2" gage)
- Road
- ✈ Air hub
- ⚓ Major port

Published since 1948
 C. 1948 by 1970
 © 1970 by 1970
 © 1970 by 1970
 © 1970 by 1970

Scale 1:4,000,000



vic vic

*If you give a man a fish, he will have a single meal.
If you teach him how to fish, he will eat all his life.*

--Kuan-Tzu, economic dialogues in the Chinese
Legalist tradition, circa 300 B.C.; quoted
in *Business and Developing Countries: A Study
of the Role of Private Enterprise in Economic
Development* (New York: Praeger, 1973)

INTRODUCTION

1. *The study and its readers.* This is a report on the impact of thirty child feeding programs in developing nations. It is directed at an audience of development specialists, particularly those concerned with food and nutrition. Additional volumes are forthcoming, directed at those in development research and providing information about the study's design and methodology. We also hope to issue a revised version of this volume, with additional data from another country and further refinement of the present analysis.

Reports such as these often take the form of a very brief executive summary, plus a very lengthy research monograph. The summaries typically omit most of the detail and precision which studies are supposed to provide, while the monographs are seldom written with policy requirements in mind. Surely a better form of presentation is possible. This is an essay which is intended to show how a research project can shed light on policy issues. We have tried to keep this material brief, so that it can be consumed in an evening.

2. *Why an evaluation?* Food programs in the developing world began as a way of bridging two problems: agricultural surpluses in the industrialized nations, and hungry persons in the developing countries. As the donor

nations have assisted the third world in dealing with problems of malnutrition, they also have hoped to benefit by providing a useful outlet for agricultural commodities purchased as a part of each nation's own domestic price support activities. Now, however, surplus farm production is no longer taken for granted, and developing countries are learning that the donors' foreign aid programs may require substantial local support if they are to be of genuine value to their recipients. Both donors and recipients must cope with a tightening market for development funds. The demand is for larger, more sophisticated programs which will have a measurable, broad impact. In this context, many development analysts question whether money now spent on child feeding programs might not be better spent elsewhere.

Because child feeding programs are relatively old and well established, people with some knowledge of them are well aware of a host of recurring inefficiencies, operating difficulties, and other routine problems. Also, because of the long history of the efforts, food programs are suspect as political or bureaucratic endeavors which may have outlived their usefulness. Such concerns give rise to evaluation studies. It is useful to bear in mind that these have been among the few foreign aid programs which try to respond to nutrition problems, and which are intended to have a direct effect on poor people in the developing nations.

3. *An example of policy uncertainty.* To illustrate the present state of the art of food program planning and management, many possible examples come to mind: unresolved debates about nutribuns and hot lunches, questions of timing of a nutritional intervention, the relative value of using schools as a mechanism versus the need to reach the pre-school child. Let us briefly review one of these unresolved debates to see what issues it poses for the policymakers: the use of nonfat dry milk as a commodity for child feeding programs. Many of us were taught to regard milk as the ideal nutrient. Until recent years, it was in plentiful supply and was widely used in child feeding projects. Its price has risen of late, and replacement commodities, such as corn-soya-milk (CSM),¹ are being substituted.

¹CSM has recently been modified to corn-soya-blend (CSB), with no milk component.

This milk situation affects the day-to-day operation of food programs in many ways, and at all levels. For example, the donor agencies must plan for future commodity requirements, estimating as best they can what products--milk, CSM, or others--can be used to achieve results which are commensurate with their efforts. In making these estimates, program managers may seek counsel from those who supervise programs on a day-to-day basis. Some of these will report that the taste of CSM is not liked by local people, that milk is an invaluable drawing card for a program, and that milk is good for the children. Turning to experts in food technology, nutrition, and development, the policymakers may also learn that in some parts of the world, lactose intolerance is thought to link milk to diarrhea and bloating in the child. Cultural practices turn out to make a difference: in Northern Luzon, some people surveyed for this study believe that drinking milk will cause children to grow horns. And unintended side effects surface: our Kenyan collaborators observed that most of the food given out at MCH (Mother-Child Health) centers was likely to be shared by others in a family, and they cited milk as a particular attraction for adults.

Faced with this kind of ambivalent and incomplete intelligence, what is the food program manager to do? For one thing, the advice given by experts and the reports received from the field do not address quite the same issues. For another, there is reason to believe that experience and research findings for Country A may not always apply in Country B, and even within one country striking regional variations may exist, in food habits, local economies, and other critical factors. What originally may have seemed simple and straightforward has become complex and obscure.

4. *Research requirements.* The task of people responsible for child feeding programs is to make decisions about which children will receive the potential benefits of a limited supply of scarce nutrients. Not all the needy can be served, for donors have insufficient commodities at their disposal. Thus important judgments must be made, often on no better basis than the information already given here about just one issue, the use of milk.

This is the way studies come to be sponsored, because it is possible that a thorough comparative review of actual programs in many countries may provide a resolution of the contradictions and uncertainties in the available information, into a more consistent and sensible whole. For this task many comparable studies in different areas of the world are needed. This is the specific basis of the present analysis, which was supported in the expectation that it might provide a framework for further research conducted by others, and thus lead to a more useful state of understanding of the child feeding activities which consume much of the resources for food programs in the Third World. In this way one might hope to achieve an improvement in rationality of development spending.

5. *The objectives of the programs.* We began by looking at the goals of child feeding programs. Many claims have been made on behalf of these by donor agencies, recipient governments, and voluntary agencies and other organizations (CARE, CRS, UNICEF, etc.) which distribute the food. Supporters have contended that child feeding programs improve the nutritional status of both preschool and school children, teach mothers and school children good nutrition practices, improve school attendance through the drawing power of the food, and improve school performance through better nutritional status.

We set out to design a replicable research project to prove or disprove these claims and to begin to better determine the development implications--cost-benefits--of impact or non-impact:¹

- Each claim or issue was designed to be treated with as much rigor as possible, including comparisons between program recipients and other people not receiving food.
- Structured survey techniques were used as the major method for recording data, but impressionistic materials were gathered as well.

¹The revised final research design will be included in a forthcoming volume of this study. Details of the approach will be treated there. A summary of the methodology is provided in Appendix A of this report.

- The key analytic unit was defined as a single program activity in one particular place, compared with a similar locality without such a program, or "program" (fed) and "control" (non-fed) groups, respectively. Both preschool MCH and school feeding were addressed.
- For each MCH program, mothers were interviewed who were currently enrolled, who had been formerly enrolled, and who had never participated; the youngest children of all of these mothers were measured; and interviews were conducted with the administrator of the program.
- School feeding was examined at both the program and control (non-fed) schools, where children in the first and third grades were interviewed, measured for weight and height, and tested for scholastic ability. Interviews were held with the children's mothers or guardians, their teachers, and the principals or headmasters of their schools.
- In the case of each of these respondent groups, sample sizes were minimized in order to hold costs of the overall three-nation study to sensible proportions.
- The study was sited in three countries-- Colombia, Kenya, and the Philippines-- and five school and five MCH projects within each country were studied. All field work was carried out in collaboration with researchers from the host countries.

At present, 30 child feeding programs have been subjected to analysis, and the extension of the project to include a fourth nation will further expand the data base.

6. *Present conclusions.* At this juncture, the results of this exercise are these. First, we appear to have developed workable procedures for carrying out useful evaluations of child feeding programs. These procedures will

be further refined during the next year. Second, our present data indicate that these programs can be made to produce results. Not all of the programs accomplish this, however. Third, we have uncovered some critical factors which bear strongly on program impact, and which ought to be more explicitly built into development programming for these kinds of efforts. Fourth, we have come across a set of analytic methods in the course of this work which we believe may be of use as tools to improve the realism and accuracy of plans for food programs, and possibly of other kinds of development efforts.

A number of observations and suggestions for child feeding programs have arisen out of this work. These are summarized in the final sections of this report. The remainder of the text provides the evidence on which these suggestions are based.

I. *THE EVALUATION IN MINIATURE:
TWO SCHOOL FEEDING PROGRAMS*

1. *The setting.* In the Rift Valley of southwestern Kenya is located Nakuru, a city of about 66,000 people. Nakuru enjoys a temperate climate year round, and some degree of economic prosperity because the town is both a principal market center and an attraction for tourism--nearby is one of the largest bird sanctuaries in the world. The people are primarily Kikuyu, the country's largest tribe and presently holders of the balance of political power in Kenya. Heads of household are mostly wage earners, small businessmen, and farmers.

2. *The program.* A single school feeding program covers all elementary schools in Nakuru, with the possible exception of one or two "Class A" buildings (i.e., for upper middle class children), and with the exception of--

- A school for Army personnel based nearby.
- Several very poor schools in nearby rural areas which have come under Nakuru's jurisdiction because the town recently expanded its city limits.

The Army base school was selected as a "control" or comparison school, partly because the rural alternatives did not compare well with the Nakuru children on background socioeconomic factors. The people of Nakuru town, while by no means well off by the standards of the developed countries, are nonetheless relatively prosperous compared to their countrymen in the nearby rural regions.

The Nakuru town council, which we would judge to have a shrewd understanding of development program potentials, has taken a strong interest in school feeding. As far as we know, present management of the program is 100% Kenyan. The operation is keyed to an impressive central kitchen system, especially constructed for large-scale feeding operations. Two or more cookers, each apparently capable of heating up about 30 gallons of food, are built into each of these facilities. Hot porridge--a bit like cous-cous-- and soup can be prepared; milk is also mixed. All preparations are poured into metal milk containers, which are then transported to school sites; children receive a hot meal with the wheat porridge, soup, and milk.

3. *The schools.* The feeding program school selected for study in Nakuru was the Flamingo Primary School. It opened in 1965 and serves "standards" (grades) one through seven, with a total enrollment of 670 students. School fees are 52 shillings per term (US\$2.51 per month), a considerable expense for the average Kenyan. In Kenya, school fee expenses have been one of the principal reasons why many children do not enroll in school at all, and why attendance drops off for those who do enroll.¹ The school fee includes food fees of 16 shillings per term (US\$.78 per month).

Flamingo's school food program began in 1967, with USAID-donated food provided through Catholic Relief Services. At present, only one USAID commodity (bulgur wheat) is provided, and local foods complete the lunch fare. The food is served at noontime five days per week, 36 weeks per year, and consists of the central kitchen fare described above-- porridge, soup, and milk, which may be varied with the use of potatoes, vegetables, and spices.

Different schools served by the program have their own ways of passing out the food. At the Flamingo School, streams of children appeared, each carrying a plate, cup, and spoon, lining up to receive a share from the milk can containers left by the truck from the central kitchen. Once fed, the pupils moved off by themselves to find a place to eat, some on the grass, some in an unused shed nearby. The school's headmaster reported that food is almost always

¹ In January 1974, Kenya initiated a policy of national free education.



Feeding programs in Nakuru. Top: children at the Flamingo Primary school line up to receive lunch. Below left: outside one of the central kitchens where the food is prepared. Below right: the lunch line. Milk and a wheat porridge were served.



Photographs in this report are the work of Diane Cleemput.

provided to the children, there are few delivery delays, and few problems exist with food preparation and serving. One teacher reported that the food is badly cooked, and both standard one and standard three teachers agreed that children only eat part of the serving, probably because it does not taste very good. Many children report that they do not like their food; nevertheless, most claim that they eat all of it, and that it is enough to fill them up.

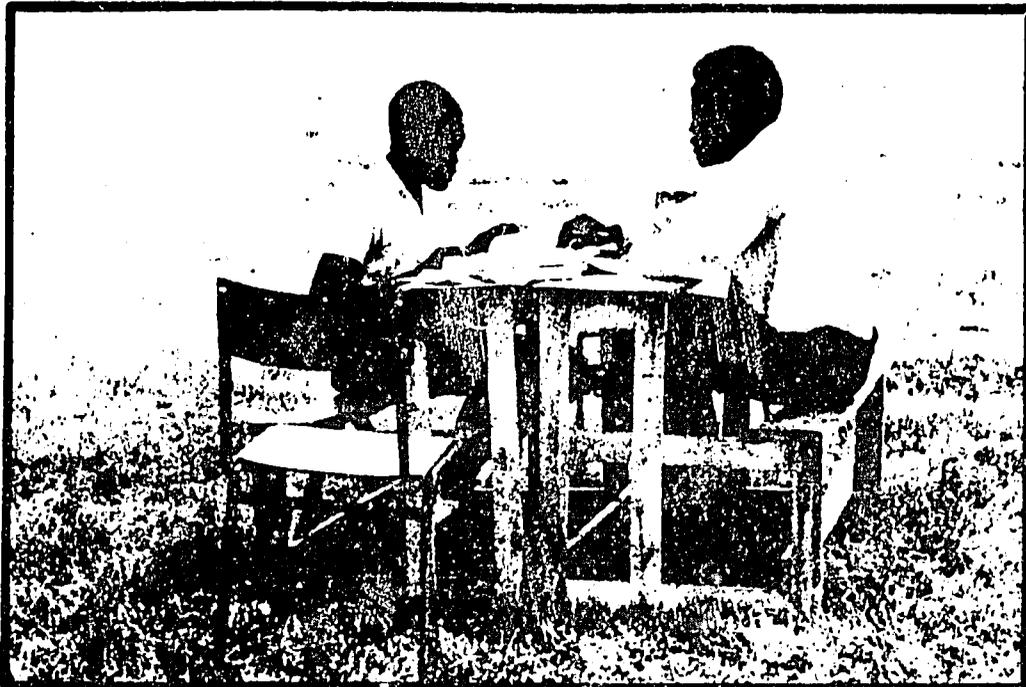
As a comparison, we looked at the Lanet Full Primary School, a recent addition to the Nakuru school district. Lanet school opened in 1966. Enrollment is drawn from children in Kenyan Army families, 600 students. Kenyan field team diaries provided this description:

The school compound was less neat than the Flamingo one. The classrooms were not smart--most of the windows and desks were broken. The headmaster's office was small and untidy. Most of the children that were interviewed were either from the Lanet Army Camp or from nearby former European farms which were acquired by Africans and are operated on a cooperative basis. Generally, the children seemed to be from less well-off homes than the Flamingo ones.

It costs 27 shillings per term (US\$1.30 per month) for children to attend school at Lanet, about half the cost of attending Flamingo, the food program school. Some food can be purchased by children at the Lanet school.

4. *Assessing the impact of the program.* This, then, is the setting of the school feeding study in one pair of Kenyan schools. Here is how the evaluation proceeded.

Our initial impressions about the feeding program came from our own visits to Nakuru, in much the same way that voluntary agency or USAID personnel form impressions of child feeding projects through occasional forays into the field. Anyone interested in development who visits schools with feeding programs may discover how difficult it is to accurately appraise such projects from observation alone. On casual inspection Nakuru looks like a good show. But is it really? For example, might this be one of those projects that cannot fail because it happens to deal with

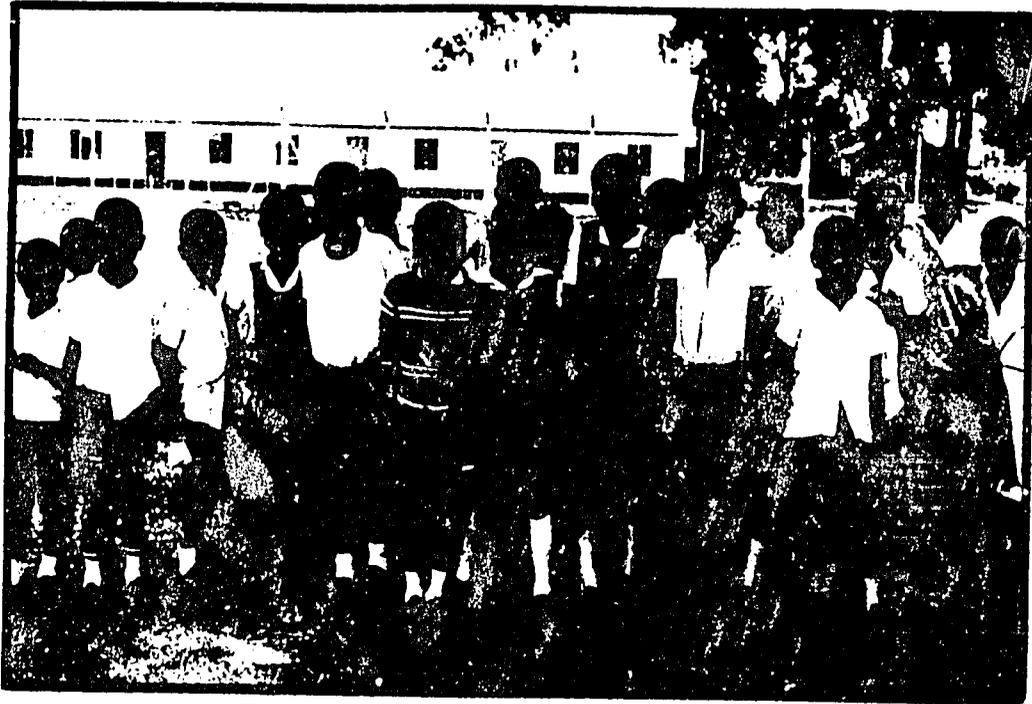


A standard three student at Lanet Primary School takes the Raven Progressive Matrices test, administered by an RBL field worker.

children who are relatively healthy in the first place? In more theoretical terms: might the prosperity of Nakuru town cause both better health of the children at the Flamingo school, and the local capability to mount a well-run feeding program which may not really be needed by those children?

At this juncture, the visitor may be tempted to try to see if the children's poverty and health can be judged by their appearance. Flamingo school children, by and large, look moderately poor and moderately healthy. What is one to make of this? Do they look healthy because they have always been healthy, or because the program works? If they don't look healthy, is that because local conditions are terrible? Or because the program has no impact? One hesitates to make such judgments on the basis of a short impressionistic visit.

There are further difficulties with relying on what one can see. Nutritional deficiencies could lead to an "adaptive" physique in children who are apparently healthy



Lanet students in Nakuru line up and ask that their picture be taken. The buildings in the background are Army barracks.

enough, but short in stature. These smaller children may lack health reserves, so they become exceptionally vulnerable to disease. Such conceptual possibilities underscore the dangers in offhand assessments made by short-term visitors to Nakuru.

5. *A preliminary analysis.* The initial opportunity to do more than eyeball these conditions fell to our Kenyan collaborators from the Research Bureau. However, their primary task was to gather data, not assess it, and their budget allowed for only a preliminary look at gross differences between program and comparison schools.¹ Possessing data for a

¹This was done for cost-effectiveness reasons, on the ground that a centralized analysis would be considerably less expensive, as well as appropriate for a comparative cross-national study. But this severely inhibited the ability of our collaborators to show what they could do. Presently we favor a modified approach in which foreign collaborators work jointly with U.S. researchers for about a month, participating in a centralized analysis. See Appendix A.

research design expressly geared to the capabilities of advanced social science computer systems, and themselves lacking access to such facilities, the Kenyans sensibly confined their analysis to materials tabulated by hand, passing on other intelligence based on their contact with several hundred program participants and other informants in Nakuru alone. Here is what RBL had to say in its own summary:

On a site by site basis, no general conclusion could be made as to whether school lunch programs have had any effects on the children. This is because no general patterns were clear from the data at hand, e.g., in the program school we would find that the school lunch has had some effect on performance in one grade but not in the other, while in the control school, performance was generally better. Under these circumstances, the evidence was not conclusive as to whether the lunch program has had effect on performance or not... [At the Nakuru site] program school children are slightly heavier than the control school children, but the program school children also happen to come from higher income families, so that the difference in weight for age is not necessarily the result of the lunch program, but could be reasonably attributed to the family income differences.

With these kinds of impressions in hand, the collaborating institutions from the three countries came to Washington for a brief joint meeting, to exchange information and help the Americans prepare for the main analytic phase of the project. The outlook for Nakuru continued to be ambiguous. There was little question that in a purely operational sense the school lunch program there worked, and worked rather well. That is to say, in Nakuru the food is reliably delivered to the targeted children. But it was clear that a much more thorough analysis of the data would be required to learn how much of the total impact of this feeding program might actually be attributable to income or other background differences among the people who were studied.

6. *A more complicated analysis.* The byword of our subject matter is complexity. There are so many critical factors affecting the impact of feeding, each interacting simultaneously with the rest to produce a total and unique pattern

of effects, that computer-assisted regression models seem to be needed, so that one can cope with ten to twenty measures at the same time. Use of such methods is not uncommon in economics, but it is still rare outside the academies in development sociology.

The first requirement of such an analysis is for some sort of conceptual outline of the subject matter. For feeding programs, at least three major types of important variables relating to impact can be identified. There are *target population characteristics*. For example, the younger preschool child may be a more dependent person, less able than the older school child to adjust its own behavior to meet changing conditions in the outside world. Under the heading of target population variables, then, are placed age-related facts which might have a bearing on the impact of a program on the nutritional status of the recipients, as well as a bearing on any of the other claimed benefits (e.g., school attendance). Many other pieces of information can be classed as target population attributes: for example, sex effects--differences between boys and girls--and social class differences.

The second set of key variables relates to *program characteristics*: type and amount of ration, extent of commodity shortages or delays in their delivery, special features like the use of a prepackaged ration like the nutribun, quality of local management, age of the program, and so on. In these matters we are not so constrained: if we can depart from what we observe to suggest what might be better, some change is possible. Perhaps research can help predict what particular changes to try out.

The third set of important variables is *site-related*. They seem to be extremely important in this study, especially insofar as they reflect cross-national, as well as within-nation, differences in culture, economic resources, language, and so on. Here we include climate, geography, local food habits, economy, public health services, and local government capabilities--to name some obvious factors. Many of these attributes are no more than group-level analogs to target population differences--per capita income as an index of the relative poverty of the place, individual income as an index of the relative poverty of the family, and the relationship between place and individual defining local socioeconomic status. In studying these kinds of interplay between the recipient and the local environment, we expect to better understand how to reach people with the development programs which are the subject matter here.

7. *The effect of site factors.* For much of this study only the first (target population) and second (program characteristics) sets of variables are required; as long as we stick to site-by-site analysis, nothing else is needed. But as soon as one attempts to aggregate data across sites to national or international levels, one of two things must occur. Either site factors must turn out to be unimportant, in which case the aggregated analysis will give much the same results as the typical site; or site factors will be important enough to cause programs which actually work in different ways to appear to work the same. If this is the case, and in this study it often is, then real and important variations in the inter-relationships between programs and target populations will be obscured in the aggregated assessments, and the programs will tend to be lumped together into an "average" composite picture which does not describe any one of them very well. The situation is directly analogous to calculating the population change of two regions, one with an increase of 10,000 people and one with a decrease of the same amount. To say that both together have no net population change is certainly true; but this is not very helpful in describing the regions or providing intelligence about how one might deal with them. The model should resemble, then, a network of linkages between target population characteristics and program characteristics, and all of these linkages must pass through a black box labeled "site."

8. *An evaluation strategy.* Next, the conceptual issues of the evaluation--the procedures for arriving at a judgment about the worthiness of a program--must be introduced. Experimental practice tells us that the surest way to establish causality--here, a relationship between establishing a development program and obtaining results from that program--is to do the following:

- Randomly divide a population of potential beneficiaries into experimental and control groups.
- Administer the program to the experimental group only, holding everything else constant.
- After the program has been completed, compare the two groups to see if the experimental group has benefited as anticipated.

It might be possible to actually evaluate feeding programs this way--if the subjects were in institutions, if they could be completely isolated from the outside world, if we were never to look at established programs, and if we had unlimited time and money. Obviously some compromises are needed. Any relaxation of the experimental standards will obscure the clarity and validity of the results, however. Many safeguards must be built in. This study uses the following approach:

- A sample is drawn of feeding program recipients, and another sample drawn of those not reached by the program.
- A great deal of data is gathered on the background of all respondents, so that we can begin to allow for some of the more obvious sources of differences among these two groups of people.
- An analysis is conducted of differences between the two groups (fed versus non-fed), and the program's apparent contribution to those differences.
- In addition, since we cannot be sure that we have successfully anticipated every relevant distinction among our two groups of people, an analysis is also conducted of differences among only those with more, versus less, exposure to the program.

If these two analyses agree, we feel confident about passing judgment on the program. If they do not agree, we can still see if a sensible interpretation is possible given other facts at our disposal--including a great deal of factual and impressionistic data deliberately sought out for this purpose.

We now have a theoretical rationale for three types of summary judgments about feeding programs. They may be:

- "Effective," that is, the program may produce significant net effects, by both the fed-nonfed and the more-versus-less exposure criteria.

- "Ambiguous," that is, the two criteria do not agree (we may seek out other data to resolve ambiguities--see below).
- "Ineffective," that is, neither criterion suggests any impact.

Why are all these complications needed? A well-conceived feeding program will be aimed at those who need it the most. In such a program the nutritional status of the participating individuals will be worse, on the whole, than that of most non-participants. The program might be effective in improving the nutritional status of the children it reaches, without being able to entirely reverse the disadvantage with which the participants started. Overall, program participants could still have worse nutritional status, and the program would appear to be the cause.

A mirror-image problem is also possible. A program might be reaching children who have a better initial nutritional status than non-participants. To the extent that any final differences are simply a carryover from the initial situation, the program will appear to be more effective than it really is--the problem we seem to have in Nakuru. In development terms, both of these situations stem from the program's "selectivity," that is, its propensity to reach the neediest possible beneficiaries. This is a crucial matter since both school and MCH feeding programs should be aimed specifically at nutritionally disadvantaged children.

There are further complications. These programs have multiple goals, especially the school feeding projects. For example, a program might successfully impact on attendance and fail to have effects on nutritional status. Yet the attendance effects alone might justify the effort. Here we allow for this by treating each program objective separately. Still another consideration is the existence of tertiary effects when programs have more than one goal. For example, if nutritional status improves, we might also expect school attendance to improve in turn. This suggests that there may be many varieties of impact, not just one; and of course this is the case (for starters, programs may have diplomatic value).

In summary, a child feeding program may look favorable when we compare people in it to other persons not reached by it. It may also look good by producing evidence of its impact on those who have been in the program for longer periods of time, compared to those with less exposure.

We would feel confident of our judgment in any situation where both criteria agree--either both favorable or both unfavorable. Where they are contradictory, interpretation becomes much more complex and must take additional data into account; here the more impressionistic materials recorded for this study become very useful.

9. *Final assessment: Nakuru.* With this rationale in mind, some conclusions about our Nakuru example can be reached.¹ The first step is to compare those in the program with those who are not. Using regression analyses to control for a number of target population and site variables so their influence is taken out, we find net positive effects in the fed-nonfed comparison between being a participant and having better nutritional status.² There is also a very strong relationship between participation and school attendance, and there are small tertiary effects on school performance. There are small, but significant, positive effects on the food habits, but not on the food knowledge, of the children.

At the same time, there are substantial family background variations in Nakuru between participant and non-participant children; we have taken account of some of these differences in the analysis reported above, but nevertheless it seems important to check into the question of impact within the participant group alone, by looking at varying lengths of program exposure. Those who have been in the program longest should have the better nutritional status. If this is not the case, we have reason to suspect that the apparent success of the program is actually just a side effect of poor targeting practices. When we look at the Nakuru data this way, the theoretical problem we have been discussing suddenly becomes considerably less theoretical: the nutrition benefits of the program are sharply reduced, and the attendance benefits vanish altogether.

¹Data on which this discussion is based are found in Table 1 in the next chapter.

²The statistic used is a partial beta weight and may be roughly interpreted in a similar manner to a Pearson product moment correlation coefficient, in that the direction of the relationship is given by the sign and the strength of the relationship is given by the magnitude of the beta weight. However, the beta weight has a causal implication which the correlation coefficient does not, and the beta weight has no upper or lower bounds. The beta weight for the relationship discussed here is +.25, which we think is rather strong for data of this sort.

It is in the interpretation of these shifts in the statistics that some improvement of our understanding of the program is reached. When we compare those who ate the food with those who did not, there is a strong effect on nutritional status; when we only compare those who ate *more* of the food with those who ate *less*, this effect is reduced. Thus we are led to ascribe some of the fed-nonfed effects to other differences which may separate these two groups of children--such as their socioeconomic background. And indeed the data do show a positive relationship between the possessions families have and participation in the food program--confirming RBL's impressionistic views.

The interpretation is more complex in the case of attendance. The fed-nonfed effects seem to be very strong--but recall that here we are comparing two schools. Flamingo has feeding; it also has the advantage of dealing with a less poverty-stricken enrollment, of having a better plant, of being the better-run school generally. When we look only at feeding effects *within* Flamingo, we find that the children who recently ate more food were also prone to be *more* absent. Attendance at Flamingo is high to begin with and this outcome could simply mean that some children who are more irregular attenders happen to be very regular eaters when they do come to school. We also find that children who have been in the program for two or three years (third graders, by definition) attend less frequently than those who have been in it only for one year (mostly first graders). In Kenya early-grade dropouts and infrequent attenders are a very common phenomenon. Some of our third grade respondents are as much as fourteen years old, and can be expected to skip school more frequently than their younger classmates. The same pattern for attendance is even more pronounced in the control school.

We are now in a position to suggest some findings of the Nakuru study, combining all of the available data:

- There appear to be small positive effects--so small that they are not especially significant, either substantially or statistically--on the nutritional status of participants as a result of the food program.
- The seemingly favorable effects of the program on attendance are probably spurious, resulting more from the quality of Nakuru's schools and the relatively greater poverty of families outside Nakuru than from the

program. In addition, we suspect that costly school fees throughout Kenya may be so great an influence that they may overwhelm any potential attendance benefits caused by school feeding.

- The small favorable effects on school performance, which show up only indirectly in the fed-nonfed analysis, hold up in the more-versus-less food analysis.
- This is not a more successful program because it is not as well targeted as it might be; that is, it is reaching children who were already relatively well off. This is not the responsibility of the program operators; they were given resources to run food programs in their town, and they appear to have done an excellent job. Even though their children are comparatively advantaged, the program does generate some small benefits. Also, other Nakuru schools already in the feeding program might be better targeted than is Flamingo.
- There is an evident need for the food program in the rural schools outside Nakuru, which are now included in the town's city limits. Program operators in Nakuru hope to reach these schools. Their food program management skills may help ensure program success; thus, expansion of their program to the surrounding poorer schools should be encouraged. Perhaps the easiest way of all to improve the effectiveness of the use of food program resources is to expand the services of well-managed operations so that they are certain to reach well-targeted recipients.

That is the situation in Nakuru: An "ambiguous" program which, on close inspection, needs to be better targeted if it is to produce the desired impact. This is not a very surprising result; around the world school feeding programs have been criticized because often they do not seem to be placed where they might address the needs of the more disadvantaged groups. Fourteen other school feeding sites in the three countries were also assessed, and fourteen variations of the Nakuru findings were reached, some with more successful stories to tell, and others with dismal results.

10. *A Philippine case.* The answer to the question, "Can school feeding programs bring about positive effects on children in developing nations?" is yes, but only if careful attention is given to the individual characteristics of the target population, to the peculiarities of the local setting, and to the relation of each of these factors to the type of program being mounted. What is good for Nakuru in Kenya may not be desirable, feasible, or necessary in other places.

In another part of the world is barrio Santo Rosario in San Juan, a town on the South China Sea coast of the Philippines in the province of La Union.¹ Its people are the Ilocanos, forming part of the fourth largest cultural-linguistic group in the Philippines. Primarily farmers and fishermen, they have the reputation of being hard-working and thrifty. Rice is their most important agricultural product.

Barrio Santo Rosario is a small community with only 72 households. Of these, 63 percent have access to a potable water supply, and only 57 percent have access to sewer facilities. Santo Rosario Elementary School has one of the few school lunch programs in the town of San Juan. According to the Ilocano field team reports:

It seems that during the last few years, almost all schools in San Juan carried feeding programs which were discontinued only a few weeks ago (more or less two months). This, according to the school principal, was due to the non-arrival of more supplies of flour. We were also informed that it is only the Sto. Rosario Elementary School which has continued with its feeding program, which is a hot lunch feeding program.

This hot lunch program was started in August 1970 by CARE and the Bureau of Public Schools. There are now no donated items from any agency; the hot lunch is made up completely of local food items. The school garden provides many of the ingredients, teachers contribute some, and the

¹ The following description of Santo Rosario is extracted from a working draft of the final report on the Philippine portion of this study and from field diaries of the Ilocano team, Institute of Philippine Culture (IPC).

school buys the rest. The child brings his own rice. For ten centavos (1½ U.S. cents), the school sells one dish to the child. According to the school's principal, main dishes particularly favored by the children are gabi guinaten (made of gabi and eggplants cooked in coconut); bulanglang (made of a mixture of vegetables and meat cooked in bagoong); and pancit (wheat noodles and other ingredients). The lunch is considered a substitute for home meals rather than a supplement. The Ilocano field team diaries discussed some interesting aspects of the program:

In the past years, a cook was specially hired by the school for their hot lunch program. This special cook was paid partly by the provincial government and partly by the school. At present due to lack of funds, the home economics teacher, together with the help of assigned grade six students, takes charge of preparing the food for the children.

Incentives for the students to buy the hot lunch are given by the school. One incentive comes in the form of a prize to be given at the end of a two-month period to the class with the greatest number of pupils who regularly eat the school's hot lunch. In this way, both teachers and students are made to be involved in the school's feeding program. The teacher's own encouragement then takes the form of an information drive about the high nutritional value of the foods being served by the school.

The school has two rooms constructed especially for the feeding program. The lunches are prepared in a kitchen, originally constructed by CARE, and passed out on aluminum trays to the children who line up outside. The children then proceed to the adjacent lunchroom which has three long tables. School regulations provide that students must eat their lunches in the lunchroom and nowhere else.

Until July, 1973 the school had a nutribun feeding program, in addition to the hot lunch, but only the donorless hot food operation was able to survive the discontinuance of flour and food supplies about two months prior to the survey. One of the issues that must be considered in assessing school feeding at La Union is the possible effect on the children of this now-curtailed nutribun effort. (The bun is a major feature of U.S. food programs in the Philippines.)

For comparison purposes, San Carlos Community School in the town of Caba was selected; it was a good match, in part because this school was approved for school feeding by CARE, but food shortages prevented the program from getting underway. (See Appendix B for a more detailed description of the control school.)

11. *The Philippine case: conclusions.* The Santo Rosario Elementary School in La Union has the most nutritionally effective school feeding program of any of the 15 projects studied in the three countries. The nutritional status of the children, measured by weight for height, is considerably improved by program participation. This finding holds when looking at participants versus non-participants; the relationship becomes even stronger when we inspect variations in exposure among only students in the program school. There are also some possible positive effects on school attendance-- here the data are "ambiguous," that is, the two analyses do not confirm one another--and on the overall quality of the children's diets, which were judged subjectively by nutritionists from 24-hour recall data taken from each pupil. This is also one of a few programs in this study which may have a notable impact on school performance. The relationship surfaces only in the within-program analysis; the children who eat more of the food tend to get better grades-- allowing for the influences of background and for the tested scholastic ability of the child.

La Union's situation is somewhat different than that of Nakuru, yet again the nature of the food, the way it is distributed, and the degree of local commitment are key factors. Recall that the nutribun program had been withdrawn, for lack of supplies, just prior to this study. We are therefore looking at the mixed impact of hot lunches and buns. The evidence is not conclusive, but at this writing the hot lunch seems to be the primary source of impact. While on the country level our sample of five sites is far from adequate--for one thing, study sites were chosen purposively, not randomly--nevertheless it is a fact that the La Union feeding project is clearly superior to the other Philippine school programs, all of which use the bun. The hot lunch is prepared by people in the school and made up entirely of locally-produced commodities. The nutribuns are designed as supplementary rations and use donated commodities from the U.S.A. La Union children do not like the taste of the hot lunch as well as children from other

Philippine schools like the nutribun; on the other hand, the hot lunch is less easy for children to take home or otherwise not eat. In the nutribun program school studied in another site, Iloilo, the IPC field team described the situation this way:

At this point we should raise the issue of whether the nutribun is actually used as a supplement. The children eat the nutribun 20 times a month. Over two-thirds report that they eat all the nutribun in school; 67% also report that they eat less food at home on nutribun days. Almost all also report that they bring home the bun either everyday or several times a week. They either share it with the other members of the family or give the entire piece to their younger siblings.

The nutribun thus loses its efficacy as a supplement because of sharing and because of eating less food at home--both resulting from limited financial resources. The program school principal herself volunteered that the nutribun served as breakfast for those who cannot afford it.

And of the nutribun program studied in Misamis Oriental, another IPC field team said:

Not all the children can afford to buy the nutribun. One child, for example, buys a nutribun on credit and pays the next day. Another eats only half and saves the remaining half for the next day. Teachers also sell more than one nutribun to those who can afford to pay for them; otherwise, the teachers would have to pay for those left unsold. Thus, children who can afford an extra bun are able to eat more, even if they may not need it as much as those children who cannot afford to buy even one...Mothers approve of the feeding program. The nutribuns help fill the stomach and act as a substitute for lunch.

¹Between 48% and 57% of the Philippine children in the four nutribun schools studied reported taking the nutribun home, while only 25% of Santo Rosario's students said they take the hot lunch items home; however, most of the children in all five schools said they eat all of their food. The two questions are treated separately in the interviews.

One essential difference between the nutribun schools described above, and Santo Rosario in La Union, is that the nature of the hot lunch is such that the intended recipients are more likely to actually consume it. To be sure, the nutribun has a high caloric and protein value, probably greater than most of the hot lunches served at Santa Rosario. But what the nutribun provides in nutritive value is offset by its distribution handicaps. Distributional features are often thought to be strong points of the bun, which can be centrally prepared under careful supervision and which does not require much in the way of special school facilities. But the study shows that what is easy to get to the school is also easy to take home.

Management of the program at Santa Rosario also helps to make the hot lunch successful. Incentives for eating food, nutrition education campaigns, and volunteer help from teachers and students all indicate that someone at Santo Rosario is making an effort to make the program work. The use of local commodities ensures a variety of lunches and means that there does not have to be reliance on donated food. That reliance, elsewhere in the Philippines, has led to interruptions in feeding, due to shipping delays, occasional erratic distribution practices, and cuts in the allocations of commodities, all to the detriment of impact.

Field reports state that the nutribun program was scheduled to return to Santo Rosario by November, 1973, following a four-month interruption. This bun-and-hot-lunch combination seems to have produced good results; further study might be able to provide a more precise estimate of the impact of the hot lunch alone. In any event, La Union's case suggests that some third world communities can put together workable programs and operate them without reliance on imported food.

12. *Illustrating the effect of a complex analysis of the La Union school program.* La Union is a good illustration of the difficulties of evaluating programs on the basis of simple comparisons. On the basis of a review of the differences between mean nutritional status for fed and nonfed schools, there seemed to be no significant difference in the nutritional status of children, and there was a significant negative difference between the groups on academic performance (control children had higher teacher's marks than program children). These conclusions are based on comparisons

between means, with no controls introduced. The more complicated final analysis involves controlling for numerous background conditions: number of people in the household, mother's education, family possessions, distance to school, mother's nutritional knowledge and practices, mother's attitude toward school for her child, the number of times during recent weeks that the child actually obtained the food, and the child's intelligence. Our conclusions are that the program has a significant positive effect on health in the comparison between groups, and a significant positive effect on health, attendance, and teacher's marks in the participants-only analysis. These are the major points of difference between the preliminary and more complex approaches.

The purpose of the complex methods, as noted in the discussion of the Nakuru school program, is to guard against drawing erroneous conclusions from badly matched fed and nonfed comparison groups--keeping in mind that mismatching may be traceable either to selectivity problems or to difficulties in obtaining good control groups for the study. One critical effect of mismatching could be to set up comparisons between groups which had significant starting differences in their prior health, one of the most crucial background variables. Up to this point other background attributes have been used to deal with this, on the assumption that general differences in income, education, etc., would be closely associated with prior health. To double check the La Union conclusions, a further analysis was run using additional direct measures of past health developed for this study by IPC. Introducing this measure has the effect of reversing the only negative effect in the La Union fed-nonfed analysis, on school performance. All other associations remain about the same or become more positive. Thus the more controls introduced, the better the La Union program looks. This reemphasizes our conviction that in order to make an effective evaluation, as many other things as possible must be taken into account and held constant. We should point out that the changes caused by introducing past health are small; even the change of sign involves only a swing of .13. Thus, the variables which have been controlled in the general analysis appear to do the job.

13. *Summary.* These two examples, Nakuru in Kenya and La Union in the Philippines, illustrate some of the characteristics which seem to make the most differences in the impact of school feeding programs:

- Local management at the regional and school level, which may or may not provide for proper distribution of the food to intended recipients, innovative methods for encouraging program participation, and the initiative to use local resources.
- Initial economic and nutritional status of the target population, which determines how great the need for food programs are and whether much impact can be reasonably expected.
- Nature of the ration and method of distribution, which determines whether the food will actually be eaten by recipients.
- Source of the ration, which determines the frequency and length of feeding interruptions.

Throughout the school feeding study, these same key characteristics seem to account for major differences in impact. A great deal of this variation is a function of selectivity--how well programs are targeted to fit site and population characteristics. Within these limits, the particular features of the effective programs vary widely. These and other factors which determine program effectiveness are taken up for the study as a whole in Section IV. First, however, it is helpful to review the findings for the other feeding programs--both those in the remaining schools, and those which deal with preschoolers and their mothers.

II. A COMPARISON OF THE IMPACT OF FIFTEEN SCHOOL PROGRAMS

1. *Criteria and general conclusions.* In each of the three countries five school programs were examined, in considerable detail. These 15 cases provide the present basis for our conclusions about school feeding. Four measures of impact on grade one and grade three children were examined--nutritional status (measured by percent of standard weight for height); food habits (the child's 24-hour recall of what he ate); school attendance (the proportion of school days during the past month when the child came to school); and school performance (average classmarks given by the teacher, controlled for the child's IQ).

The general approach used here for an assessment of school feeding programs was outlined in the previous section.¹ For comparative purposes, it was necessary to make the rules for judgment very explicit, to ensure that all programs would be treated alike. The critical statistical data are provided in Table 1 on the next page. The numbers in the table are indicators of the *net direct effect* of participation in the program, taking a number of background characteristics into account (e.g., family income, the education of the mothers, the tested scholastic ability of the children). Any sample statistic is subject to a predictable degree of random variation; to ensure that conclusions would not be drawn from data which might be substantively trivial or statistically insignificant, all of the associations with a strength of less than +.10 were treated as if they were zero. Any strong negative associations were treated as signs of a badly defective program.

¹Additional details are provided in Appendix A.

TABLE 1

COMPARATIVE RANKING OF SCHOOL FEEDING PROGRAMS
 BASED ON RELATION BETWEEN PROGRAM EXPOSURE AND MEASURES OF IMPACT
 (numbers shown are partial beta weights)

PROGRAMS	NUTRITIONAL STATUS (weight for height)		SCHOOL ATTENDANCE		SCHOOL PERFORMANCE		FOOD HABITS (24-hour recall)	
	Fed vs. Nonfed	Fed: More vs. Less Exposure	Fed vs. Nonfed	Fed: More vs. Less Exposure	Fed vs. Nonfed	Fed: More vs. Less Exposure	Fed vs. Nonfed	Fed: More vs. Less Exposure
<u>EFFECTIVE ON NUTRITION, PROBABLY EFFECTIVE ON ATTENDANCE</u> La Union (Philippines)	+ .29	+ .47	+ .04	+ .12	- .07	+ .26	+ .45	+ .08
<u>EFFECTIVE ON ATTENDANCE, PROBABLY EFFECTIVE ON NUTRITION</u> Kigumo (Kenya)	+ .06	+ .22	+ .17	+ .36	- .07	- .37	- .17	+ .15
<u>PROBABLY EFFECTIVE ON BOTH NUTRITION AND ATTENDANCE</u> Nakuru (Kenya)	+ .25	+ .06	+ .36	- .30	- .16	+ .12	+ .06	.00
Eldama Ravine (Kenya)	+ .04	+ .13	+ .13	+ .02	+ .53	- .16	+ .17	+ .11
Neiva (Colombia)	.00	+ .14	- .43	+ .19	- .19	+ .52	+ .29	+ .50
<u>EFFECTIVE ON ATTENDANCE, INEFFECTIVE ON NUTRITION</u> Naga (Philippines)	- .18	.00	+ .39	+ .54	+ .07	- .10	- .10	+ .16
Rivera (Colombia)	- .16	- .46	+ .25	+ .16	- .16	- .15	- .06	+ .11
<u>PROBABLY EFFECTIVE ON ATTENDANCE, INEFFECTIVE ON NUTRITION</u> Iloilo (Philippines)	+ .03	+ .09	+ .06	+ .33	+ .11	- .18	- .04	- .07
Cogua (Colombia)	- .18	+ .07	+ .18	+ .09	- .23	+ .19	- .13	+ .05
Pereira (Colombia)	- .30	+ .04	+ .22	- .06	+ .27	+ .03	.00	.00
Zipaquira (Colombia)	- .02	- .10	- .16	+ .21	- .20	- .07	+ .06	- .12
Kanzalu (Kenya)	- .16	- .19	+ .03	+ .50	+ .07	+ .59	.00	.00
Manila (Philippines)	- .26	- .44	- .16	+ .66	- .20	+ .05	- .13	+ .40
<u>INEFFECTIVE ON BOTH</u> Misamis Oriental (Philippines)	- .04	.00	+ .05	+ .08	- .09	- .03	- .07	- .32
Tala (Kenya)	- .27	- .29	- .44	+ .05	.00	- .14	+ .23	- .20

30

The "fed versus nonfed" analysis represents food program effects when comparing children in food program schools with children in matched control schools. The "more versus less exposure" analysis represents food program effects when comparing children within program schools who had had varying amounts of program exposure, measured by the number of days children had the school lunch during the one-month period prior to the survey.

The partial beta weights used in both analyses are measures of *net direct effects* between program presence and program goals, drawn from regression analyses that control for a number of target population and site variables, including household size, household possessions (which correlates highly with income), mother's education, mother's nutritional habits and knowledge, distance to school, and child's intelligence scores. Other possible indirect effects are not presented here.

Significance of statistical data is a judgment which depends on how precise one chooses to be. Here those beta weights which fall between +.10 and -.10 are likely to result from random variations in the data. The closer to zero, the greater the chances of this random result.

When these rules were applied, several possible situations emerged, each requiring a specific interpretation:

- If both the fed-nonfed and the more-versus-less-exposure analyses were significantly positive, the program was labeled "effective," at least in terms of its ability to serve the particular objective under consideration.
- Similarly, if both measures were not positive, the program was labeled "ineffective" (note that this conclusion could be reached with zero-value associations as well as with negative ones, the idea being that it is not sufficient to run a harmless operation).
- If the measures disagreed, we checked for the presence of very strong effects in either analysis. Strong positive associations are taken as a good reason to give the program the benefit of the doubt. Strong negative associations, as noted above, are taken as signs that something is seriously wrong with the program targeting, its day-to-day operation, the assumptions inherent in the particular program approach, or all of these. We inspected other data and found that most of the large negative fed-nonfed results could be traced to comparisons with advantaged control groups. Here the positive more-versus-less exposure criterion becomes the more valid one. In the case of the negative more-versus-less results, our interpretation is quite different: these programs seem to have targeting problems, like Nakuru. However, our own data show that control schools in these places may be able to benefit from feeding, so the effort is repairable. The result is to stop calling any of the programs in this conflicting category "ambiguous." Instead, we call them "Probably Effective."

The final comparisons were guided heavily by the results for nutritional status. School attendance is secondary. All other possible benefits are treated as academic interest. Food habit and academic performance data are included in the tables; other data, on topics such as food

knowledge, are noted occasionally in the text. The application of these rules of thumb yields a comparative ranking of the 15 programs as follows:

- No programs succeed in clearly serving both the nutritional and attendance objectives.
- There is an effective program at La Union in the Philippines. It is unambiguously successful in improving nutritional status, and there is persuasive evidence that this program also may have favorable effects on attendance, food habits, and academic performance.
- There is another effective program at Kigumo in Kenya. It has strong consistent attendance benefits and may also have some effect on nutritional status. The data suggest that the school may have begun with children more nutritionally disadvantaged than those in its control school.
- There are two more programs which are more ambiguous but which, on the whole, look fairly good: Eldama Ravine in Kenya and Neiva in Colombia. At Eldama Ravine, the program is nowhere very impressive in its impact, but it does achieve a consistent degree of small positive effects which add up to a workable operation. The strong nonfed results on performance should be discounted, since these could be at least partially attributable to the quality of the school itself. And at Neiva, the judgment is based on a combination of small nutritional benefits for the more exposed children; strong food habits results; and school attendance/performance data which suggest that Neiva's feeding program, while unable to catch up with the standards of the control school, still manages to pass on benefits to those with the greater exposure to the food. The school at Nakuru, discussed at length above, is a case of targetting difficulties, and the program, already impressive in many respects, can be made better by simply expanding it.

- Two school programs are clearly ineffective, at Tala in Kenya and Misamis Oriental in the Philippines. The latter operation does not seem to have much of any sort of effect, either good or bad, except for some strong negative association between increased program exposure and worsened food habits. The Tala program is generally *negative* in its effects.
- The remaining programs show more mixed patterns. Two of these, Naga in the Philippines and Rivera in Colombia, are quite effective in producing attendance effects, but the negative association between the food and nutritional status leads us to discount the one benefit because equal disbenefits seem to be involved. Of these two, the Naga program looks to be the better one. Six more schools show variations of the same pattern: possible attendance benefits, even rather spectacular ones on the more-versus-less food side in Manila and Kanzalu, which have to be discounted because of nutritional drawbacks.

Several additional comments may be helpful before proceeding. First, these are rather tough standards. The programs must not only show that they can produce the desired results, and at a substantively and statistically significant level; they must also address several objectives. Slippage in any one of these can downgrade the total effort. Second, a number of possible program benefits are ignored here, both those of a political or diplomatic nature and those which speak well for the use of food programs as the kernel of a community development effort, such as may be the case at Nakuru and La Union. Third, the statistical procedures used here are conservative in that they treat only the net direct effects of the programs; to the extent that nutritional benefits may be present--for example, in Kigumo--then additional indirect effects of the program on attendance or on performance may be passed on through this intervening variable.

We do not hesitate to call these programs "ambiguous." Ambiguity can be quite realistic; there is no point in forcing the programs into the polar categories of "effective" or "ineffective" when it is obvious that many development projects are, indeed, mixed or marginal in their impact,

succeeding in some ways and failing in others. Nor is it so surprising that there should be disbenefits; these could occur in many ways, from interference with the other activities of a school, to unsanitary preparation procedures.

2. *Attendance benefits.* Of the four measures of impact, the food programs in this study seem to have their most pronounced effect on school attendance. Three of the 15 programs showed positive attendance results at both levels of analysis. Of the remaining schools, only one, Nakuru, showed negative within-school attendance results (comparing only children in the feeding program who had varying amounts of program exposure). Four schools showed negative results when comparisons were made with control schools--those at Neiva and Zipaquira in Colombia, at Manila, and at Tala in Kenya--but this is due primarily to very high attendance rates in those control schools. School children at these schools attend about 98% of the time on the average, making it nearly impossible for the program schools to do any better. These same programs tended to show positive effects when only the children at the schools with feeding programs were compared.

Comments by each of the school headmasters concerning attendance tended to concur with the objective data. Nearly all of the principals said they think the food program has encouraged their students to come to school daily; for schools with all-day sessions some headmasters said the food encourages children to stay for the afternoon session instead of leaving at midday. Only in three sites, all in Colombia--Neiva, Pereira, and Zipaquira--did headmasters say that the food programs have not had any effect on daily attendance. Teachers in these schools generally concurred with this assessment. These three schools also show less favorable attendance results than some of the other schools in the data presented here. In all three countries, teachers had mixed reactions when asked about the ability of the food program to increase daily attendance. Many teachers said that attendance is already good and the programs don't affect it. In Kenya, standard three teachers, with the lone exception of those in Nakuru, said the food keeps children in school, while standard one teachers said it has no effect. This may be a function of greater attendance problems for older children. In the Philippines, only teachers in Naga and



School feeding in Neiva. Above: a CARE-supported comedor at the Alberto Suarez School. Right: delivery of bulgur wheat to a CRS-sponsored school.



Misamis Oriental agreed that attendance in their classes is improved. Data here show that the Naga program has the most pronounced effects on attendance of any school in the study; Misamis Oriental shows no significant impact of food on attendance.

Factors which food programs may be unable to affect could account for the inability of some programs to improve attendance. In Colombia, school attendance is already fairly high, and there are frequently pressing reasons to account for those who do not attend regularly, such as the need for many school-age children to go to work. Thus it may be difficult for such incentives as low-cost lunches to make a significant difference in Colombian school attendance. In the Philippines, where formal education is probably more greatly valued than in the other two countries, school attendance is already very high (about 95%), so that even if the food programs do increase attendance they cannot have very much of an impact, at least not in general. In the case of Kenya, school attendance is lower overall (about 85%) than the other two countries, but here the financial burden associated with attending school may outweigh the food incentive. Despite this, some Kenyan schools show some small positive effects and at least one school, Kigumo, shows considerable attendance improvement associated with the food program.

Retrospective attendance records for the six-year period 1968-1973 were obtained from principals at each school. In most cases, no clear pattern of effects showed up when comparisons were made before and after startup of the food program (some programs were more than six years old, making this comparison impossible). However, three of the schools, La Union (Philippines), Kigumo (Kenya), and Rivera (Colombia) did show favorable results, when compared with their respective control schools over the six-year period. All three also looked favorable on the basis of the survey analysis.

3. *Nutrition effects.* Program impact on nutritional status, measured by percent of standard weight for height, showed favorable results for both levels of analysis in only one--La Union--of the 15 school programs. Ten schools showed either no effects or negative effects on nutritional status, in both of the analyses. As noted before, Nakuru is a special case; it does seem to show some nutritional benefits but the bulk of these may be due more to the socioeconomic characteristics of the pupils than to the feeding as such. The remaining schools--Kigumo and Eldama Ravine in Kenya, and Neiva

in Colombia--seemed to have little or no impact on their children's weight for height in comparison to the controls, but on a within-school basis those with more exposure to the food did have significantly better nutritional status.

To a lesser extent this same pattern characterizes the less effective programs. Cogua, for example, showed negative results when compared with its control school, and small and probably insignificant positive effects when only children within the program school were assessed. The situation in Cogua may be explained by the fact that both the program and control school children already manifested relatively good nutritional status. The average weight for height for control school children in this site is 106% of standard, higher than the mean for any other school in the study. The program school average is 104% of standard. Either the program is serving an area where the need is not very great, and therefore only a small measure of impact can be expected, or the program had its main impact sometime in the more distant past, and has already brought most of the first and third graders up to an acceptable nutritional status, with little capacity for further improvement. To further resolve this question, the number of years that the third-grade children had been in the program was injected into the analysis for all sites, again controlling for other background factors. This analysis yielded a small negative relationship with nutritional status; that is, children who had been in the program longest had no better weight for height readings than children who had *not* been in the program very long, leading us to believe that the Cogua effort is probably not a well-targeted one, instead reaching children who were already relatively well off when they entered the program. The same situation is true of some other schools, particularly where discrepancies exist between results of the two analyses.

4. *Diet.* Food habits, measured by the children's 24-hour recall of the foods they consumed,¹ appeared to be unchanged by the food programs in most of the schools. Two schools showed positive results at both levels of analysis--Eldama Ravine (Kenya), and Neiva (Colombia).

¹This measure, the value of which seems to be the subject of some debate in nutrition research circles, tends to act very sensibly in relation to other variables in the study (presence in the program, mother's own 24-hour recall). On the whole we are encouraged to suggest its further use as long as only gross differences at the group level are at stake.

La Union has strong comparative differences, but these tend to disappear when the analysis is limited to just the children in the school with feeding; this would be expected in a place with a strong nutrition education program, which could affect children whether or not they eat the food. Four other schools showed significant positive results when control school comparisons were eliminated, and only program children were compared; here it is the food itself which seems to count, rather than any educational effort per se.

5. *Academic performance.* In the case of school performance, measured through combined use of the Raven Progressive Matrices test (see Appendix A for details) and teachers' grades, no clear pattern of effects was shown by the food programs. This result is not surprising; of the four claims made in behalf of the programs, this is the most tenuous and indirect.

Performance could be affected by food in at least two ways: through the effect of nutrition on mental growth and development, or through the effect of nutrition on energy levels. The former is difficult to substantiate in a study of this type because we are dealing with school-age children who are past the age of rapid brain growth, and such effects would be more likely to occur during pre-school years.

The other issue, effects of school feeding on energy levels, is also open to speculation. Nearly all of the first and third grade teachers interviewed for this study reported that children who eat the school food perform better after eating. Teachers in only three schools, Misamis Oriental (Philippines), Nakuru (Kenya), and Eldama Ravine (Kenya), reported no perceptible improvement in student performance from the food. These are subjective judgments on the part of the teachers; that, however, should not lead us to discount such information too much. The more objective survey data shows a very mixed pattern of effects, some fairly favorable. Perhaps improvement in performance follows eating the food, but is not a very long-lasting effect. This could tend to produce the kind of findings which seem to have occurred here, if (for example) some teachers tend often to test their pupils at those times of day which follow the feeding.

6. *Summary.* We think that school feeding improves the daily attendance of children in many of the schools, although this improvement can only be small since attendance levels in the three countries are already fairly high. School feeding can also improve the nutritional status of children, but this outcome is not so widespread as the attendance benefit.

The favorable effect on attendance is the only impact strong enough to survive the "least common denominator" results obtained when all of the data in this study, either for schools or for MCH, are combined into one multi-country analysis: there is a small but significant relationship between feeding and attendance when all 15 cases are aggregated. Whether or not this might imply some "global effectiveness" for school feeding is a judgment which depends on how good a sample we have of food programs in general, worldwide. The sample is far from random; on an impressionistic basis we would guess that the group of sites is a fairly representative one. There is a way to improve the sample for these purposes. A separate analysis was undertaken in which new scores were computed, discounted against the effects of site--in effect, removing cultural effects on the variance in worldwide attendance.¹ A new regression analysis was then run and in it the global attendance finding disappeared. This suggests again that site distinctions are crucial, and it shows that the earlier global-level finding was misleading.

Food habits do not change in most cases, except in La Union where the program is fairly strong in other respects, and in Neiva, where we cannot show any carryover of the encouragement of those habits into actual benefits on nutritional status. The effects of school feeding on performance remain inconclusive; they seem to be unrelated to the ability to reach the other goals.

The next step is to determine in more detail why effects show up in some programs but not in others. This is taken up in Section IV. Before taking this step, we should present the MCH findings. These will be much briefer, because most of the complexities of method have been treated already in the discussion of the schools.

¹For an explanation of how this was done, see Appendix A.

III. EVALUATING MCH:
A COLOMBIAN CASE STUDY AND A COMPARATIVE ANALYSIS

1. *The setting in Neiva.* From Bogota, a five-hour descending drive to the southwest brings one to the lowland plains of tropical Colombia. There, on the right bank of the Magdalena River, is Neiva, capital city of the Department of Huila. Its population is estimated at about 130,000. Cattle raising and agriculture, as well as small-scale commerce and trading, are dominant economic activities in the area.

On the south side of Neiva is the Santa Isabel Mother-Child Center. Reports from the Colombian field team concluded that the center is badly needed in this area of the city. Citing a recent population explosion in Neiva, which has placed a strain on the resources of the area, field reports said:

The migration toward this zone is evident and, consequently, the mother-child program is insufficient to take care of all the families who are concentrated there. In the majority of the families visited in this zone, the fathers do not have a steady job and, consequently, starting at a very early age the children have to work. The most common jobs among the children are shining shoes and selling newspapers and lottery tickets. The mothers wash clothes, which work is done in their own homes.

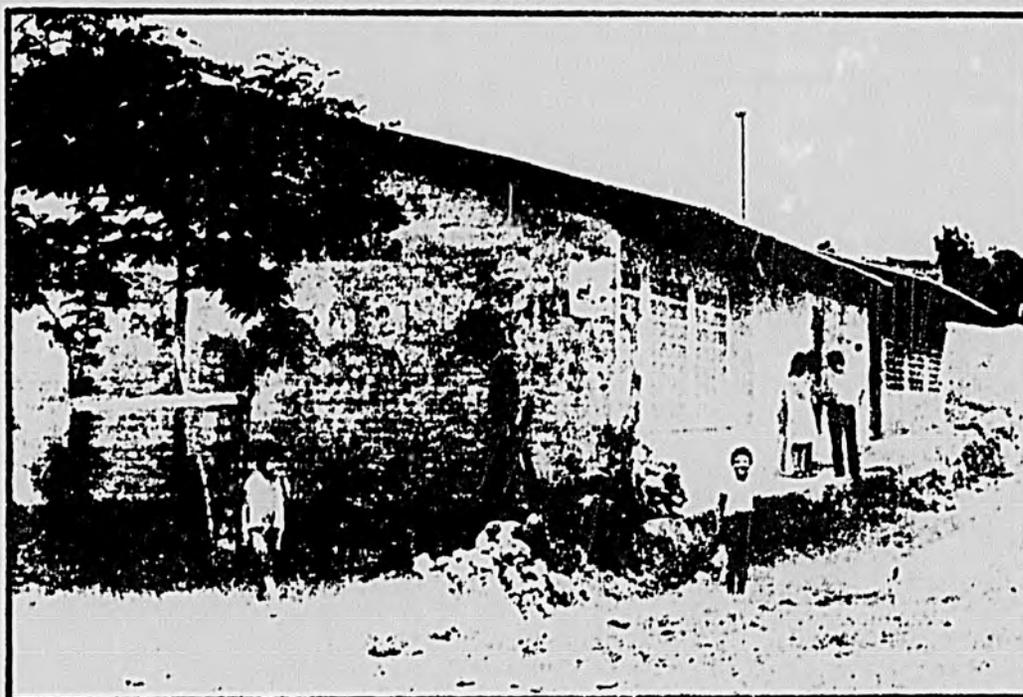
2. *The MCH ration.* The mother-child center was opened in 1970 and is supported by the World Food Program, its Colombian counterpart, PINA (Integrated Program of Applied Nutrition), and ICBF (The Colombian Institute of Family Welfare). It provides medical, infirmery, and vaccination services, in addition to the mother-child health program. It is staffed by a medical doctor who attends three days per week, and a full-time infirmery assistant.

The food distributed in the program adds up to the largest of any of the MCH rations in this study: every two weeks approximately 20 pounds of food are distributed, intended for a mother and three pre-school children. If a mother has more than three pre-school children, she can not receive additional food. The ration consists of powdered milk, cheese, fish, cornmeal, oil, legumes, and "Colombi-harina," a local, high protein, cereal-based processed food comparable to CSM. To receive this food, families must pay five pesos (21 U.S. cents) every two weeks. In spite of the large ration, both the MCH administrator and the mothers said that the food lasts only about one week.

The criteria for entry into the Mother-Child Program are rigidly defined, based on the mother's pregnant or lactating condition, underfed children under six years of age, socioeconomic level, and, most importantly, participation in the health program: mothers and children must be examined by the medical doctor. In addition, families may not participate for longer than six consecutive months, when they are replaced by another group (except for pregnant women). The average length of exposure for families sampled at the center was four and a half months.

These criteria are not always followed, according to the following report from the Neiva field team:

It is advisable to explain with respect to the criteria used to select the mothers who participate in the Mother-Child Program, that these criteria are not applied in a precise way since, despite the efforts made by the officials who directly supervise these programs, certain pressure is applied by the Community, particularly by the Mothers' Club, in order to benefit certain mothers who have considerable prestige within the Community, thus excluding some families who are interested in the program and who meet the requirements to participate.



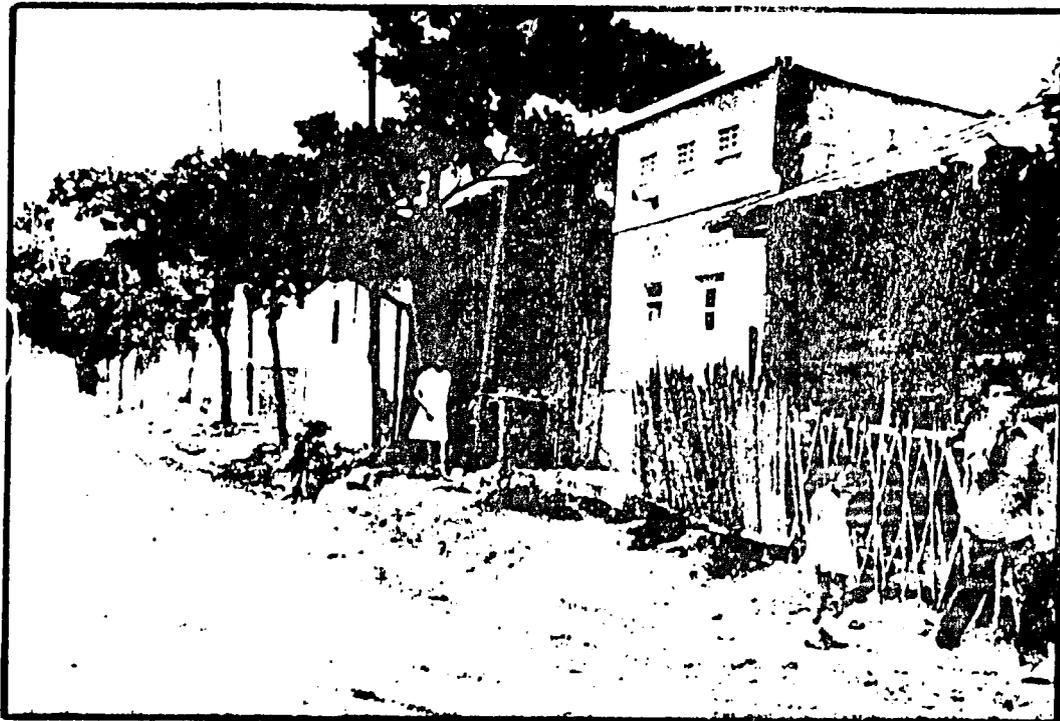
MCH in Neiva: the Santa Isabel Mother-Child Center...

The field team also mentioned that most families in Neiva know of the existence of the Mother-Child Program, but many do not participate because they have been unable to "for reasons of an economic nature which prevent them from buying the 'carnet' (coupon book) that gives them the right to participate, or because they cannot meet the requirements for that purpose, or due to lack of space in the courses which begin every six months." It appears that not all of the mothers admitted to the program are necessarily the neediest.

3. *Conclusions for the Neiva case.* The Santa Isabel Mother-Child Center has successfully made small improvements in the nutritional status, measured by weight for age, of the children sampled in this study.¹ As in the school analysis, we looked at the program two ways--in comparison with persons it did not reach,² and at differences among

¹Table 2, on which this discussion is based, is found on page 46.

²In the MCH studies, control groups were located using a sample of household interviews in neighborhoods less likely to be served by the program



...and the neighborhood served by the program.

those exposed to the program for various lengths of time. The effect on children's nutritional status holds up in both of these assessments. The nutritional knowledge of the mothers may also be improved, but actual food preparation habits are not affected. Some possible reasons for this inability to make use of food preparation knowledge are suggested by the Neiva field team's interviews with these mothers:

The markets (food items) which are distributed by the program appear to be the only identification that the mothers of the families have with same. The assimilation and practicing of the knowledge received on nutritional principles is very little. This is clearly noticed in the fact that they continue to use the traditional food items in their meals (potatoes, yucca, rice and green plantains), and also in the frequent consumption of coffee water at breakfast, because their low economic resources do not allow them to improve their food rations. The aforementioned resources are also affected by the growing rate of births of these families.

Some mothers stated that they know food items such as yucca and plantains are not nutritious. However, they resort to those food items because they are the easiest to obtain due to their low cost and because they increase the daily ration.

Overall, this MCH effort in Neiva was one of the more effective programs of the 15 studied. Again, the reasons for this seem to be related to Neiva's site and target population characteristics, as well as to the particular program characteristics of the Santa Isabel Center.

Neiva is an urban area with comparatively good health facilities in the community. Compared to the other MCH centers studied, it is at an advanced stage of development; that is, Neiva is not so poor that it lacks the health personnel or facilities to run an MCH effort, although it is poor enough that the food and nutrition education are needed. At the same time, it is experiencing serious problems of growth. Population is rising due to high birth rates and migration to the city, resulting in high unemployment, constraints on food resources, and high infant mortality as well as high overall death rates. These conditions seem to provide a ripe setting for a nutrition intervention aimed at the women who typically attend MCH centers.

The strongest characteristic of the Santa Isabel program is the quality and amount of its ration. Its general impact would probably be improved if the admission criteria set by the program were better followed, and if the consumption of the pre-schooler's ration by other family members was lessened. An average of 7.7 family members eat the MCH ration, which explains why the two-week ration is consumed in one week. Administrators of the program seem to be aware of these problems and feel that it is not possible for the MCH center to make significant inroads on malnutrition due to the enormity of the problem in the area. The medical doctor chief of the Santa Isabel Center commented on the situation to the Neiva field team, and they passed on his opinions in their own analysis:

These programs are palliative (or mitigating) measures which do not solve the serious problem of malnutrition in Colombia and which are limited in their projection by interests of a political nature and by the steady growth of the population.

Thus the Santa Isabel Center is making some contribution to improving the lives of people in Neiva, but obstacles may prevent it from being as effective as it might be. This is not an atypical outcome for MCH efforts in this study, as the comparative review to follow makes clear.

4. *Comparative criteria and general outcomes for the MCH sites.* MCH centers in 15 communities across the three countries were evaluated for their impact on the mothers and children being served. Two measures of impact were of principal concern: improvement in the nutritional status of pre-school children and improvement in the food habits of mothers. As with the schools, agreement between analyses was required, and the same set of rules introduced above in Section II.1 was used to control our judgments. Table 2 on the next page contains the major statistical data. In this analysis, nutritional status of the children is the major factor on which judgments are based.

These MCH programs have a fairly consistent positive impact on the nutritional status of children, measured by percents of standard weight for age.¹ As shown in Table 2, three of the 15 programs, Neiva and Pereira in Colombia, Misamis Oriental in the Philippines, show noteworthy net positive effects on children's nutritional status, both when compared with matched control families and when compared among only MCH families with varying degrees of program exposure. Pereira also shows some clear evidence of effects on the more general food habits of the mothers of these children. Only three out of the 15 programs (one in each country) show consistently negative results or no impact.

In the middle are seven programs which have positive effects in one type of analysis and negative or no results in another analysis, requiring further interpretation. Three of the sites--Nakuru and Ngong in Kenya, and Naga in the Philippines--show positive fed-nonfed differences in the nutritional status of recipient children, but insignificant

¹Three measures of nutritional status were computed (height for age, weight for age, and weight for height percents of standard). Weight for age was chosen as the best indicator of nutritional status for pre-school children, and weight for height was selected as the best indicator for school-age children. See Appendix A.

TABLE 2

COMPARATIVE RANKING OF MCH FEEDING PROGRAMS
 BASED ON RELATION BETWEEN PROGRAM EXPOSURE AND MEASURES OF IMPACT
 (numbers shown are partial beta weights)

PROGRAMS	NUTRITIONAL STATUS OF MCH CHILDREN (weight for age)		FOOD HABITS OF MCH MOTHERS (24-hour recall)	
	Fed vs. Nonfed	Fed: More vs. Less Exposure	Fed vs. Nonfed	Fed: More vs. Less Exposure
<u>EFFECTIVE</u>				
Neiva (Colombia)	+ .15	+ .18	- .06	+ .05
Misamis Oriental (Philippines)	+ .12	+ .25	+ .06	+ .15
Pereira (Colombia)	+ .10	+ .37	+ .11	+ .15
<u>POSSIBLY EFFECTIVE</u>				
Naga (Philippines)	+ .17	+ .08	+ .13	- .21
Nakuru (Kenya)	+ .11	+ .06	- .17	+ .14
Ngong (Kenya)	+ .16	.00	+ .05	- .03
Cajica (Colombia)	- .05	+ .19	- .22	+ .17
Arabia (Colombia)	- .15	+ .27	+ .08	- .11
Manila (Philippines)	- .39	+ .11	+ .23	+ .15
Kanzalu (Kenya)	- .18	+ .09	+ .25	+ .12
<u>INEFFECTIVE</u>				
Iloilo (Philippines)	+ .05	- .07	+ .07	+ .16
Nyeri (Kenya)	+ .03	- .12	+ .17	+ .38
Zipaquira (Colombia)	- .02	- .15	- .03	- .09
La Union (Philippines)	- .12	- .17	- .17	- .14
Eldama Ravine (Kenya)	- .17	- .04	- .24	+ .04

The "fed versus nonfed" analysis represents food program effects when comparing mothers and children in MCH programs with those in a matched control area. The "more versus less exposure" analysis represents food program effects when comparing mothers and children within MCH programs who have had varying amounts of program exposure.

The partial beta weights used in both analyses are measures of *net direct effects* between program presence and program goals, drawn from regression analyses that control for a number of target population and site variables, including household size, household possessions (which correlates highly with income), mother's education, and ratio of living children to births. Other possible indirect effects are not shown here.

effects when we inspect only variations in exposure. These patterns are similar to those uncovered in the Nakuru school case; targeting difficulties may exist, the programs reaching better-off recipients in the first place. If this is the case, the control groups themselves may be worth looking at as potential program targets.

In the case of Manila (Philippines) and Kanzalu (Kenya), the control areas selected were not well matched--the MCH families are considerably less advantaged--so that differences in nutritional status may be a function more of background conditions than of program participation. Even though the fed-nonfed analysis controls for many of these background factors, it can not possibly take all of the differences into account, resulting in a negative assessment when MCH families are compared with their control families. However, when comparisons used only the MCH families' varying lengths of program exposure, both Manila and Kanzalu show small net positive effects. Arabia and Cajaca in Colombia follow similar patterns and a similar diagnosis may be called for. Our final judgment is to give all seven ambiguous programs the benefit of the doubt, even in Kanzalu where the participant-only analysis just barely falls short of reaching the significance levels established for the study. The remaining programs seem to be clearly ineffective.

5. *Changing the food habits of mothers.* A measure of food habits was used as an index of the impact of the MCH program on the overall diets which mothers provide, measured by recall of the foods mothers prepared for their children during the 24-hour period prior to the interview, and rated on a nutrition quality basis by nutritionists in each country. This food habits measure showed positive results in four sites, at both levels of analysis (Pereira in Colombia, Nyeri and Kanzalu in Kenya, and Manila in the Philippines). Only one site (La Union) showed consistent negative results. The remaining ten sites were more ambiguous, again requiring that additional data be used to draw reasonable conclusions.

There is a consistency, as one would expect, between good food preparation habits as reported by the mothers, and good nutritional status for their children. However, the data suggest that food preparation may not be affected as much by the ration as one might expect, since neither the number of days the food lasts the families nor the size of the monthly ration seems to make a consistent difference



Mothers and their children at the Kanzalu (Kenya) Child Welfare Center.

in the results. Since the food is consumed so quickly in most households, it is possible that this study did not pick up the literal use of the MCH ration at all for many of the families; at the time mothers were interviewed, many may have already used up their entire monthly ration, and they therefore would have had less food to prepare during the 24-hour reporting period. Mothers reported that the food lasts an average of ten days per month, and MCH administrators reported that the food lasts an average of 11 days monthly, for all sites combined. This is one-third of the period that programmers intend it to last.

These mixed results may also be attributable to substitution of the MCH food for the families' normal diet. In the case of the Philippines, 56% of the MCH mothers studied reported buying *less* food since they had been going to the MCH center, and 23% of the MCH mothers studied in Kenya reported buying less (similar data for Colombia are not available). Finally, other data obtained for the study suggest that in some sites the ration is not large enough to make much of a difference in any event on the overall quality of mothers' food preparation habits (see discussion to follow in Part IV).

Two secondary measures of mothers' food knowledge and habits were also assessed. Each was based on responses to inquiries about the type of nutritious foods prepared by the mothers, and whether they had knowledge of the nutritional value of some specific foods. (These were selected by our research collaborators and vary from country to country.) The two variables were used together as a measure of the effectiveness of nutrition education in the MCH programs.

On these secondary measures, the programs do not do as well. Only three, Misamis Oriental and Manila (both Philippines), and Kanzalu (Kenya) produce a consistent positive impact on a mother's nutritional knowledge. Only in Misamis Oriental are the effects very strong; only in Misamis is there also evidence of actual transfer of this knowledge to effects on the nutritional status of the target children, although all three sites show up well on the mothers' food habits.

All of this suggests that although mothers may learn about good nutrition from the programs, they may not be able to put this learning into practice. Field teams in many sites have offered comments about this problem, similar to those quoted for the Neiva site in the previous section. There is a widespread sense that mothers do not have the resources to practice what is taught at the centers. In Kenya, field teams said that in all Kenyan sites "most of the mothers knew the right type of foods which are good for their families. The problem is that they just can't afford it." So, instead of relying on nutritious foods, families look for bulk. As the Kenyan team at the Nyeri MCH Center described it, "Mothers claimed that with such large families, the quantity of food was a more important consideration than the nutritional value of the food."

In summary, three of the MCH programs studied here show a clearly favorable impact on the nutritional status of children. Several other cases show reasonable promise. The quality of food preparation in the homes has been improved by the programs, and we think these differences are more attributable to the MCH ration than they are due to nutrition education. The mothers' overall food habits are not much affected, due to difficulties in obtaining the needed resources.

IV. DETERMINING IMPACT DIFFERENCES

1. *A classification of differences.* We wish to understand what distinguishes the effective programs from the ineffective ones. The first part of the report noted that the major determinants of program effectiveness could be classed into the following principal categories:

- Differences in the types of individuals who make up the target population.
- Differences in the food program itself, such as administration, ration size, ration type, cost, etc.
- Differences in the cultural, demographic, economic, and other features of the sites.

The program differences are fairly straightforward and are treated first. The target population variations are very complex indeed and cannot be sensibly interpreted without also taking site factors into account.

This section is not an evaluation of country programs. The sample of sites is far too small to do this. Rather, we seek some broader kinds of understanding about food programs generally, by comparing attributes of the particular cases which happen to be included in the study.

2. *School feeding program differences.* A large number of characteristics were examined. These included the type of feeding, the age of the program, how high food fees were, frequency of interruptions to the program, whether or not food was taken home, how many days per year the food is served, proportion of children in the school served the food, sponsoring agency, and estimates of per-recipient annual costs. Data on these characteristics for the 15 sites will be found in Appendix B.

Of all of these characteristics, we find several that seem to distinguish the more effective school feeding operations (see Table 3 on the next page):

- Selectivity within the school as to which children receive the food.
- Having a greater number of feeding days per year, and few feeding interruptions.
- Having hot lunches, as opposed to other forms of feeding.
- Having less food taken home.

Note what does not seem to make very much difference, at least in these sites, at this writing: the age of the programs, the food fees, program sponsor, or costs (which will be treated separately below). Drawing on all we have learned about these particular programs, we can suggest some reasons why certain program characteristics are important.

Why should the effective programs tend to be in schools in which less than all the students participate? In any school there are variations in nutritional status among children. If everyone in the school receives the lunch, then both the more and less healthy students get the food. The effect of the program may be muted because it will be more difficult to bestow benefits on the healthier children.

The idea of directing the program at the neediest children within a school is not a new one. For example, it is built into the rationale of the Philippine nutribun projects. Participation is formally governed by nutritional status (school children are weighed and measured, and classed into red, yellow, white, or green zones on a weight-for-age chart). This system is intriguing as a nutrition education device, but it does not work out well in our sites

TABLE 3

SCHOOL FEEDING PROGRAM CHARACTERISTICS WHICH RELATE TO NUTRITION EFFECTIVENESS

Programs	Percent of Total School Population Fed	Number of Feeding Days Per Year	Frequent Feeding Interruptions	Type of Feeding	Food Being Taken Home (Percent of Respondents)
<u>EFFECTIVE PROGRAMS</u>					
La Union (Philippines)	38	200		Hot Lunch/Nutribun (partial)	25
<u>PROBABLY EFFECTIVE PROGRAMS</u>					
Kigumo (Kenya)	46	200		Hot Lunch	11
Nakuru (Kenya)	100	180		Hot Lunch/Milk	8
Eldama Ravine (Kenya)	62	180		Bulgur Wheat/Milk	5
Neiva (Colombia)	68	200		Hot Lunch	16
<u>INEFFECTIVE PROGRAMS</u>					
Naga (Philippines)	100	105	Yes	Nutribun	78
Rivera (Colombia)	41	200		Hot Lunch/Milk	0
Iloilo (Philippines)	100	200		Nutribun	97
Cogua (Colombia)	100	200	Yes	Hot Lunch	27
Pereira (Colombia)	100	190		CSM/Bread	5
Zipaquira (Colombia)	100	150		Bread	18
Kanzalu (Kenya)	100	84	Yes	Bulgur Wheat	36
Manila (Philippines)	97	215		Nutribun	73
Misamis Oriental (Philippines)	88	240	Yes	Nutribun	48
Tala (Kenya)	100	200		Hot Lunch/Milk	62

as a selection scheme. One-hundred percent of the children sampled in Naga and Iloilo get the food, 97 percent in Manila, 88 percent in Misamis Oriental. Between 35 and 50 percent of the children in these four nutribun schools fall into the red (least healthy) zone. If the programs were more concentrated on these children, the results might begin to look better.

There is also a series of especially crucial logistic differences in these school feeding operations. Effective programs tend to operate more days per year. One reason the number of feeding days varies is that ration cuts lead some schools to restrict the food program to three or four days a week. Interruptions also cause many schools to divide their ration into smaller parts so more children can be served. The more effective efforts also tend to have hot lunches, and have little food taken home by the school child--which amounts to the same thing. As was noted in the La Union analysis, there is a much higher tendency to take home dry rations than hot lunches, because the hot lunch items are less transportable, and there is better supervision where they are eaten. These characteristics conform to common sense notions of what makes up a good program. Programs simply work better where the food is regular, frequent, and entirely consumed.

One other difference emerges in the school programs. The most effective school program in the study, in La Union, is also the only program which is presented as a food replacement effort, as opposed to food supplementation, at least to the extent that the data do not also reflect the effects of the discontinued nutribun at this site. That is, at La Union, the hot lunch is thought of as a way of maintaining the local diet, as well as a means for possibly improving on this diet. The whole concept is indigenous and does not depend on the use of fortified foreign commodities. It provides the community with a way to replace home food consumption with a communal meal served at the school.

Several points can be made about the "supplement versus replacement" issue. First, no feeding program is likely to be treated by its participants as purely supplemental. Both school and MCH programs in this study bear this out. Given the fact that these are developing nations and economically constrained environments, it is reasonable to assume that some of the resources which the feeding programs provide will be diverted from the uses intended by donors. The ration should be regarded as both a supplement and a replacement for other food which the child would have received if there had been

no program. What is likely to happen is that when the school child who has been fed goes home, he eats somewhat less than he otherwise would. His mother knows he has had something to eat at school and that there are others who have not. It is quite likely that she will limit his intake. The data in this study suggest that she can do this, at least to some extent, without negating the intended benefits.

Cost differences in school programs are treated separately below.

3. *MCH program differences.* A number of MCH program characteristics were inspected, including the size of rations, ration type, frequency of food distribution, length of time that rations last, distance to the MCH center, type of services offered, food distribution agency, and estimates of the worldwide costs of each program. Since all 15 MCH programs studied have dry, take-home distribution, no comparison could be made with on-site feeding (an attempt was made to include on-site MCH operations but none were located which met the other site criteria for the study).

Of all of these characteristics, the ones which distinguish effective MCH programs are (see also Table 4):

- A larger amount of food being distributed.
- A longer period of time that the food ration lasts families.
- A shorter distance between the center and the homes of the recipients.
- A more recent program start-up date.

Again, note that sponsoring agency, cost, and type of ration or services did not seem to make much difference.

In Kenya, the number of persons in the family who eat the food also is a factor--the smaller the number of persons eating, the more effective the program is. This is not so in Colombia and the Philippines, because the average number of persons eating the food (7.8 and 6.4 persons, respectively) is consistently much higher than in Kenya (3.6 persons). Again the supplementation versus replacement issue is raised. These data suggest that programs can

TABLE 4

MCH FEEDING PROGRAM CHARACTERISTICS WHICH RELATE TO NUTRITION EFFECTIVENESS

Programs	Type of Commodities Distributed Each Month	Pounds of Food Distributed Per Month	Average Number of Days Food Lasts Each Month	Average Number in Family Eating Food	Average Distance to Center (Kilometers)	Year of Program Start-up
<u>EFFECTIVE PROGRAMS</u>						
Neiva (Colombia)	Powdered Milk, Cheese, Fish, Corn Meal, Oil, Flour, Legumes, Colombiharina	40	16	7.7	1	1970
Misamis Oriental (Philippines)	CSM, Rolled Oats	8	12	6.4	1	1972
Pereira (Colombia)	CSM, Oil, Bulgur Wheat, Breadstuffs	12	17	8.5	1	1972
<u>PROBABLY EFFECTIVE PROGRAMS</u>						
Naga (Philippines)	CSM, Rolled Oats	20	22	8.5	1	1972
Nakuru (Kenya)	Bulgur Wheat, Oil, Dry Milk	8	7	2.9	8	1968
Ngong (Kenya)	Bulgur Wheat, Oil, Dry Milk	3½	5	2.8	2	?
Cajica (Colombia)	CSM, Rolled Oats	12	13	6.6	?	1971
Arabia (Colombia)	CSM, Oil, Bulgur Wheat, Breadstuffs	12	17	8.6	3	1971
Manila (Philippines)	CSM, Rolled Oats, Bulgur Wheat	10	8	5.7	1	1965
Kanzalu (Kenya)	Bulgur Wheat, Oil, Dry Milk	5	4	5.3	10	1969
<u>INEFFECTIVE PROGRAMS</u>						
Iloilo (Philippines)	CSM, Rolled Oats	2	18	6.0	1	1967
Nyeri (Kenya)	Bulgur Wheat, Oil, Dry Milk	8	9	2.6	4	1971
Zipaquira (Colombia)	CSM, Oil, Bulgur Wheat	22	14	7.8	3	?
La Union (Philippines)	CSM, Rolled Oats	8	5	5.6	1	1968
Eldama Ravine (Kenya)	Bulgur Wheat, Oil, Dry Milk	5	7	4.8	3	1967

withstand some diversion of rations to non-recipients and still manage to pass on benefits to the targeted child.

With respect to ration sizes, there is reason to believe that many of the reported rations are less than the programmed rations. It is clear that there is room for improved impact through better management of the food. The larger ration sizes tend to be found in the better programs, although this relationship is not as strong as one might expect it to be. Instead, the number of days that the food lasts seems to make more difference, suggesting that *regardless of the size of the ration*, the overall family eating pattern--e.g., number of people the food has to feed, proportion of family food given to young children, other food resources, etc.--will determine to a large extent whether or not the MCH ration benefits the pre-school child. Because it is a family feeding situation, the entire family group needs to be considered. Because of the feast or famine situation brought about by family feeding, the youngest children may be suffering most since they may be more sensitive to fluctuations in food intake.

This issue must be viewed in relation to the expectations of the program sponsors. The programmers intend that the ration be eaten only by pre-school children and should then last for a full 30 days. The longest length of time the food lasts for any MCH program studied here is 22 days; the average is 12 days. It is clear that the underlying reasoning of the sponsoring agencies is fairly sound: if the food was actually channelled only to the designated children and lasted the full 30 days, there would probably be a striking impact on children's nutritional status. As it is, the rations can be diluted (replacement) yet still have a small effect (supplement). Given the reality of what happens to the food, it is clear that other benefits, such as improved nutritional status for adults or other children in the family, may be derived at the expense of the pre-school child. That these are *unintended* benefits does not necessarily make them invalid. Simply increasing the size of the ration is no guarantee that the health of small children will improve, since there is no assurance that all of the increase will actually be consumed by the pre-schooler. At minimum, any increased impact on the target child will be much less than hoped for; in fact, large rations may only encourage diversion.

This situation might be improved by more frequent distribution of smaller rations, such as once a week. It is very clear from the data that programs which have more frequent distributions also have food lasting more days of the month, and are somewhat more effective.

Distances the mothers must walk from their homes to the MCH center also seem to be a factor in program effectiveness. This is probably a function of the better overall effectiveness of urban MCH programs where recipients live closer (see the site effects discussion below). Nevertheless, mothers living in rural sites do have difficulties traveling to the centers, due to the time-consuming nature of the visits and the need to take along small children. This factor may cause some mothers to miss monthly visits, and it is a reason why some mothers in rural areas stop going altogether.

Programs with more recent startup dates tend to be more effective. Perhaps the people who start MCH programs are more likely to know how to operate them, and more likely to put greater effort into the operation than are persons who have inherited programs from someone else. This suggests a need for continuous supervision of these efforts, throughout their duration.

4. *Cost differences.* Data were compiled at three levels--site, country, global--to arrive at an estimate of the cost to feed a recipient for one year in each of the 30 programs. This was not an easy task. Estimates of costs seemed to overlap from one agency to another, many gaps existed, and in nearly all cases computed value of the donor-supplied portion of the ration, as served, did not agree with the "official" estimates. Most aspects of a realistic cost appraisal are somewhat foreign to many of the local people who run the programs, who tend not to keep any detailed accounts other than those for items monitored by auditors, e.g., food fees, container sales. Actual budgets are rarer yet. Because of these problems, we urge caution in use of the results, presented in Table 5 on the next page.

First, these estimates are probably fairly good indicators of program value, from the recipient's point of view. Most fall within a roughly plausible range, given other information available to us. The total estimates include allowances for the cost of imported commodities and the transportation and warehousing of these from port of origin to the recipient; any additional commodities supplied locally; the costs of local facilities and staff; and all country-level administrative costs (international administration is assumed to be a constant for all recipients, and can be ignored here--in any event, an incremental increase

TABLE 5

ANNUAL COST ESTIMATES PER RECIPIENT FOR SCHOOL AND MCH PROGRAMS, BY EFFECTIVENESS

Classification	SCHOOLS		
	Site	Estimated Cost	
		Official Ration	Actual Ration
Effective on Nutrition, Probably Effective on Attendance	La Union (Philippines)	\$ 4.42	\$ 4.42
Effective on Attendance, Probably Effective on Nutrition	Kigumo (Kenya)	9.12	5.81
Probably Effective on Both Nutrition and Attendance	Nakuru (Kenya)	10.17	7.86
	Eldama Ravine (Kenya)	7.30	14.01
	Neiva (Colombia)	62.54	25.01
Effective on Attendance, Ineffective on Nutrition	Naga (Philippines)	5.33	5.00
	Rivera (Colombia)	101.71	63.36
Probably Effective on Attendance, Ineffective on Nutrition	Iloilo (Philippines)	8.51	12.51
	Cogua (Colombia)	27.29	20.99
	Pereira (Colombia)	9.45	7.67
	Zipaquira (Colombia)	11.23	4.93
	Kanzalu (Kenya)	7.36	5.81
	Manila (Philippines)	8.96	5.76
Ineffective on Both	Misamis Oriental (Philippines)	8.10	12.16
	Tala (Kenya)	7.70	5.13

Classification	MCH		
	Site	Estimated Cost	
		Official Ration	Actual Ration
Effective	Neiva (Colombia)	\$50.27	\$38.13
	Misamis Oriental (Philippines)	10.45	11.29
	Pereira (Colombia)	14.53	17.69
Probably Effective	Naga (Philippines)	10.93	26.02
	Nakuru (Kenya)	6.14	22.27
	Ngong (Kenya)	6.00	10.12
	Cajica (Colombia)	18.56	22.51
	Arabia (Colombia)	17.20	20.36
	Manila (Philippines)	13.00	13.00
	Kanzalu (Kenya)	6.44	15.24
	Ineffective	Iloilo (Philippines)	13.09
Nyeri (Kenya)		5.40	18.84
Zipaquira (Colombia)		15.57	22.19
La Union (Philippines)		20.03	20.87
Eldama Ravine (Kenya)		8.49	18.91

Note: For derivation of estimates, see Appendix A. All three very expensive programs use large rations supplied by WFP. In addition, estimates for the Rivera school operation include costs of a program for boarding students in the school.

is a small one). We did not attempt to calculate hidden costs, such as the inroads programs may make on the time of teachers and school headmasters. In general, the work on cost for the project to date is a first cut; further refinements will be generated in the upcoming fourth-country project.

With this caveat in mind, some conclusions can be wrung out of the cost data. First, the most important component of the estimates is the imported commodity: the donated food. This is one element which we can pin down fairly well. All other expenses combined do not begin to match imported foods in their impact on the overall totals. These totals are almost certainly understated in many places because program conditions make it very tricky to estimate local inputs. For example, a Catholic sister's stipend may understate considerably her worth as a trained professional--and even if we resolve this, many people have great difficulty estimating how much of their time goes to a program. Our costs are if anything underestimated, then. However, when a constant is added to see what the data would look like if our theorizing is valid, the overall pattern does not change all that much; local site costs are just not that large a component.

Second, costs derived from official representations about rations bear little relationship to the value of actual rations delivered to recipients. In some programs, much less than the approved amount is provided; this may be partially due to diversions, but note that this study took place when there was a worldwide shortage of commodities for many of these programs. Some sites literally got nothing for some of the time--like La Union, they made up the difference in local inputs, to the extent possible. In other places, considerably more than the official ration was provided. In general, school programs tended to get cut back, MCH programs managed to get about what they expected.

Neither reported costs, nor adjusted estimates which allow for more realistic treatment of actual ration values, seem to be related to program effectiveness. Only in Neiva's MCH program, supported by the World Food Program, does high cost (because of exceptionally generous rations) seem to go along with effectiveness, and in this case one might well wonder if the very large Neiva ration may be especially cost-effective as a *nutritional* effort (it may have many other productive values, of course), in view of the equal or nearly equal performance of some other programs with much smaller rations. Beyond this, the study as a whole suggests that

factors other than cost--intangibles like local management skill, tangibles like program interruptions--remain the crucial ones for producing impact. More thorough cost-benefit analyses will require two things: better data--which ought to be obtainable, based on the experience gained here, and information about a larger number of effective programs, so one can begin to generalize from more than just a few examples.

5. *Site distinctions.* The communities where this study was carried out differ in a large number of ways. Some are rural, some urban. Some are in radically different geological and climatic zones than others, even within the same country. In Kenya it is possible to drive in a few minutes from Tala, one of the poorest places in the study and one situated in near-desert surroundings, to Kanzalu, which has fertile countryside, a more prosperous economy and a more temperate climate. Some places are experiencing the effects of migration. In Pereira, in Manila, in Misamis Oriental there are refugees. Some other major factors:

- In Colombia our recipients, who are poor people, nonetheless are the most comparatively advantaged of any of the three nations. This is true of both school and MCH families; the former are better off than the latter. They are advantaged in health as well as in wealth, compared to the other two nations.
- In the Philippines the recipients live in communities which are as developed as those in Colombia in some respects. Even small settlements show many signs of frequent contact with the industrialized world. But these sites are poorer than the Colombian ones in other ways. The MCH recipients are better off than their Kenyan counterparts, but the school families are not. That is, "middle class" people in the Philippines, those who can afford to send their children to school, are poorer, relatively, than the same class of people in Kenya. Perhaps schooling costs less for Filipinos, or the lure of education is stronger. School attendance is higher in the Philippines than in the other two countries.

- In general, children studied in the Philippines have the lowest nutritional status of any of the three nations. (Two Kenyan sites, Tala and Kanzalu, also approach the general level of those in the Philippines.) To some extent this is probably due to the construction of the measures themselves, insofar as gene pools may produce diminutive Asians whose standards for weight-for-height (or age) should be lower than those used here. Recall, however, the possibility of the "adaptive physique" mentioned in the first section; and beyond this the Philippines' tropical conditions are prey to a host of problems--floods, disease, and crowding of people--which are not quite so serious in the highland regions of Colombia and Kenya, where most of the people in those nations live. This general Philippine nutritional deficit is most marked in MCH children, less so in school children. The fact that the school children show relative improvement is at least partly due to the removal from the population of those who would have been the less healthy older children: some may not be able to afford school, others may fall prey to sickness and disease.
- Kenyan sites are the poorest communities of the lot. Only in Nakuru do people have much access to sewer systems, for example. This relative poverty shows up in two ways: first, the MCH recipients are poorer than those elsewhere, and second the country is less able to provide widespread education. In consequence, we have a smaller and more highly selected group of school families, which seems to exceed the Filipinos in well-being, as noted above.
- In general, school attendance is lowest in Kenya. There is clearly an international "curve" on grades awarded by the teacher: the Kenyans are more willing to award good ones than the Filipinos, and the Philippine teachers are not as tough as the Colombians (as in all of these country generalizations, some sites may be exceptions to the rule). If there is better impact in Kenya on school performance, this "curve" may help explain it.



Rural poverty in Kenya. Above: a standard three schoolgirl poses in front of her home in Kigumo. Below: a primary school studied in Tala.

Table 6 provides site data which distinguishes the more and the less effective school programs. The effective ones seem to occur in the places that are comparatively less prosperous (relative to the country as a whole). The major exception is Nakuru, which we know is a program which ought to be adjusted to reach a known group of needier recipients. The effective operations also tend to be found in communities with fewer water and sewer facilities, and there is some tendency for them to be rural.

The apparent success of the more disadvantaged locales could be a function of program rations. The school rations per recipient per year tend to be smaller than those used in MCH programs. To some extent this may be due to the need to cover the obvious replacement requirements in a take-home MCH ration; but even so, the typical school ration is not intended to supply as much of an increment to the diet of a child as are the typical MCH rations. For one thing, the number of programmed feeding days is much lower. This may tend to limit the effectiveness of the school programs, so that they work well enough in really disadvantaged areas, but lack sufficient potency to have much effect in regions which are relatively more advantaged, even when legitimate need still exists. It is reasonable to apportion scarce food resources by spreading them thin and hoping to have a little effect on a lot of people, of course; but the effect is to make more visible the drawbacks of these programs in places like Nakuru. Perhaps the merits should be considered of an attempt in food programs to have more effect on fewer people.

In Table 7 are some site characteristics which distinguish between the more and less effective MCH programs. As elsewhere, of course, no one characteristic explains everything, but a number of trends can be perceived. Among the 15 sites, the more effective programs tend to be urban, with a somewhat higher level of income than the others, as well as a greater number of material possessions. This is a mirror image of the effective school sites!

These more effective MCH program sites are also characterized by unstable populations due to migration into the areas. They are prey to what the Colombians call the "invasion barrio"--the squatter slum. Effective sites tend to have somewhat lower birth rates, somewhat higher death rates, and more sewerage and potable water facilities, all of which suggest an urban location. On the whole, the effective groups are more homogeneous, especially on facility

TABLE 6

SITE CHARACTERISTICS WHICH RELATE TO SCHOOL PROGRAM NUTRITION EFFECTIVENESS

Programs	Household Income of Recipients (Percent of National Recipient Income)	Material Possessions of Recipients (Scale 0-8)	Potable Water (Percent of Service)	Sewerage Facilities (Percent of Service)	Urban or Rural
<u>EFFECTIVE PROGRAMS</u>					
La Union (Philippines)	75	3.3	40	48	Rural
<u>PROBABLY EFFECTIVE PROGRAMS</u>					
Kigumo (Kenya)	47	2.8	0	0	Rural
Nakuru (Kenya)	128	4.1	99	85	Urban
Eldama Ravine (Kenya)	113	3.3	50	5	Rural
Neiva (Colombia)	89	4.6	73	80	Urban
<u>INEFFECTIVE PROGRAMS</u>					
Naga (Philippines)	102	3.5	100	80	Urban
Rivera (Colombia)	91	3.6	95	80	Rural
Iloilo (Philippines)	89	3.2	70	0	Urban
Cogua (Colombia)	85	3.2	100	55	Rural
Pereira (Colombia)	118	4.4	80	85	Urban
Zipaquira (Colombia)	116	4.1	80	75	Urban
Kanzalu (Kenya)	109	3.4	80	0	Rural
Manila (Philippines)	153	3.9	100	70	Urban
Misamis Oriental (Philippines)	81	2.7	75	65	Rural
Tala (Kenya)	103	3.7	40	0	Rural

TABLE 7

SITE CHARACTERISTICS WHICH RELATE TO
MCH PROGRAM NUTRITION EFFECTIVENESS

Site	Household ^a Income of Recipients (Percent of National Recipient Income)	Material Possessions of Recipients (Scale 0-8)	Recent Significant Population Movement	Birth ^a Rate (Percent of Nation)	Death ^a Rate (Percent of Nation)	Potable Water (Percent of Service)	Sewerage Facilities (Percent of Service)	Doctors (per 1,000 population)	Urban or Rural
<u>Effective Programs</u>									
Neiva (Colombia)	88%	3.0	yes	90%	144%	73%	80%	.05	Urban
Misamis Or'ental (Philippines)	90	2.5	yes	65	102	75	65	.10	Rural
Pereira (Colombia)	146	4.3	yes	90	89	80	85	.76	Urban
<u>Probably Effective Programs</u>									
Naga (Philippines)	131	3.5	yes	79	100	100	80	.10	Urban
Nakuru (Kenya)	83	3.3	yes	100	89	99	85	.50	Urban
Ngong (Kenya)	79	2.3		132	316	96	12	.04	Rural
Cajica (Colombia)	73	2.9		--	--	--	--	--	Rural
Arabia (Colombia)	102	3.7		55	78	90	0	.06	Rural
Manila (Philippines)	122	3.1	yes	125	128	100	70	.20	Urban
Karuzalu (Kenya)	199	3.8	yes	116	105	80	0	.05	Rural
<u>Ineffective Programs</u>									
Iloilo (Philippines)	64	1.8		59	90	70	0	.25	Urban
Nyeri (Kenya)	60	2.4		100	89	50	0	.03	Rural
Zipaquira (Colombia)	91	3.3		110	89	80	75	.03	Urban
La Union (Philippines)	93	3.5		68	95	40	48	.20	Rural
Eldama Ravine (Kenya)	79	2.2		100	89	50	5	.03	Rural

^aFigures are the percentage of site averages over the combined averages for all sites studied in the country.

resources at the site, than the group of effective school programs. Considering the wide range of locales from which the effective sites are drawn, this homogeneity suggests that MCH programs as they are now conceived may best be suited to a particular type of place. Moreover, coupled with the population increases, it suggests that the public health facilities associated with the site may be of crucial importance to the workability of the program.

As they are designed, MCH programs ought to be effective in unstable population environments, because the recipients' propensity to move around is not as crucial as it is in schools where those who don't show up don't get fed. Individuals in MCH receive rations once or twice a month and carry them home. There are women in the Kenyan study who regularly go as far as ten kilometers to maintain contact with an MCH center. They go this far, perhaps, because the ration represents a sizeable portion of their food requirement and is worth going for.

The MCH program also has an informational aspect to it. It attempts to teach proper nutrition and health practices. In those places where the MCH programs appear effective, there also appear to be more health-related facilities and food markets on hand, to use the knowledge that may be transferred.

Misamis Oriental (Philippines) is the one MCH site which veers noticeably from the characteristics of the others in the effective group. But like the other effective sites, it has recently experienced population increases due to immigration--Misamis is located on the island of Mindanao--suggesting that this may be a key factor: where population is rapidly increasing, greater constraints on food resources may exist. In such places, MCH food rations are likely to be more greatly needed.

6. *Target population differences.* We have seen above that the effective program sites tend to be rural (and probably fairly stable) in the case of schools, and urban and unstable in the case of MCH. What about the characteristics of the particular people in those sites who are reached by the programs?

To learn which of many personal and environmental factors are important in determining a child's nutritional status, we ranked each of the factors used in this study according to the strength of their effect on the weight-for-age of the children studied in each site. A global ranking was also obtained. This was done separately for both school and MCH programs and the results were then compared. Table 8 shows these results. To better illustrate this ranking, factors were plotted in Diagram 1 so that the clusters show up clearly.

For the schools, we draw the following conclusions:

- The strongest predictor of nutritional status of the school children in this study is the IQ of the child, but only in Kenya does this show up with real clarity. Another strong predictor is the food habits of the child, and this acts in much the same way, except that not only is its effect more obscured in the Philippines, but it actually becomes rather unimportant in Colombia.
- Precisely the opposite pattern obtains for two more important indicators. Distance from the school and school attendance are quite strongly associated with nutritional status in Colombia, moderately related in the Philippines, and not much related in Kenya.
- The size of the household is fairly important for the school child's nutrition in both Colombia and the Philippines; it is relatively unimportant in Kenya. The same pattern is true for the education of mothers.
- The child's food knowledge is unusually important in the Philippines; in the same country, the child's actual diet during the past 24 hours is less critical than elsewhere, as is the mother's recall of what she happened to serve the children and what she knows herself about good food.
- Presence of the programs themselves is relatively unimportant in predicting nutritional status in Colombia, but is fairly important in Kenya and the Philippines.

TABLE 8

SCHOOL AND MCH PROGRAMS:
RANKINGS OF THE IMPORTANCE OF DIFFERENT VARIABLES ON NUTRITIONAL IMPACT
(PERCENT OF STANDARD, WEIGHT-FOR-AGE)

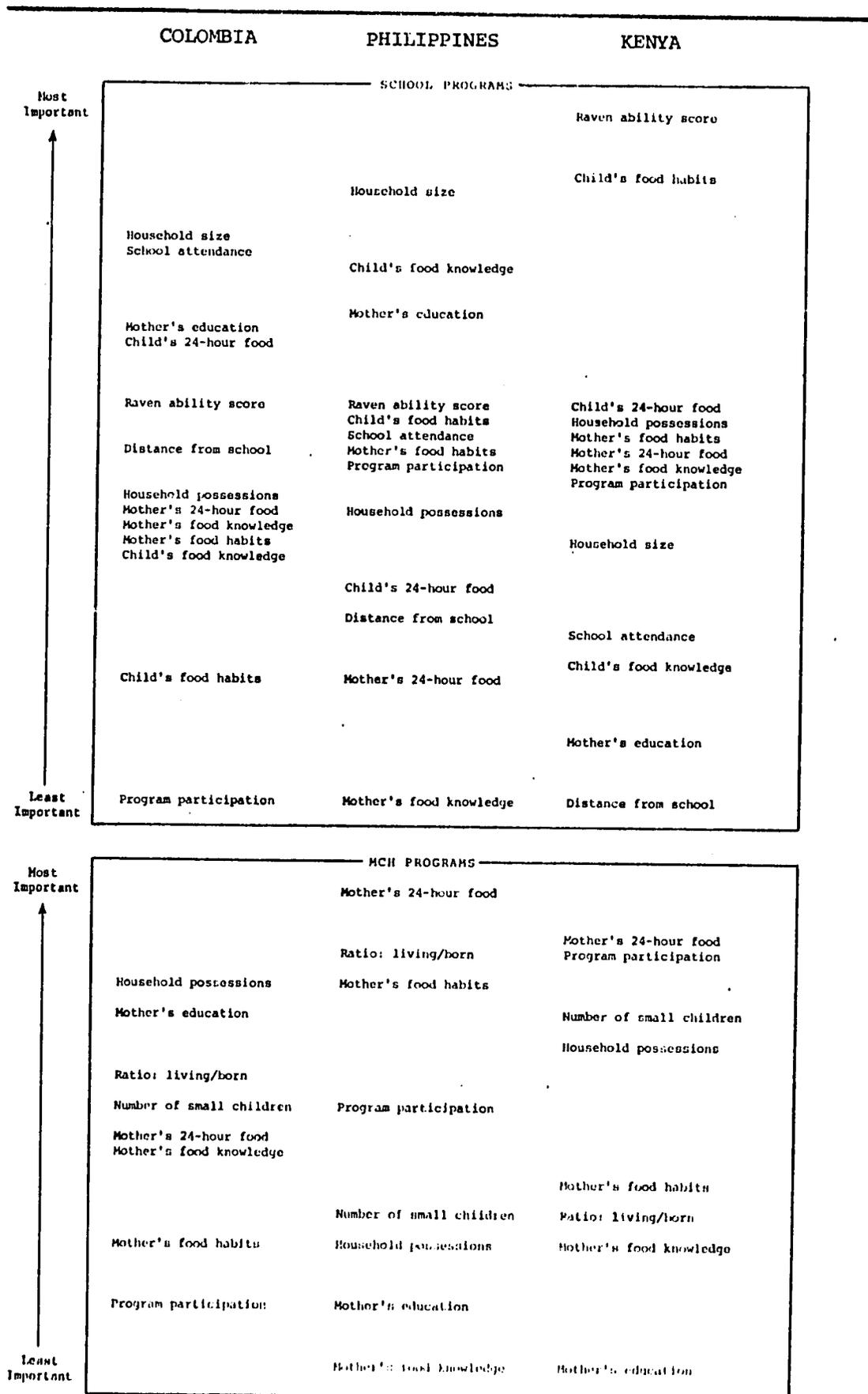
School Programs	Average of Site-Level Ranks in--											
	Global Level		Colombia		Philippines		Kenya					
	Rank	Value	Rank	Value	Rank	Value	Rank	Value				
Raven Ability Test Score	1	4.7	5	6.2	4½	6.4	1	1.6				
Household Size	2	5.2	1	4.4	1	3.6	9	7.6				
Child's Food Habits	3	6.1	12	8.8	4½	6.4	2	3.2				
School Attendance	4	6.5	2	4.6	6	6.6	10	8.4				
Child's 24-Hour Food Intake	5	6.7	4	5.8	10	8.0	3½	6.4				
Mother's Education	6	6.8	3	5.6	3	5.4	12	9.6				
Household Possessions	8	7.0	7	7.2	9	7.4	3½	6.4				
Mother's Food Habits	8	7.0	10½	7.6	7½	6.8	5	6.6				
Child's Food Knowledge	8	7.0	10½	7.6	2	4.8	11	8.8				
Mother's 24-Hour Food Served	10	7.6	8½	7.4	12	8.8	6½	6.8				
Mother's Food Knowledge	11½	8.2	8½	7.4	13	10.6	6½	6.8				
Program Participation	11½	8.2	13	11.0	7½	6.8	8	7.0				
Distance from School	13	8.5	6	6.6	11	8.2	13	10.8				

MCH Programs	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Mother's 24-Hour Food Served	1	3.4	5½	4.6	1	2.4	1½	3.2
Ratio: Living Children/Born	2	4.1	3	4.2	2	3.2	6	5.0
Household Possessions	3	4.2	1	3.6	6	5.2	4	4.0
Small Children in Household	4½	4.4	4	4.4	5	5.0	3	3.8
Program Participation	4½	4.4	8	5.6	4	4.4	1½	3.2
Mother's Food Habits	6	4.5	7	5.2	3	3.6	5	4.8
Mother's Education	7	5.3	2	7.8	7	5.6	8	6.6
Mother's Food Knowledge	8	5.4	5½	4.6	8	6.6	7	5.2

Note: Global results used here only to determine order presentation of variables; these were computed by combining country-level results, with ties resolved by averaging country rankings. The reader may wonder just how important the top-ranking predictors are. In general, the analysis on which these rankings are based is able to account for about 15% of all of the variation in the nutritional status (weight for age) of MCH children, and better than 20% of that variation for school children. This leaves 80% "unexplained;" that is, attributable to errors in the work, variables like detailed past medical history which have not been included in the study, "acts of God" like accidents and loss of income, the quality of program management, and so on. In the face of such a real world, we do well to "explain" 20% of anything; these predictors are about as good as any we know about for such data. Their efficacy varies from place to place, so site-level interpretation should be made with care (see Table 9 in the following section).

DIAGRAM 1

TRANSLATION OF TABLE 3: FROM MORE TO LESS IMPORTANT PREDICTORS OF NUTRITIONAL STATUS, MCH AND SCHOOL, BY COUNTRY



And for the MCH programs:

- The food the mother serves her children to eat turns out to be the most important predictor of the nutritional status of pre-schoolers in the Philippines and Kenya; it is much less important in Colombia.
- Presence of the program is an unimportant predictor of nutritional status in Colombia, a moderately important one in the Philippines, and is as important as the mother's 24-hour food preparation habits in Kenya.
- The amount of education the mothers have follows a similar pattern to that shown in the schools--it is important for the child's nutritional status in Colombia, much less important in Kenya. Here, however, the Philippine mothers follow the Kenyan trend, not the Colombian one. Apparently the Colombians have successfully begun to implant nutrition education into their school curriculum.
- Also in the Philippines, the food habits of the mother and the ratio of children living to those ever born (used as a rough family health index) are both more important than they are elsewhere, while the number of small children in the household, the possessions of the family, and the food knowledge of the mothers are all somewhat less significant than elsewhere.

In this study, the nutritional status of children is taken as a function of the child's own nutritional habits and abilities, and his home environment. Given the data reported above, we are led to suspect that there has been insufficient appreciation of the extent to which school children in the poorer countries come to be the major controllers of their own nutritional status. We are dealing with developing countries in which the poverty of the environment places constraints on what the family and household can offer. Children have little alternative but to leave their dependent state as quickly as possible, becoming producing members of the family economic unit (especially in Colombia) and guardians of their own survival (especially in Kenya). Thus, for school children, access to food outside the home becomes fairly important.

Some of the between-country and within-country differences illustrate this interpretation. For example, in Kenya, where sites are the least developed of the three countries in terms of income and other measures, the school child's intelligence and own food habits are the strongest determinants of his nutritional status. To take this one step further, it is in Tala, one of the poorest sites, where the school child's intelligence, nutritional habits, and food intake rank first, second, and third, respectively, as the important things to know about in predicting his weight-for-age.

For MCH children, the family conditions, food prepared at home, and the MCH program itself become important in dealing with pre-school nutrition, as one would expect. The young child is dependent; it is the mother we must look at, and again we find a similar effect: the mothers' education and household possessions are significant. Moreover the pattern of country variations is very significant. For both schools and MCH, the number of years of schooling a mother has is most likely to make a difference in Colombia, the most developed country, for her offspring's nutritional status. The opposite finding applies in Kenya, the least developed of the three. In the Philippines, which is educationally rich but resource poor, a division occurs: the MCH mothers take on the Kenyan trend--they do not have the resources to use their knowledge--while the school mothers follow the Colombians, possibly because by this stage of the child's life, the advantages he may get from his mother's education are less dependent on tangible wealth and possessions.

As one would expect from all of the above, a very important difference between school and MCH populations is wealth. MCH mothers report an average monthly income one-third lower than school mothers, and one-fifth fewer material possessions. In the schools, the food programs deal with a more advantaged population, one which may not be as responsive to food supplements as would the more economically disadvantaged population of MCH recipients.

7. *A summary of some of the important differences.* It is obvious that the general level of development of a place has a major effect on the impact of the programs; it is also obvious that the nature of the program depends on where one puts it.

We find that the more effective school programs serve those relatively advantaged groups of people who live in the fairly stable but less prosperous areas. The children served by these schools are likely to benefit, in part at least, because of their increased general dependence on food resources outside their homes. The more effective MCH programs do not resemble this school pattern at all. They tend to be in urban areas and in places where the population is unstable. They serve the poorest people in the more advantaged regions--a much different group than the school population. One development programming opportunity here would seem to be with MCH programs designed to fit disadvantaged regions--these may exist elsewhere (for example, there is the "traveling MCH" concept found in West Africa), but they are not prevalent in this study.

These effects hold up, insofar as one can generalize about them from a small number of sites, at both the country and international levels. The better school programs tend to be in Kenya and the Philippines (especially if we ignore impact other than nutritional impact). The better MCH programs tend to be in Colombia and the Philippines.

This finding implies that the two programs are likely to have very different kinds of weaknesses. School programs are most likely to run into trouble because of targeting difficulties; MCH programs may be more likely to fail because of inabilities on the part of the recipients to make good use of the food and of the knowledge which is passed on. To put the matter another way, school programs which do not work will tend to be in the more prosperous regions, while the less satisfactory MCH program is likely to be in the poorer area. Somewhere in the middle there is a ground where both kinds of operations may function acceptably well; Nakuru and Neiva may be such places. Nakuru's school population is less advantaged than those in most other areas of the world, while Neiva's MCH population is more advantaged than most. Diagram 2 on the opposite page illustrates this idea, and shows that the food programs tend to be weakest in those places which represent the greatest extremes of wealth or poverty. This argues for great emphasis on careful siting and targeting of programs, building this into program operation and management planning.

8. *Some further evidence, and a note on the validity of conclusions.* The methodology employed for this study required that we assemble all of the variables to be used

DIAGRAM 2

A THEORY ABOUT THE ORIGIN OF FOOD PROGRAMS
AND THE DATA UNCOVERED IN THIS STUDY

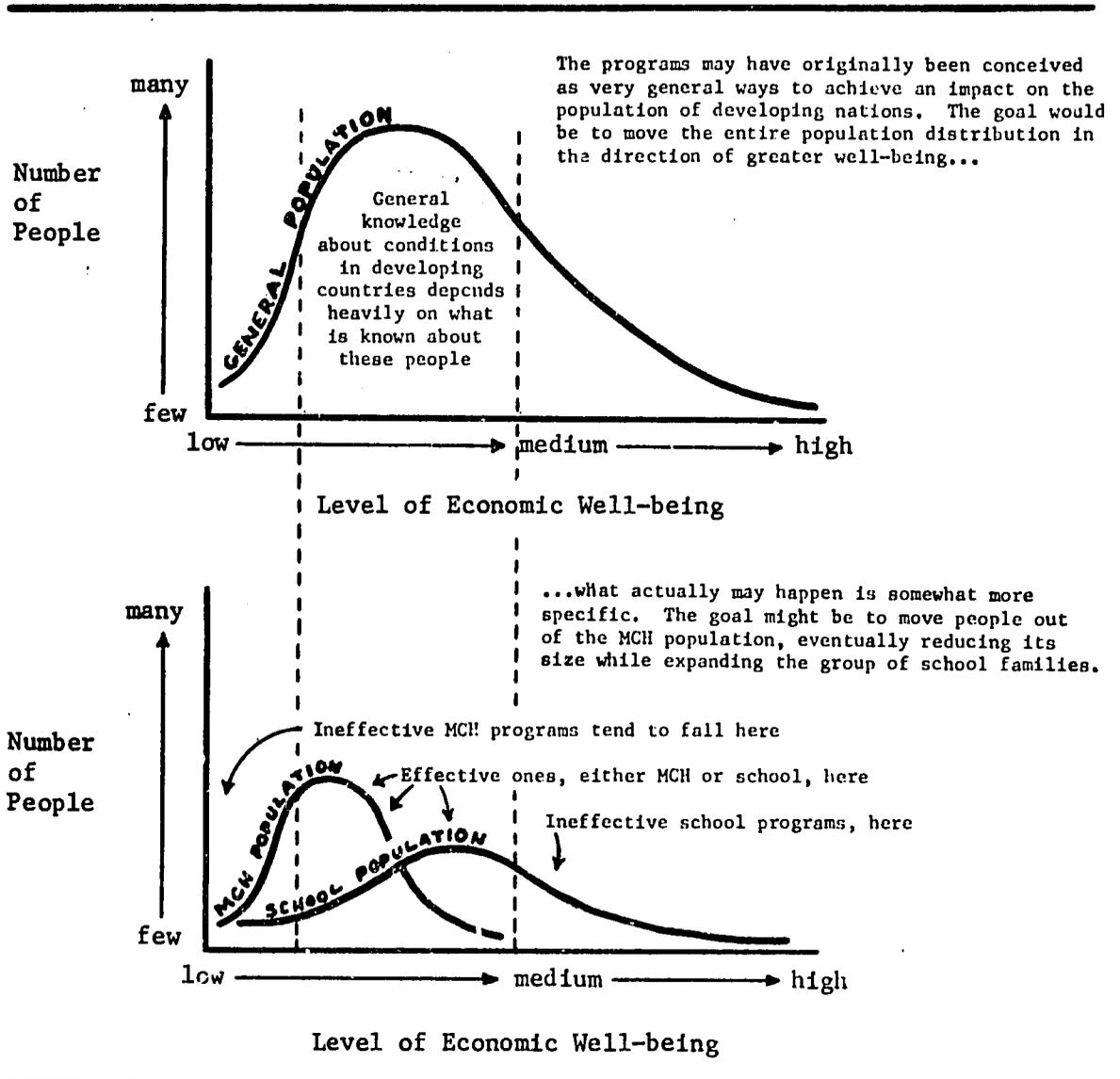
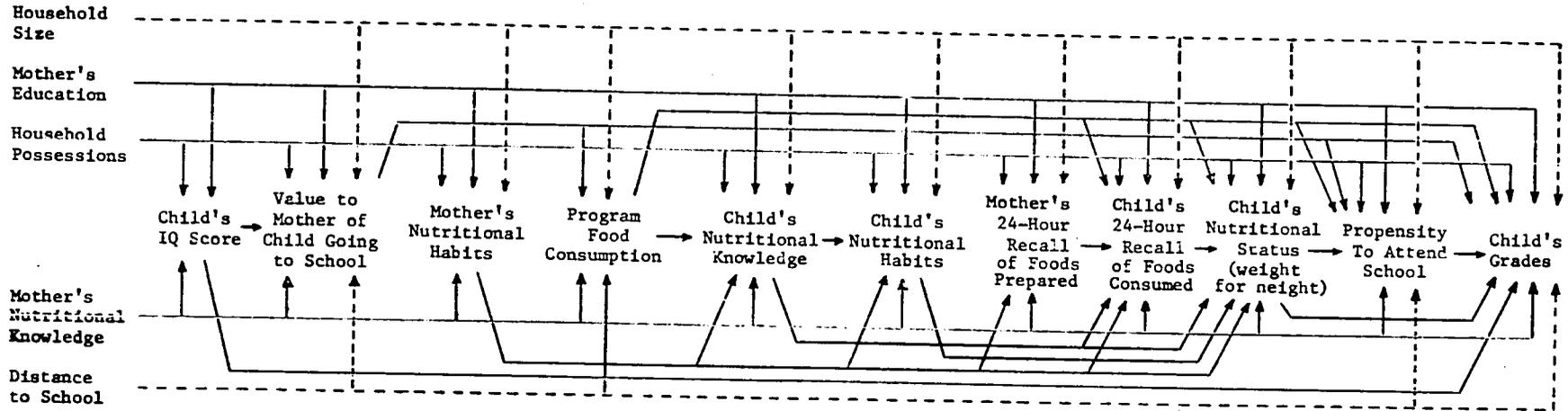


DIAGRAM 3

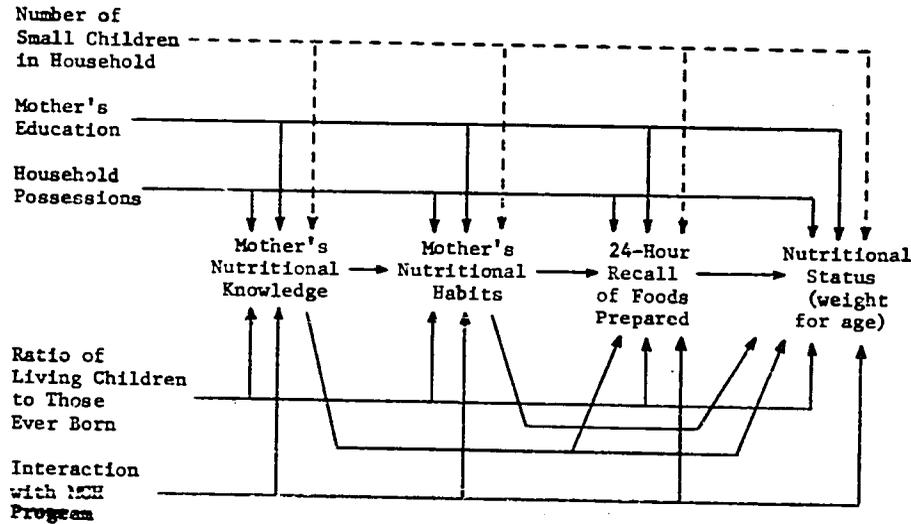
COMPARISON OF THEORETICAL MODELS:
SCHOOL AND MCH PROGRAMS

SCHOOL PROGRAMS



74

MCH PROGRAMS



N.B. These are some of the theoretical, possible associations tested in the study; this is not a summary of actual results. See text.

———— anticipated positive associations
----- anticipated negative associations

Expected insignificant relationships are ignored.

in each analysis--school and MCH--and use these to define models of working programs. These models are depicted in the figures in Diagram 3, on the opposite page; they are quite unrefined and we expect to improve them in the months to come. They do work well enough for present purposes. For example, in the school case no linkage is shown between household possessions and presence in the program; if this were the case, then the program would be directed at those better able to pay (and least likely to benefit). To the extent that such a relationship actually does show up, several things can be concluded: first, the fees may be set too high; second, the program designer's intentions are not being followed; and third, impact is going to suffer.

If we assume that these models of working feeding programs reflect a program planner's conceptions about the way school or MCH operations should function, and we think that they do, one could conclude that ineffectiveness may be due to a lack of fit between the assumptions inherent in the design of the effort and the actual conditions found in the field. The modelling exercise tends to support this. For MCH, Kenya, the least developed of the three countries, has the largest number of "incorrect paths"--a shorthand term for the unanticipated cause-and-effect linkages which turn up in the model when we look at real data. That is, MCH programs in Kenya follow a less familiar pattern of functioning, while those in Colombia and the Philippines tend to operate in a way that is more in line with the conceptual ideas of the donor nations. Moreover, when we divide all MCH sites according to economic resources, we find that those below the mean income or level of material possessions have more "incorrect" paths than those above. If we focus only on the dependent variables--those the programs are supposed to affect, such as nutritional status, knowledge, and habits--the dichotomy is even more striking. This is not to suggest that MCH programs cannot work in less developed areas; it does mean that our theoretical notions may be better suited to more developed regions, and that MCH programs might be more carefully tailored to poorer sites than any of those covered in this analysis.

Again, school feeding site factors are a mirror image of the MCH factors. In school feeding, Colombia shows the greatest number of "incorrect" paths, while Kenya shows the lowest. This squares with our earlier generalizations; the theoretical model for school feeding is better suited to less developed areas.

What else can be learned about the level of our own understanding? Table 9 on the next page provides measures of how able we are to explain the nutritional status of children in each site. Again the information is organized to reflect degrees of success in reaching the program goals.

First, we seem to have the best general understanding of school programs--not surprising because these are the more familiar institutions. In consequence, we also seem to have a very good ability to understand really ineffective programs, if Tala is any sample. Our understanding of the marginal school program may be a bit better than our knowledge of the really effective ones.

There are several sites where our knowledge about how improvements are made in nutritional status is quite limited, especially in MCH programs. One should not expect any of these proportions of explained variance in nutritional status to be especially large. The sociologist Otis Dudley Duncan is supposed to have noted that no one would want to live in a world so deterministic that researchers would be able to account for really sizeable portions of variance in such elemental phenomena as health, education, or income. But the multiple correlations for MCH populations in several sites fall below acceptable levels. We may be able to show that a particular program works or doesn't work, but we do not have much to offer in the way of further diagnosis. (The upcoming revisions of the research design should focus on such matters.)

The impact measures used in this study are conservative; that is, if anything, they understate benefits. In turn this leads us to be confident about labelling a program "effective," and to give marginal cases the benefit of the doubt. The conservative nature of the measures stems from the character of the evaluation itself, which necessarily stresses the more obvious possible benefits. Longer-run objectives built into the formal objectives of the donor's food programs--for example, the creation of healthier communities--are not addressed. Evaluation studies necessarily direct their attention to more short-run goals, and assume implicitly that success now is a good predictor of success later, which it probably is. The sensible thing to do is to use research to identify the exceptionally good programs, to locate the more obvious failures, and to give more ambivalent programs the chance to learn from the experience of the others.

TABLE 9
 PERCENT OF VARIATION IN NUTRITIONAL STATUS
 EXPLAINED IN THE ANALYSIS, BY PROGRAM EFFECTIVENESS

School		MCH	
La Union	18%	Neiva	14%
Kigumo	15	Misamis Oriental	17
Nakuru	30	Pereira	15
Eldama Ravine	23	Naga	22
Neiva	23	Nakuru	9
Naga	15	Ngong	17
Rivera	31	Cajica	4
Iloilo	11	Arabia	42
Cogua	10	Manila	19
Pereira	14	Kanzalu	32
Zipaquira	24	Iloilo	21
Kanzalu	12	Nyeri	7
Manila	23	Zipaquira	2
Misamis Oriental	22	La Union	6
Tala	46	Eldama Ravine	15
<hr/>		<hr/>	
Mean for all sites	21%	Mean for all sites	15%

Note: Numbers are the square of the multiple correlation between weight-for-age (both analyses) and a large package of background, economic, food, and intelligence measures. See text and Appendix A.

SOME OBSERVATIONS AND SUGGESTIONS

1. *Observations about the programs.* We have stated that school and MCH feeding programs can bring about beneficial changes for children, in the direction of furthering development goals in nutrition and education. We have also suggested that these programs are only occasionally successful. A few good programs convince us that child feeding can work, a claim which few development projects can support with hard data. The other cases tell us that more thought, effort, and resources need to be put into food programs, if child feeding is expected to be a significant vehicle for dealing with world malnutrition problems.

We have tried to pinpoint some of the factors which make some programs successful and others not so successful. The key to successful development programming is to find combinations of those critical factors that lead to positive results. This suggests that one model about how food programs ought to work is not enough. Programmers must deal with many different strategies, depending on the particular situation in a given locale, so as to best fit their program to whatever real-world mechanisms are present to encourage or inhibit nutritional and educational development.

This review does not suggest that these child feeding operations are any better than the alternative uses of the food in reaching development goals. Those alternatives have not been subjected to this kind of study. It is assumed that the few remaining purely charitable food programs in the third world will continue to receive support, as will the use of food commodities for payment in kind to people engaged in capital development projects--food for work.

We also point out that these child feeding programs are a product of the development thinking of the 1950's and 1960's; the picture for the years to come is far less assured than it was then. Child feeding programs have already suffered from scarce resources, as a result of overwhelming demands for the food in disaster relief operations, such as in the Sahel.

2. *Specific suggestions for improving school and MCH programs.* Some observations have come out of this study which suggest how program operators can begin to determine where the weak points in their programs are. For the school programs, these observations are:

- In general, school feeding must be more carefully targeted. The programs appear more effective in stable, poorer, rural areas. This is probably due to the fact that the school lunch may be a larger nutritional increment in these regions. The school program also may be a greater incentive in poor rural areas for increased attendance and performance. A strong structural effect can operate in school programs, so that a population of those on the borderline of their own development scale--the poorer people among those who are able to send children to school--are especially likely to benefit.
- Due to the incremental nature of school programs, they require a high number of feeding days and a very low level of interruptions to be effective.
- Hot lunches, with a variety of food and with inclusion of local commodities, seem to make effective meals for school programs. Some way must be found to see that food actually goes to those who will have the best chance of benefiting, and that all of the food given out is actually eaten; the advantage of the hot lunch may be that it can be reliably delivered to the targeted child.

In addition, the following may apply to both schools and MCH:

- The replacement-versus-supplement issue appears to be less of a problem than is generally assumed. It is best to think of the programs as partially replacement and partly supplementary in nature. The goal of the program then becomes to harness the resources freed by replacement, plus whatever else can be provided in a genuine supplement, to the improvement of the nutritional status of the target child.

For MCH programs:

- Effective MCH programs seem likely to be located in sites with a relatively high number of public health facilities, and overall per capita income above the level of the typical MCH recipient who lives in the country. It may be urban; in any event, it has the facilities to provide the program participants with the opportunity to use whatever knowledge they can obtain from the program.
- Since MCH programs appear more impervious to instability in the population (much more so than school programs), these operations are particularly well suited to refugee situations, and other places with high rates of immigration. MCH programs appear to be especially suited to the growing urban slums of the world.
- Ration size may be related to the effectiveness of the program, but food management is probably even more critical. The problem of diversion presented by the family feeding context of MCH programs require a better understanding of family eating patterns, to determine how benefits to the youngest children can be maximized. One method of more carefully directing MCH programs at the target child may be new methods of disbursement, such as more onsite meals, probably at the sake of increased costs.

- MCH programs can be improved by locating centers close to the participants; this improves the regularity of interaction with the program. It also appears that more frequent disbursement of smaller rations would improve the impact on the child's nutritional status, by avoiding the feast or famine nature of present disbursements (in which the food is consumed within a few days after visiting the MCH center). However, the frequency of disbursements would have to be weighed against the penalties in increased recipient travel which would have to be paid. A dry, once-a-month disbursement permits the mother a good deal more leeway in terms of the program's demands on her time.

Considering all the complexities of these programs, the basic findings are simple enough. Obviously either type of child feeding program can be badly managed, suffer problems with food shipments, and so on. But when effectiveness suffers and these factors do not seem to explain the problem, we suggest that for MCH the problem may be one of *inadequate* resources: the program is not enough to enable the recipients to improve their condition. In the case of schools, the problem is likely to be one of *wasted* resources: the ration, whether adequate or not, is not reaching those children who need it most.

This is not a surprising conclusion; it may seem especially obvious to those with long experience in the field. These programs suffer from inadequate resources at all levels; they are rather primitive by modern standards for the effective use of economic resources, because as yet the donor nations have not been as generous with funds for program support as they have with the food commodities themselves. A price has been paid for this. It has been assumed that if one gives a child more to eat, his nutritional status will improve. And so it will--maybe. So many important factors influence success at the site level, which is where we must look for a final judgment, that unless the operation fits well with other constraints, its chances for impact appear to be seriously impaired. If this reasoning makes sense, the best programs are likely to be those run by outstanding *local* people and more technical assistance in management and facilities. Our data seems to offer rough support to such a concept.

3. *Larger suggestions.* This review strongly suggests that the time has come to consider a significant increase in the support given to child feeding programs. Given the importance that local site factors play in achieving program effectiveness, we suggest that increased support be concentrated on better backing of local program managers, through better training and technical assistance, program reviews, and communication with the donors.

In a time when the critical issue in food programs is the food itself, the management of the food becomes a prime concern. Until the world awakens to the need for saner policies for producing and distributing its food, we should at least be able to effectively handle the limited resources now at our disposal. Management seems to be the key because so many of the issues uncovered here can be effectively resolved if only adequate administrative support is provided.

As the level of development declines, this support becomes more critical, since greater responsibility must fall on local people to interpret the unique conditions of their environment and their people so that a better fit can be made between the program intentions of the donors and the actual mechanisms in the field which bring about social change. A program can be made to be successful if its intended recipients really need it and if an effort can be made to understand the unique constraints imposed by sites. Some general guidelines for success can be given by the donors, but in the end the impact of child feeding is very dependent on the people who are the final link between the program and the recipient: the volunteers, school headmasters, Catholic priests and nuns, nurses, local officials and others who have operating authority over programs on a day-to-day basis. At this level, programs are subjected to the whims of pure chance: random variation around the means of individual character and common sense in the population of those people in the trenches, as it were, of the War on Hunger.

The people who actually run child feeding projects are not employees of the donor nations, excepting perhaps the occasional volunteer, and only rarely are they expatriates. Expatriates who have genuine skills are likely to be promoted to regional supervisors, and sometimes incentives to good performance are provided from above when really good people are in charge. Even at this

level, however, it is a very long way up the bureaucratic ladder before the official decision levels are encountered. The effect of these conditions is to remove those with real day-to-day responsibility from the reach of those in the donor agencies or elsewhere who may have useful advice to render. The problem with management of food programs is that it has so little help to offer to those on the firing line.

Training programs have been proposed for the people at the end of the line in child feeding. The general reaction has been to consider the number of potential trainees and throw up one's hands in despair. How can anyone afford to train an appreciable fraction of them? A legitimate point; we would counter that the requisite "appreciable fraction" is probably a small one. The role of training should be to identify the better fieldworkers as potential trainees, thereby making them more visible to the donor, the local people, and themselves; then reward these people with a chance to learn how to be more successful in their work, with the expectation that (a) they will be more likely to become supervisors who may enforce good practices and (b) they may tend to pass their training on. It is not the training as such which may be needed, but the creation of a larger cadre of good food program people who not only know their own local situations but also have some understanding of the broader aspects of the problems of malnutrition and food. Without such trained people, directives and advice about how to best achieve impact will accomplish very little, because there will be too few people with both the ability to recognize advice and the opportunity to act on it.

Consider next the question of evaluation. What is its role? Both the donor nations and the developing countries should consider the great difficulties that they have experienced to date in sizing up the real potential benefits of even something so concrete as a road. The benefits claimed by child feeding programs are not nearly so easily observed. One thing established quite clearly by this project is that it is not possible to make a valid appraisal of child feeding projects without the assistance of measurements, and those measurements cannot yield convincing results until they are examined along with a large number of other influential data. Studies like this one can generate predictors of better success in a probabilistic sense, that is, we can begin to make statements like "the chances of success are good for an MCH program in Dacca." But within

the class of those programs, some will be better than others, and within the class of (for example) school programs in Brazil there will be some good operations, even though our data leads us to expect that these would be relatively less common. The conclusions of the study stress these two levels of application: at the program policy level, rather broad generalizations may be possible which can provide workable guidelines for success, while at the level of a review of a specific individual project, judgment has to hinge on much more specific information.

Evaluation becomes important, therefore, because it can be used as a tool to provide intelligence to people with decision-making responsibilities up and down the line. This may be especially true if enough can be learned to make a reasonably rigorous review of programs without incurring very high costs, an ultimate objective of this research project. One of the present difficulties of these programs is that relatively little guidance is ever really given to most of the program operators. In Kenya, for example, Catholic Relief Services has enough staff to be able to try to visit each school once a year! To the extent that one could provide more and better guidance than this, impact might improve. There are almost no rewards for good performance; instead people have the sense that a program's actual value has almost no relation to its chances of surviving a round of cutbacks. To the extent that evaluation provides a way to identify the work of good people--and also to the extent that it provides a stick as well as a carrot in posing a threat against lazy or misdirected projects--then its value may be further enhanced.

Accordingly, a second piece of a proposed approach for improving the usefulness of food program resources use is more and better evaluation, including more frequent on-site program inspection. In this sense, evaluation is a data-gathering instrument which ought to be available to everyone in the system. To do otherwise will defeat our own purposes, which are to improve the quality of the performance of those people who are in a position to take action, and in most cases this means the lone program operator at the end of the line.

Other aspects of an improved system might be suggested at this juncture: decentralization of decisions at every level; a strong emphasis on increased collaboration; and the capability to accept a requirement for great flexibility

and diversity. One lesson of this study is that the global guidelines for these programs are not especially helpful in dealing with some of the critical decisions. For example, should milk really be used in Kenya? As the system is currently structured, this question becomes a debate between adversaries situated at great distances from one another. We would suggest instead that such questions might be better addressed by a hypothetical East African food program group which includes donor agency, voluntary agency, and host government personnel.

This calls for a third major requirement, a good management information system which is shared by all donors and recipients alike. Since there appear to be many different paths to success in operating a useful child feeding project, better communication is essential, particularly with people at the site level.

These suggestions--training, evaluation, and communication--have been explored before. The conclusions of this study suggest that they should be examined again. The programs can work if they are properly designed and run, probably producing more, not less, in the way of real benefits than one might have anticipated. If this is the case, it may be time to begin providing the support which the donors give to other major development efforts. To do less in a time of global food shortages would be grossly negligent.

Washington, D.C.
July 1974

CHILD FEEDING PROGRAMS IN DEVELOPING COUNTRIES:

**A Comparative Evaluation of Ongoing Programs
in Colombia, Kenya, and the Philippines**

ANNEX A

Richard Ellis
Diane Cleemput
Mark Cooper

Checchi and Company
Washington, D.C.

in collaboration with

Consultal, S.A., Bogota
The Institute of Philippine Culture, Manila
The Research Bureau (East Africa), Ltd., Nairobi

August 22, 1974

APPENDIX A: HOW THE STUDY WAS DONE

- Q. Which came first?
A. The chicken or the egg.

-Adhocist riddle¹

1. *Some premises.* This appendix is not the place for a discussion of the theory of research design (a topic which we do hope to treat in the detailed methodological volume forthcoming in this project). Insofar as our approach may be unconventional, however, a few underlying notions might best be made explicit here.

- Checchi, being a consulting organization, trades in judgment. Perhaps this accounts for our willingness to take a somewhat more serious view of our own impressions than may be characteristic of most social research groups, especially if these views can be made to square with more objective data. Our awareness of the importance of human judgment also leads us to recognize the influence that subjective tastes play in even the most quantitative research disciplines. For example, the great debates in modern physics are as much cosmological as they are strictly scientific and objective.

¹Charles Jencks and Nathan Silver, *Adhocism: The Case for Improvisation* (New York: Doubleday Anchor, 1972).

- The evaluation of programs designed to produce social benefits poses the most formidable research difficulties. Consider that the full-scale experiment is still the only way we know about to establish causality with any final assurance--and then only when one has the luck to ask the right question. This works well in disciplines like chemistry where one has some confidence that questions asked today will continue to be relevant tomorrow. But social, economic, and cultural realities, unlike the subjects of natural science, evolve with incredible swiftness.¹ This study illustrates the point well. Why did AID not sponsor a full-scale experiment as a way to assess feeding programs? Because it would be incredibly expensive and by the time it was completed the findings might well be of little more than historical value.
- An effective solution to these problems is becoming possible. In the case of any endeavor important enough to justify the investment, one can establish a regular data collection system--and with this in hand it is feasible to build a continuing experimental design into a general systems framework. This strategy may be likened to industrial process control, a continuous-flow monitoring system to keep within specified limits of tolerance. In principle this is the function of a census; we value wealth enough to have begun such systems in a more continuous fashion for the economy and for such critical matters as war and the worldwide outlook for energy.² As the cost

¹Compare the field of genetics, in which the fruit fly offers a means to speed the passage of generations. The whole problem in the social sciences is exactly polar: reality moves so fast that we must either slow it down (which is why so much socioeconomic research addresses very broad topics), or--alternatively--make as yet unheard of increases in the swiftness of the execution of research projects.

²Meadows' *The Limits of Growth* is a pioneering work in this regard.

decreases for such systems--they have only been made possible by the availability of the computer--we will begin to be able to adapt them to a wider variety of concerns.

- As in other disciplines, a recognition of our increasing potential to control ourselves and our environment leads to a recognition of some adverse potentials. For some time it has been obvious that we are acquiring a capability for genetic engineering. Capabilities for real social engineering also may be about to surface. Unless tempered with sense and good will, these capabilities could lead to the end of politics: that is, a degree of determination in daily life indistinguishable from totalitarianism. It is crucial to understand that facts do not speak for themselves; engineering will give us more precise facts, but people must continue to decide on interpretations and applications. Confidence in subjective judgments is, therefore, an absolute necessity. And so we come back to impressions and values.

This study is not value-free. If it were, it would be irresponsible. And it does not resist impressionistic data--to the contrary, we have insisted on agreement between the subjective and objective aspects of these materials. The goal of these methods becomes, then, not a search for the Holy Grail of final "truth" about child feeding programs--as if we could presume to succeed in such a quest. Rather we prefer a continuous iteration of a progressively refined model of reality, checked in each cycle against simple observations and informed opinion. The modelling approach is described below, but first some chronological notes.

2. *The background of the project.* In the Fall of 1971, the Agency for International Development asked Checchi to carry out a worldwide assessment of the commodity donation programs authorized under Title II of U.S. Public Law 480, the Food for Peace Act. An exercise in instant total immersion, the project took us to eight nations¹ and

¹Morocco, Ghana, the Philippines, Malaysia, Indonesia, Sri Lanka, Colombia, and the Dominican Republic.

plunged us into the murky waters of such topics as donated foods, voluntary agencies, and nutrition research. Within a few weeks after first learning about the project, we had departed for the field, with teams made up of both Checchi people and knowledgeable personnel from AID's Washington headquarters, to begin talking to program operators and administrators, ministry officials, school headmasters, and anyone else whose experience made them worth seeking out.

This review was completed in June 1972. The reader who wishes a thorough description of Title II from the perspective of AID is referred to that report (*Food for Peace: An Evaluation of PL 480 Title II*, Washington, D.C.: Checchi and Company, 1972). However, to establish the tenor of the findings we might quote briefly from the study's summary:

The overall conclusion...is that the PL 480 Title II program, as it now stands, is generally soundly conceived, well administered, and making a significant impact on the economic and human development of recipient countries. Recommended changes arise primarily from observations of missed opportunities or less than full utilization of the potential inherent in the program.

This favorable assessment was not lightly derived. Even in a project which was restricted to unstructured field work and a generally impressionistic methodology, many aspects of the program could be judged convincingly.

The major difficulty with the prior Checchi Title II review is that it did not provide a direct, objective, verifiable proof of program effects on health, school attendance, and other goals which are claimed to be served by these activities. Such a rigorous test, equivalent to the type of program evaluation long practiced in the United States for domestic health, welfare, and other endeavors, has been specifically reserved for a separate project. Up to this point actual program impact was taken on partial faith. That is, if programs were found to operate as planned--something which could indeed be established in a more impressionistic way--then the linkage between program existence and impact was made through application of clinical and other scholarly findings. It was well understood that those clinical results might not always hold up in the messy reality of actual field conditions. But verification of this portion of the problem was a large and complex effort in itself, and rather than add a more scientific assessment package to

other efforts, AID elected to conduct this part of its review separately, in a structured, quantitative evaluation of child feeding projects.

In the summer of 1972, AID's Office of Nutrition invited Checchi to prepare a detailed design for the research itself. The ensuing study plan was unorthodox in many ways. In some respects it was narrow because, as the authors of a prior related study, we thought that we could draw on our own existing experience and knowledge. In retrospect, this was an error. Our collaborators lacked this prior exposure and we did not allow sufficient time for adequate briefings on the programs, the policies of the donor agencies, and the practices of the voluntary agencies. In most other respects, the research plan was exceptionally broad. For the most part, this resulted from a determination on Checchi's part to avoid some of the weaknesses and loopholes associated with evaluation research in the past. To complicate matters AID had opted for, and Checchi agreed to, an approach in which host country researchers would carry out field studies but the Americans would have the main responsibility for overall analysis. All of this required a structured cross-national design; assurance that everyone would do their utmost to stick to schedules; considerable willingness to subordinate local interests and some very genuine research talents to the demands of an international endeavor; and in general the acceptance of what William Glaser has called "centralized" research,¹ which to foreign nationals might be less politely and more accurately called paternalism or even imperialism.

The single massive problem which this study had to resolve, then, was the need to carry out a "centralized" project--necessitated by budget, deadline, and other logistic reasons--while at the same time providing enough genuine encouragement to foreign colleagues to assure that they would be willing to put forth the efforts required to execute the work. A number of the more peculiar characteristics of the design can be traced to our attempts to face up to this problem. The research plan itself was written with the foreign researcher in mind, as well as for the use of

¹"The Process of Cross-National Survey Research," second draft of a chapter for a book of papers from the Round Table Conference on Cross-National Survey Research, sponsored by the International Social Science Council, Budapest, 1972. Available from the author at the Bureau of Applied Social Research, Columbia University, this paper is an excellent and telling analysis of some of the factors which influence multinational studies. Our own experience verifies the wisdom of much of Glaser's text and may suggest some solutions to some of the problems which he identifies.

AID in Washington. The design was extremely detailed and seemed to permit almost no leeway for the host country colleagues. It took this form because we wanted to use the limited resources available for foreign subcontracts to add to the substantive merit of the study, rather than to develop other methodological approaches. In retrospect this approach has worked very well, but only at the sacrifice of opportunities for our foreign colleagues (see below).

The original design was ridiculously optimistic in its scheduling; we proposed that the whole project be carried off in nine months! Luckily we were never to be held to these estimates. Costs were also underestimated, especially the cost of doing business with good researchers overseas; inflation has hit them just as it has affected the rest of us.

In early June, 1973, Checchi signed a contract to execute the study. Total funding was about \$179,000, later increased to over \$190,000 to cover further unanticipated costs of the non-American collaborators. At this writing, AID has provided an additional \$115,000 for site studies in a fourth nation and some further refinement of the existing analyses. We also will produce a greatly revised version of the research design, to provide diagnostic information for the redesign of country programs.

By the end of July, 1973, all three in-country collaborating research organizations had been selected. This selection was made competitively (except in Kenya, where all informants agreed that RBL was the only reasonable choice). It is intriguing to compare the three organizations. In Colombia, we worked with an economic consulting and market analysis firm. In the Philippines a university-based social research center emerged on top after a very close competition. In Kenya we were dealing with a branch of a British marketing research group, one of the largest in the world.

As noted above, the decision to centralize the analysis did indeed cause problems. We were only able to pay our collaborators for working papers and raw data, plus some limited analysis at the site level. As good researchers, our collaborators could have continued the analysis, but were precluded from this by the nature of the project's time frame and budget, which called for a centralized Washington-based study. In retrospect, at this juncture, we think a centralized analysis for a project of this kind is the only sensible approach--for cost reasons if no others. However, all parties should participate in this analysis, by bringing them physically together in one location.

This is an appropriate point at which to express our respect and admiration for the non-American collaborators in this project. The country field studies were very demanding. Many of our U.S. colleagues believed that no foreign organization would be able to complete these assignments on time. All of our collaborators delivered. It was evident that this outcome was largely due to the willingness of key people to commit themselves without reservation, to deal honestly with their American colleagues, and to work very hard.

We will also note that many people predicted that the use of such a detailed and explicit design would lead to a lack of enthusiasm and originality, but this was not the case at all. Each collaborator had strengths and a special perspective not possessed by the others, and each has put its stamp on its own work and on this study generally. To draw an analogy, a research design need not be more restrictive than an architectural framework; the detailing and style are matters of taste and judgment, and there are lots of legitimate paths to an esthetically satisfying and functional product.

By early January, 1974, just six months after beginning the field work, data began to flow in to Washington. By March, the computer systems for the study were operating. Because preliminary steps had been completed by the collaborators, we were able to jump immediately into the simultaneous analysis, using correlations and multiple regressions, of around 20 separate, potentially critical variables in each of 30 program sites, as well as a variety of aggregated country-level and global studies. To conduct such an analysis with the older and more familiar cross-tabulation methods would have taken ten times the number of cases and many, many months of professional time.

3. *The technical approach and its rationale.* The methods used for this project involve a blurring of the traditional separation of theory and empirical study. A full discussion of their rationale would require excursions into such topics as the philosophy of science, the sociology of work in applied social research, and the theory and practice of experimental design and statistical analysis. Perhaps the greatest departure is reliance on many kinds of data and a wholistic view of social phenomena in its natural setting, rather than detailed examination through extremely

pointed inquiry into some particular aspects of a system. The practical effect of this approach is to call into question any conclusion which seems at variance with the analyst's own perceptions of observed reality. Rather than invent torturous rationales for conflict between empirical results and more impressionistic judgments, we prefer to treat all such conflicts as signs that the thinking which led to them, either impressionistic thinking or statistic thinking or both, needs to be improved.

One way to illustrate the difference between this approach and the alternatives is to outline the steps each requires. Differences in terminology here are more than semantic distinctions. A more traditional experimental study design would isolate key hypotheses for testing. Each of these would be a distinct proposition. The aim of the work would be to develop a believable and reliable statement about each such proposition. There would be less formal provision for comparing these kinds of separate conclusions with one another, or with other kinds of information on the nature of the systems in which they appear.

In contrast, the present approach begins by defining a model of what the phenomena to be studied ought to look like, in its total context. The resulting statement (which takes the form of a systems diagram like those presented in Diagram 3, Section IV) will include many propositions, implicitly as well as explicitly. Our concern is not so much with any one of these (although obviously the same key hypotheses will tend to emerge), but rather with the overall sensibility of the model when empirical data is introduced as a test of its realism and accuracy. The aim of the work is to develop a believable and reliable characterization of the phenomena in general. There is less formal provision for individual tests of particular pieces of the system. Such tests are not ignored, but they tend to be built into the overall analysis and to take the form of measures of agreement between our impressionistic and our empirical perspectives, rather than the form of individual "truth tables," to use the formal terminology of symbolic logic to describe traditional hypothesis-testing ways of thinking.

The technical procedure used in this strategy is sociological path analysis. This in turn is an application of multiple regression, and many readers will be aware that great care must be taken by researchers to be fully aware of the demanding mathematical assumptions of this type of approach--assumptions which cannot be clearly

established in most sociological inquiries. For example, we are aware that many of the phenomena examined in this study--e.g., the relationship between presence in a food program and the nutritional status of recipients--may not clearly meet the linear assumptions of conventional correlation-based analysis. Our response to this problem would take note of the following points:

- First, a large and very fruitful literature is now emerging which accepts the same limitations and yet still seems to generate results worthy of one's attention.¹
- Second, the most likely effect of applying linear methods to phenomena which may not actually meet all of the formal assumptions of such methods is the probable loss of precision and the understating of the strength of relationships. Since we are conducting a simultaneous analysis of many relationships at once, it becomes unlikely in the probabilistic sense that all of them will be so systematically distorted as to yield a misleading impression of the system as a whole.
- Third, one can begin to inquire into the actual extent of non-linearity in the relationships under examination, building this into the overall analysis itself; in this sense the linearity problem is simply one of a whole host of conceptual and practical pitfalls which include nonstatistical as well as statistical problems. We prefer to be judged in this exercise on the total sensibility of our conclusions, and these do not depend solely on any single set of methodological procedures.

¹See, for example, the critical essay by George W. Bohrnstedt and T. Michael Carter, "Robustness in Regression Analysis," in Herbert L. Costner, ed., *Sociological Methodology 1971* (San Francisco: Jossey-Bass, 1971).

4. *Some key variables and how they were measured.* With the above caveats in mind, we will briefly describe how the path analysis was done, and how some derivative analytic approaches were surfaced during this work. It is first necessary to acquire some feeling for the actual measures which were used.

Assessing the effects of feeding programs on children's health required the use of a reliable and objective index of current nutritional status. It is generally recognized that height and weight are among the most important indices of nutritional status.¹ These traits are also practical for application in the field, since height and weight measurements can be carried out readily with minimal equipment and training. All children in this study had height and weight measurements taken by field teams, using standardized instruments and procedures. In addition to height and weight measurements, past illness histories were recorded for each child, and subjective assessments of health were made by mothers, teachers, and interviewers.

To permit a comparison of nutritional status among children of differing ages and sex, heights and weights were converted to percents of standard height-for-age, weight-for-age, and weight-for-height.² These percents of standard are derived from two data sources:

- For birth through age 66 months, the Stuart-Meredith (Harvard) Standards.
- For ages greater than 66 months, the U.S. National Health Examination Survey, Cycles II and III.

¹See, for example, International Union of Nutritionists Ad Hoc Working Group, "Evaluation of Child Feeding Programs" (School of Public Health, UCLA: April 1972), p. 6; and U.S. Public Health Service, *Screening Children for Nutritional Status: Suggestions for Child Health Programs* (Washington: U.S. Government Printing Office, 1971), p. 3.

²A subroutine for the computer generation of these percents of standard, based on these two data sources, was developed by the Center for Disease Control, and obtained for use in this study. The routine also generates percentile scores. CDC's work here was invaluable for us and is presently being further refined; its major use will be for fast-response diagnosis of disaster relief operations.

These external standards are used as a benchmark for comparing similar groups (feeding and non-feeding) within countries, rather than as a universal norm for good health. However, this does not preclude a judicious use of the data for international comparisons.

Weight-for-age is the most common measure for nutritional assessments, but requires that precise ages be known. For the MCH analysis, this was generally feasible (because most of the programs keep careful track of age so that weight charts can be utilized). But age for school children was much less easy to ascertain. This was a particular problem in Kenya, less so in Colombia, and almost no problem in the Philippines. To choose the most appropriate measure, we also were influenced by the definition provided by Waterlow: "weight-for-height is an index of *current* nutritional status; height-for-age gives a picture of *past* nutritional history."¹ For the school study, we must look at current health; feeding programs would not be expected to have had a significant impact on past health of school-age children (those in this study average less than one year of exposure to programmed feeding). Thus for these reasons, weight-for-height was judged the most reliable measure of current health for school children. Weight-for-height is a measure of body proportions, independent of age, and according to Waterlow, "should be relatively independent of genetic differences in absolute body size."²

Measures of nutrition knowledge and habits were made separately, to determine the effects of feeding programs on (1) what people know about nutrition and (2) what they actually practice with respect to nutrition. We had no knowledge of any reliable and practical measures of nutrition knowledge from previous studies, so a set of *ad hoc* questions was devised and pre-tested. In the case of mothers, we asked a series of five questions about whether or not they thought specific foods were good for their children's health. In the case of school children, we asked a series of six questions on whether or not they thought specific foods are good for their own health. In each case, "correct" responses were added up to form a scale for high to low nutrition knowledge. The types of foods used in the questions were country-specific and were determined by our foreign colleagues, using

¹J. C. Waterlow, "Classification and Definition of Protein-Calorie Malnutrition," *British Medical Journal* (September 2, 1972), p. 567.

²*Ibid.*, p. 567.

the guideline that the foods should be reasonably available and not very costly throughout the country.

In measuring nutrition habits, a similar scale was devised; here respondents were asked if they had eaten (in the case of school children) or prepared (in the case of mothers) specific foods within a recent period of time. Mothers were also asked the frequency of preparation and reasons for not preparing each food item.

Twenty-four hour recall of foods consumed (in the case of school children) or prepared (in the case of mothers) was also asked, in order to obtain an additional measure of nutrition habits. In each case, respondents were asked to name the types and amounts of food consumed or prepared during the previous 24-hour period. These responses were then coded by local nutritionists in each country, on a scale from excellent to starvation level, using the artificial assumption that the particular recall was typical for all food consumed over time by the respondent. This would be obviously weak for individual diagnosis, but worked quite well as a way to make group comparisons.

For school attendance, an approach to measurement was developed at the outset of this study which encompassed initial enrollment, dropping out, and daily attendance. Of the three, daily attendance provided the most reliable information, while enrollment and dropout data was difficult, and in some places impossible, to obtain.

Daily attendance was measured in two ways. First, data was obtained from teachers' records for the number of days individual students were present at school for the one-month period prior to the survey, as a percentage of the total number of days school was in session during the same period. This provided a measure of each child's current propensity to attend school. Reasons for absences, and distances to school, as reported by children and their mothers, were also recorded. Second, school principals were asked to provide records for the past six years of average annual school attendance and enrollment, by grade levels. This provided a measure of propensity to attend school for each cohort (grade) over a six-year period. Principals and teachers were also asked to comment on trends in attendance over the years, in an absolute sense and in relation to their feeding programs.

Measurement of enrollment effects demanded the gathering of data on *potential* enrollments, so that these could be related to *actual* enrollments. In all three countries, data on potential enrollments was nearly impossible to obtain. Problems of defining school "districts," estimating school-age populations, estimating school capacities, and knowing enrollments of other schools within the same geographic area, presented very serious obstacles to obtaining precise, objective information. Concepts such as "school capacity" and "school districts" can only be used loosely in Kenya, Colombia, and the Philippines, where children may sit on benches in the schools or out-of-doors on the ground, and where distance to school or the cost of fees are the main criteria for enrolling in a particular school rather than the district where a family resides.

Comments by school principals and teachers also shed some light on the enrollment issue, and provided some sense of whether or not food programs might affect the drawing power of schools.

The final major dependent variable was school performance. We had expected to measure this through the use of the Raven Progressive Matrices,¹ a test which is nonverbal in content and which can be administered in many different languages. Given without time limits, the Raven tests are considered by specialists in the field of psychological testing and measurement to yield a workable index to IQ; with time limits the test becomes more heavily loaded with scholastic performance factors. In all three countries, our local research collaborators felt that the unlimited time administration of the test would better assure their ability to use the test with young children. As a result, the grades awarded each child by the teachers have been used as the performance outcome measure, with Raven-derived IQ as a control. This is a clear improvement on the original design and one of many such improvements made with the help of our collaborators.

To measure our key intervening variable--exposure to food programs--a variety of approaches were used. For the school study, the number of days each child ate the school food for the one-month period prior to the survey

¹For more information, see J. C. Raven, *Guide to Using Coloured Progressive Matrices* (London: H. K. Lewis and Co., Ltd.) 1965.

was used, as well as the number of years that the grade three half of the sample had eaten school food. For MCH, the number of months mothers had been going to the MCH program was used, when comparing only current MCH respondents. When comparisons were made with control groups, simple presence or non-presence in the programs was used. In refining this methodology, we expect to develop a more sensitive MCH exposure measure by combining use of the number of months of mothers' net MCH exposure, ages of children, and, for former enrollees, the number of months since the last MCH visit.

Most remaining control variables are self-explanatory. The household possessions scale is of some interest. Included as an attempt to get a measure of socioeconomic status among people whose cash income might or might not reflect their real wealth, the scale included material things like simple cookstoves, bicycles, timepieces, beds, etc. It appears to have worked well, which is extremely fortunate in view of the importance of the differences in relative well-being of recipients for the issues posed in this study. The possessions scale turns out to be an excellent predictor of the nutritional habits of many mothers, which raises intriguing questions about such possibilities as the contribution of some of the specific items on the scale--especially the stoves--to nutrition-related behavior. This will be more fully explored in the coming months.

6. *The path analysis.* The old saw has it that a picture is worth 10,000 words. Let us assemble an analytic picture of a school feeding program. The model is, again, Diagram 3. The first step is to see what will affect IQ. (Strictly speaking, this need not be done for the evaluation but the opportunity to compare our sites with patterns well established in the educational and sociological literature for developed nations is irresistible. In one sense, the school analysis for this project is simply a nutritionally detailed version of the classical approach to the study of factors affecting educational performance.) Again, La Union will be the focus; our example is from the fed-nonfed analysis, that is, control school children are included.

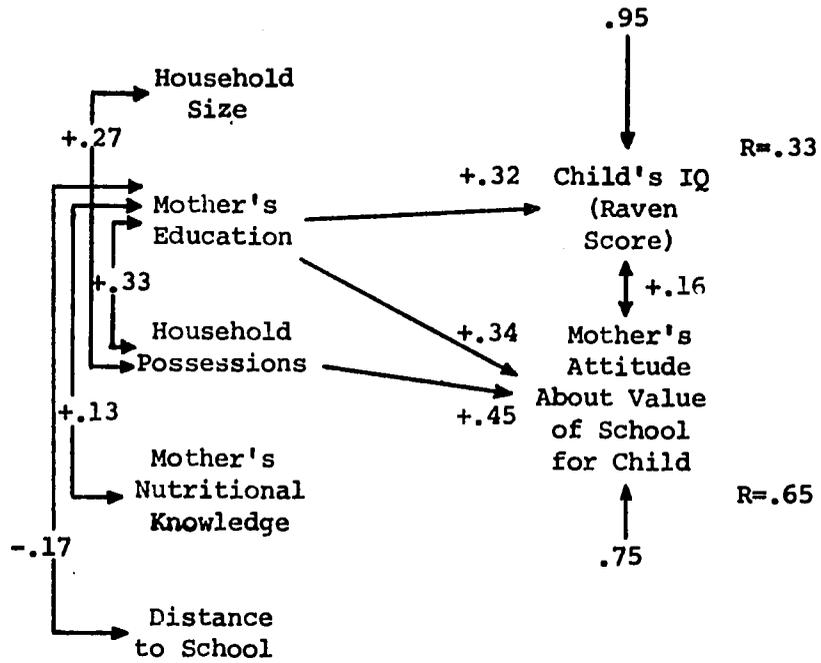
Our initial package of predictor variables, as specified in Diagram 3, must include the education of the mother; the distance the child must go to get to school (which is placed here as a convenience--the interpretation will be ambiguous, as noted below) the number of people in the household; household possessions; and the mother's food knowledge. All of these items show considerable variation *within* the population of La Union respondents, with the exception of food knowledge, which tends to be rather good across the board (some variation does exist; our measure is simply not very demanding).

The relationships among these items are depicted in Diagram A-1. The curved lines represent simple correlations; the straight lines show the standard beta weights from the multiple regression of all preceding items on a variable, and therefore show *net effects which allow for the influence of other predictors*. Only the more significant relationships are shown. Thus from Diagram A-1 we learn that:

- Larger households are better off economically in La Union (an interesting illustration of the effect of having many breadwinners, a topic of some interest in population studies). Mothers in the wealthier households are very likely to be better educated, which is what we would expect.
- There is a slight relationship between education and nutritional knowledge--but clearly most of the variance in the latter is due to other things, which could include the knowledge passed down from generation to generation in the home, whether formal schooling occurred or not. Also, there is a slight tendency for the better educated mothers to live closer to the school.
- Of all of these, only the mother's education has much to do with the child's Raven score, and this is probably a reflection of genetic inheritance to at least some extent.
- Adding in another variable of interest, we also looked at how much schooling these mothers thought would be good for their

DIAGRAM A-1

LA UNION SCHOOL PATH ANALYSIS, STAGE I



children to get. The Philippine respect for education shows up in strong positive relationships for both the mother's education and the family possessions. There is also a relationship with the brightness of the child but this is largely a reflection of the other influences on both IQ and respect for schooling.

- This system of predictors is able to account for about ten percent of the total variation in IQ among the La Union children¹ (which is about what one might expect). The unlabeled path measures the combined effect of everything *not* taken into account--the father's genes, errors, etc. The ability to predict encouragement of education is considerably stronger--here the system can account for 43 percent of the variation among these families. The pattern is very clear and shows the well-known propensity for any advantaged group to act to preserve its status.

From this point onward the analysis proceeds by adding in each new variable in the causal order specified by the model.² The complete 11-step result is shown in Diagram A-2. The deviations between the original model and actuality in La Union now become quite clear. (Some minor discrepancies between this model and the narrative in Section I are due to the suppression here of some of the more marginal paths, for the sake of clarity in this already complex diagram.) For one thing, larger household size, which the model predicted to be counterproductive on the grounds that limited resources would be shared by more people, does not seem to make much difference. Distance to school is very strongly related to program participation--understandably because this is what the program is designed to do, and thus our causal specification in the original model is inapplicable; distance should follow program participation in the La Union case, not precede it. Some other interactions which the data has uncovered defy simple explanations. For example, these data suggest that the brighter child is a little

¹ Calculated by taking the square of the multiple R ($.33 \times .33 = .11$).

² For convenience (to avoid having to deal with recursive systems, which make much greater mathematical demands) the IQ of the child is taken to precede the value of schooling from the mother's perspective.

less likely than most to participate in the program; he is also a little less likely to have good food knowledge. Although there is no direct relationship between program participation and the child's food knowledge (not depicted on Diagram A-2, the linkage has an insignificant value) this pattern suggests that there may be some *indirect* effect of participation.

This analysis not only suggests what the program effects might be; it also relates those effects to the comparative importance of other variables. The only factor to have a major effect on school performance is IQ. For attendance, the household possessions are the most important predictor--the children from the better-off homes attend the most--and the next most potent predictor is nutritional status, which in turn is influenced by the food program. The 24-hour recall data is also definitely affected by the program--participants eat better food.

Many other patterns here lead to the findings reported in the text. For example, food knowledge is related to habits for both mothers and children, and while there is no mother-child link at the food knowledge level (in a girls-only analysis it might be a different story), there is a mother-child link at the habits level.

The two paths leading away from the program are the crucial ones for the evaluation. The values here are the same numbers shown before in Table 1; thus this analysis described above leads directly to the final assessments discussed in Section II for fed versus nonfed children.

7. *Do-it-yourself analysis.* Given the above information on the derivation of the principal statistical measures used for the study, we can describe how the reader can recreate the comparative assessment. The procedure is as follows, using the data in Tables 1 and 2 on pages 30 and 46 of the text of the study. First, insignificant associations should be identified, so that our inferences are limited to cases where the results are trustworthy. We have used a limitation of plus or minus .10 to define associations which are regarded as essentially the same as zero. In both tables, then, the first step is to cross off all the associations between +.10 and -.10. One exception should be noted now, for the Kanzalu MCH program's effect on nutritional status in the more-versus-less-food analysis. This is the sole instance where

sticking rigidly to our significance formula can cause a shift in the final categorization, and as noted in the text, we decided to give this operation the benefit of the doubt.

Next, all remaining negative associations can be crossed out; as one proceeds, the clearly ineffective program-and-goal combinations can be identified. At this juncture the reader's table should agree with our own reported classification. Clearly effective efforts will have positive associations left for both analyses. Probably effective efforts would have such associations for one of the two approaches; ineffective ones will have such associations in neither. As a check, the reader can see if the following results obtain for the secondary objectives of the programs:

- For school performance, there are no clearly effective programs; La Union, Nakuru, Eldama, Neiva, Iloilo, Cogua, Pereira, and Kanzalu all look as if they are probably effective.
- For the school children's food habits, Eldama and Neiva look clearly effective, and La Union, Kigumo, Naga, Rivera, Manila, and Tala are probably effective.
- For food habits of MCH mothers, Pereira, Manila, Kanzalu, and Nyeri seem clearly effective; in addition, Misamis, Naga, Nakuru, Cajica and Iloilo are probably effective.

It should be kept in mind that these secondary measures were not used to derive the final evaluation categories, on the grounds that these data are less central to the evaluation issues and somewhat more subjective than the information on nutritional status and attendance. And again we want to stress the nature of the classification that is being made. We are interested in a scheme which will reliably locate the extreme programs; we do not wish to make invidious comparisons among marginal cases. Accordingly, the way to minimize error is to adapt reasonably demanding standards for the top group, and give the benefit of the doubt to all remaining uncertain cases.

Further do-it-yourself analysis is possible with Tables 3-7. Here decision rules are somewhat less structured; in general we have proceeded by comparing the average results for each class of programs (e.g., a comparison of the average percent of school populations fed for the effective, probably effective, and ineffective groups: 38, 69, and 92.6 percent respectively. Even with only 15 cases we would regard such a distribution as quite unlikely to result from chance). Other judgments from Tables 3-7 are more tenuous because the distributions are more ambiguous, and in those cases we attempt to be appropriately conservative in the text.

8. *Some notes on further work in progress.* The project has led to a number of other analytical experiments, a few of which might be briefly described here. The one of greatest potential interest might be called stagewise regression or multiple partial correlation. This is somewhat simpler than either the name or the mathematics involved might lead one to expect. We can detail this here, and provide some sense of the materials to come in the methodological report for this study; other current work will be treated more cursorily.

There are a series of variables which, although not unimportant, do tend to obscure the effects of the feeding programs themselves, for two reasons: the variables are so complex that they tend to be uninterpretable, and they are completely beyond the power of the feeding program to control, that is, they form the context in which the program operates. These factors include cultural differences (e.g., values, beliefs, attitudes) and site features (e.g., availability of doctors, potable water, sewers, and so on). A third set of site differences exists and is difficult to separate from these more general matters: variations on a site-by-site level in the efficiency and sensibility of management, types of foods used, etc. Although these factors could have very marked effects on program impact, they do not tend to show up in this study. We suspect that strong management is more or less randomly distributed with respect to other program characteristics. This, if true, would constitute empirical evidence for our conclusion that these programs are weak on the management and administrative side.

All of the above factors can be taken out of the analysis (that is, their potential confounding influence on our conclusions can be eliminated) by adopting the following procedures. First, an average is calculated for the nutritional status (or other variable of interest) of all individuals in one of the sites. Any deviation from this mean is defined to be attributable to something other than site-level factors. Thus a conversion to deviation scores should yield a measure of effects free from site-level influences, affected instead by those characteristics which are idiosyncratic to individuals--one of which is participation in the program, while other key remaining factors include possessions, the education of mothers, and so on. In effect, an analysis of variance model is introduced in which we concentrate on the within-group variation, ignoring between-group (site) distinctions.

For the actual application, we were interested in removing the effect of site differences from the rest of the analysis. Each specific site was coded as a "dummy" variable, that is, everybody living there was scored with a one and everybody else was scored zero. The global-level regression of these dummy variables on nutritional status (leaving out one of the 15 sites in order to avoid the complete determination of the equations) yields a measure of the influence of all of the differences on this outcome traceable to variations among the sites themselves. The same measure can be used as a weight to adjust nutritional status data, by calculating a predicted score for the site--the average which becomes our site-level benchmark--and subtracting this from the original information on nutritional status for each person. Conceptually, we are attempting to derive the scores we would have gotten if no site distinctions had existed.

A series of equations can describe this process:

$$(1) Y_p = C + b_1s_1 + b_2s_2 + b_3s_3 + b_4s_4 + b_5s_5 + b_6s_6 +$$

$$b_7s_7 + b_8s_8 + b_9s_9 + b_{10}s_{10} + b_{11}s_{11} + b_{12}s_{12} +$$

$$b_{13}s_{13} + b_{14}s_{14}$$

$$(2) Y_r = Y_a - Y_p$$

107

...when Y_p is the predicted score for nutritional status when only site differences are taken into account, C is a constant, b 's are beta weights, s 's are site dummy variables, Y_a is the original estimate for nutritional status for a respondent, and Y_r is the new corrected residual estimate. The excluded site becomes the benchmark against which all other sites are compared; that is, the mean nutritional status for that site becomes the constant C in the equation, while the mean for other sites becomes C plus some deviation from this value, defined as the b_1 for that site. In actual use all sites in equation (1) drop out except the one in which the case actually falls (since for all others the case has been coded zero). What we have here, then, is a way of treating the effects of living in a particular place.

The use of this in the analysis was noted on page 39 of the text, where it effectively eliminated the sole global-level finding of the study; we learned, in other words, that the propensity for feeding programs to have an impact on school attendance on an international level is an artifact of the site level variations in the data. The interim results of the procedure were also useful. As a part of generating the adjusted scores, we found that we had created a workable way of measuring site and country differences. Here, for example, are the correlations generated by the computer between these site dummy variables and weight-for-height of school children:

Cogua	+ .25	Kigumo	Zero, by definition
Zipaquira	+ .13	Misamis Oriental	- .06
Rivera	+ .10	Tala	- .07
Eldama Ravine	+ .05	Iloilo	- .08
Neiva	+ .04	Naga	- .09
Pereira	+ .03	La Union	- .09
Nakuru	+ .03	Kanzalu	- .10
		Manila	- .13

The ordering is especially interesting because country differences are so apparent. Five of the top six sites are Colombian, five of the bottom seven sites are Philippine (which led us to note in the text that the Philippine school children show up worst, by and larger, on nutritional status measures in the study).

There are a large number of other issues which will demand treatment in any really adequate methodological report for this study. A full analysis of all the individual paths in each of the 30 case studies has yet to be done, and this work is likely to change some of the details of this analysis (but not, we think the general conclusions). Indirect effects of the program have not been adequately explored here. They are negligible for the most part, but in Eldama Ravine and Nakuru substantial indirect effects of the food program are indeed present on academic performance, and in La Union the same is true for attendance.

The 11 sites common to both MCH and school operations were subjected to a factor analysis to see what clusters of variables might emerge. To the extent that a distinct ordering would turn up, one would have further clues about what the keys might be to achieving some effects on nutritional status. For MCH this analysis identifies two clusters of sites, one quite heterogeneous and without much in the way of unifying characteristics. The second cluster includes only two sites, Misamis Oriental and Iloilo, both in the Philippines and both among the most undeveloped locales in the study. In the case of the schools, the picture becomes even more diverse; there are four clusters, two strictly within-country and two cutting across countries. Here Kenya joins the Philippines as a place where conditions may be unique enough to generate a country-specific cluster. With only 15 cases such results could occur by chance; what is clear is that there is a tremendous diversity of programming situations, not just from one country to the next but within nations as well. The factor analysis suggests strongly that no single model or conceptual approach to feeding programs will make really good sense in many different sites. Further work along these lines can be done as the data base is expanded through additional country studies.

We expect to publish as part of this project a comprehensive set of tables of first-order correlations for these data, at the site, country, international, and partial (site-corrected) levels. This will permit any reader to conduct their own regression analysis of these data without further recourse to the original materials. A fully cleaned SPSS tape for the study data is also available, and with this the data can be tapped inexpensively through any time-sharing terminal with access to the right hardware and software.

This is an unusual evaluation report in that we have been able to show positive effects from the programs. Most reviews of publicly sponsored benefit programs have been depressingly negative. To some extent, such results may be traceable to inadequate methods--especially to methods which fail to place programs in some realistic context of expectations about what they were supposed to be able to accomplish. Two major influences on our methods deserve special mention. First, we have been strongly persuaded by the literature on evaluation research--especially by the writings of Carol Weiss of Columbia University--that most evaluations are not relevant enough to the needs of policy people. Second, experience we have gained with AID has confirmed the striking sensibility of that organization's approach to evaluation, which stresses management and the removal of threats so that people in the field actually make use of any insights that reviewers are able to turn up.

To our knowledge, there have not been many prior opportunities to carry out quite this sort of study--cross-national in scope, with access to a large amount of reliable data, quite applied and policy-oriented yet also of great interest theoretically, with all of the built-in advantages which can accrue from a sensible use of the tools developed in recent years by social scientists like Otis Dudley Duncan and Hubert Blalock--to name two of the principal contributors to path analysis. On top of all this we had the further advantages of having done intensive, recent studies of food programs--the PL 480 project--and of collaborators whose enthusiasm for the project matched our own and sponsorship which was intelligent and supportive.

The present report does not, we hope, much resemble most studies of this sort. As was observed in the opening section, we have written on the assumption that most readers of this document will be concerned with our methods only to the extent that such details provide a basis for confidence in the work as a whole. Thus there are few tables, and discussion has tended to be assertive, rather than descriptive and passive in the policy sense. Extensive statistical presentations are often a characteristic of evaluation studies; this one lacks them, both because of the parsimony of the methodology employed and because we judge that most readers would prefer to concentrate on the conclusions of the project, leaving detailed assessments of the credibility of the study to their more technically inclined colleagues. Even so, this report does

contain most of the key data needed for an analyst to form some judgment about our procedures, and a great deal more of this sort of information will be forthcoming. During the coming year we will prepare a methodological report on this project which will encompass the existing approach and also a number of additional research opportunities which we did not recognize two years ago. In the meantime, this brief statement has been intended to help the curious reader to grasp the rationale of this strategy of work, so that the chances may be enhanced for careful examination and judicious criticism of these procedures.

APPENDIX B. THE STUDY SITES

1. *The site selection.* The research was carried out simultaneously in three countries--Colombia, Philippines, and Kenya.

Field work began in September, 1973 in Colombia and the Philippines, and in October, 1973 in Kenya. It was completed by December of the same year. In Colombia and Kenya the school year was nearing its end, and in the Philippines it was midway. The drought in East Africa had not yet reached serious proportions in Kenya; it was harvest time and typhoon season in the Philippines; no major health or food crises affected the three countries during the period of research. Nevertheless, the timing of the study was far from ideal--world food shortages threatened to make the study moot in areas where food deliveries to schools and MCH centers had been interrupted or stopped altogether. This made the work of site selection considerably more difficult.

The choice of countries was made by the study sponsors, primarily on the basis of the size and quality of child feeding efforts. Other important considerations included interest on the part of host country governments and survey research capability within the country.

Five MCH and five school communities were selected for study within each country. Quality of school and pre-school feeding programs was the major criteria for selection. Only the fairly good programs, as determined by sponsoring agencies, AID mission staff, and the researchers, were to be selected for study. Suggestions for specific schools and MCH centers to be studied were obtained from sponsoring agencies in each country, and visits were made by the researchers to each recommended food center prior to commencement of field work, to ensure that food was indeed reaching the children to be studied. Even at this early stage the shaky understanding of program managers, of their own operations, was clear; they do not really have the resources to keep us with all of their programs, and some potential locations had to be rejected.

In addition to quality of food programs, other factors affected site selection. For field team logistics purposes, it was desirable to select communities which had both school feeding and MCH feeding within the same community. Adequate control schools and MCH control areas were needed. As much diversification as possible was sought in basic demographic and geographic characteristics between sites, including variation among tribes and urban/rural populations, dry and fertile areas, and so forth. Freedom from community health crises, such as epidemic and drought was considered. Adequate record-keeping in the schools and MCH centers was desirable. These conditions, coupled with the requirement for good quality feeding operations, necessitated careful on-site scrutiny of each potential study area prior to the start-up of field interviewing.

2. *Site descriptions.* Based on the criteria previously discussed, final site selections were as follows for each country:

	<u>MCH Center Studied</u>	<u>School Studied</u>
Colombia:	Zipaquira	Zipaquira
	Arabia	Cogua
	Neiva	Neiva
	Cajica	Rivera
	Pereira	Pereira
Philippines:	La Union	La Union
	Manila	Manila
	Naga	Naga
	Iloilo	Iloilo
	Misamis Oriental	Misamis Oriental
Kenya:	Ngong	Tala
	Kanzalu	Kanzalu
	Nakuru	Nakuru
	Nyeri	Kigumo
	Eldama Ravine	Eldama Ravine

The pages which follow contain descriptions of each of these sites and characteristics of feeding programs. These descriptions are drawn from site baseline data, field team diaries, school principal and MCH administrator interviews, and reports of the collaborating research organizations in each country. Key demographic characteristics of each site and characteristics of each feeding program are summarized in tables at the end of site descriptions for each country.

COLOMBIA

Zipaquira (Colombia)

The city of Zipaquira is located about forty miles north of the capital city of Bogota in the Department of Cundinamarca. Population is estimated at about 30,000 with two-thirds of its labor force employed in industry.

The Mariscal Sucre School, located in the Los Cuches section of Zipaquira, was selected as the program school for study. It operates in a large one-story brick building. The school enrolls 167 students in five elementary grades.

The feeding program, begun in February 1970, is operated every school day for 30 weeks during the year. All children may participate in the CARITAS-sponsored morning snack program, called "La Colada," which consists of one cup of coffee (with milk) and one roll of bread, if they can pay the US\$.01 per month charged for the food. Cooking facilities, tables and chairs, and a central kitchen are non-existent. In addition, kitchen service, utensils, fuel, water, and the absence of a dining room were cited as problems. At times, the school has been unable to provide the food and generally there are delays in getting the food. According to study team members at the site, children appeared to be in a good state of health, although negligence in cleanliness and personal appearance was manifest.

The General Santander School, opened in 1961, was selected as the control school. It enrolls 282 students in a morning shift of six grade levels and 200 students in an afternoon shift of five elementary grades. School premises are modern, but recreation yards are narrow and toilet facilities scarce. The school is said to be in a precarious economic situation. Children come from a low income area. Health is listed as a major cause of school absence. No food is available at or nearby the school.

The MCH center studied in Zipaquira operates a main office, the San Juan de Dios Hospital, and two branches in Barrio San Rafael and Barrio La Concepción. Families in San Rafael have medium low incomes while those in La Concepción are at low, rather precarious, economic levels. In some homes in La Concepción there are cesspools instead of toilets. Health facilities are located in the barrios with doctors, nurses, and other medical personnel available.

This CARITAS/CRS-operated center is open daily throughout the year. In addition to distributing food for preparation in the home, participants also have access to the medical, dental, infirmary and drug store services available at the center. The center also serves mothers receiving only medical care and no food rations. Rations of yellow flour, wheat meal, and oil, lasting from five to six days, are distributed to mothers who pay a monthly fee of US\$.75 per child. Lectures on family planning, general nutrition, child care and

feeding, and pre- and post-natal care are also available, but are given by assistant nurses who do not go into any subject very deeply.

Administration of the MCH center is handled by a Sister of the Presentation and a social worker. Some disorganization in carrying out the program was noted as no files or addresses could be found. The selection of participants is also somewhat arbitrary--some are selected by CARITAS without complying with regulations while others are selected by the Junta de Acción Communal (Community Action Board) without consideration of their course attendance. The most favored women are those with close connections to the Board or those with very low socioeconomic status.

Arabia (Colombia)

The District of Arabia is located in rural Pereira. Coffee, bananas, and sugar cane are grown in this agricultural region where mostly persons of medium low or low income reside. Arabia has no medical assistance center nor its own market and residents must travel to Pereira for these services. Water and sewer services are deficient and irregular.

The Arabia MCH Center operates in a house built by CARE in 1971, when the program began. The single-floor modern building also serves as a school restaurant and as a storage facility for food distributed to mothers participating in the program. Mothers, selected by the age and nutritional status of their children, and their socioeconomic level, pay US\$.42 monthly per child for a ration of CSM, bulgur, oil, and breadstuffs which lasts approximately seven days. The Center is open five days per week throughout the year. Lectures on food preparation, sanitation, family planning, and general nutrition are also provided. MCH staff report that actual change in behavior patterns has not been demonstrated, inadequate cooking methods are still being used, consumption of alcohol is high, and it appears that the only incentive for program participation is the food distributed.

Cogua (Colombia)

The municipality of Cogua, lying east of Zipaquira, is an agriculture, livestock, and coal mining area. One health center operates in the area, as does a small Sunday market.

The Buenaventura Jauregui School, selected as the program school, was established in 1945 and serves a population of 400 students enrolled in five elementary grades. The school operates in old premises which, despite the cleanliness in which they are maintained, present a poor appearance. Large recreational areas are available for basketball and volleyball. School desks are made of wood and are considerably worn. Although facilities are old, this school is considered to have a high academic level. No tuition or fee is charged students who attend this school.

The length of time the feeding program has been in operation is unknown by school officials. The school principal says that all students receive the food for which they pay US\$.33 monthly. However, the field team for this study observed that restaurant attendance, due to budgetary reasons, was very limited and only three or four children per grade participated in the program. Frequent food stoppages have been the norm at this school and the school principal registered a complaint of inadequate food supplies. Food is served daily 40 weeks per year. Unlike most other programs in Colombia, food is supplied to the school by a combination of sources: the municipality (59 percent), the local parish (20 percent), CARITAS (20 percent), and parents (one percent). The lunch consists of a variety of foods including cereal soup, rice, potatoes, meat, salad, and fruit.

The La Concepción Elementary School was selected as the control school from among schools in Zipaquira because no other school existed in Cogua. La Concepción opened in 1968. The school, operating in an old building, gives an impression of poverty due to lack of cleanliness, scarcity of supplies, and worn furnishings. The school enrolls 150 students in four elementary levels. No tuition is charged. The school does not have a garden, but children can buy cold lunches or snacks at the school. Teachers, discussing a food program, stated that although food has been offered to them, none has ever been sent.

Neiva (Colombia)

Neiva, capital city of the state of Huila, is located on the right bank of the Magdalena River. Its population is estimated at about 130,000. Cattle raising and agriculture, as well as small-scale commerce and trading, are prominent economic activities in this area. A recent population explosion has placed a strain on the resources of the area. A free hospital, several pay clinics, and several markets provide services to the residents of the area.

The Alberto Suarez School, program school for the study in Neiva, is located in the Rojas Trujillo neighborhood. It occupies a modern building with a capacity for 200 students. Daily attendance and academic level are considered low in comparison with the control school. This school, opened in 1964, serves a community with a low income with grades one through five. All boys attend the school in two sessions of 117 and 122 students. Attendance is mandatory but it has been observed that children do not attend regularly.

The school feeding program at Alberto Suarez began in March 1970. An average of 180 children attend the lunch program from Alberto Suarez and a nearby all-girls school. The two schools have lunches in a separate school restaurant located next to the school. The restaurant, constructed by CARE, is a modern building with a large lunch room area, kitchen facilities, and storage room. Children pay the equivalent of US\$.42 per month for their lunch, which consists of a hot lunch of fish, rice, vegetables, cheese, and milk. They can also purchase coffee with milk and bread for US\$.01 as a morning snack. The restaurant is funded by PINA/World Food Program which contributes food items, ICBF which gives US\$83 monthly, and the income from lunch tickets. Food is served daily, 40 weeks per year. Facilities are adequate, although problems with kitchen services, fuel, changes in food, and low salaries of service personnel are reported. At times, the school has been unable to provide the food to the children.

The Eliseo Cubrera School, located in the Libertad neighborhood of Neiva, served as the control school for the study in Neiva. It operates in a modern building constructed in 1964. This school, with a maximum capacity of 240 students enrolls 338 students in a morning session and 235 students in an afternoon session. Due to this overenrollment, classrooms and ventilation are insufficient and, despite the fact that students cooperate in the maintenance of the school, a general feeling of untidiness and disorganization is noted. No tuition or fees are charged the students who enroll in the five primary grades at the school. This school does receive bread from PINA, which they sell for US\$.01 per piece as a morning snack. The staff is interested in setting up a lunch program, but due to lack of time they have not been able to organize such a program.

(See Chapter III for a detailed description of the Santa Isabel MCH Center and other aspects of the MCH study in Neiva.)

Cajica (Colombia)

Cajica is situated in the state of Cundinamarca, a short distance from Zipaquira. Agricultural activities and livestock breeding (especially hogs), along with several industrial enterprises, support the people of this area. The majority of farmers work the land for others with a minimum share in the profits. Small landowners exploit the land to take care of their food requirements and to increase their family income. Rural electrical power is supplied to a majority of the homes, but sewer and water facilities are available only within the town limits. One health center is available in Cajica, but some people prefer to go to hospitals in Zipaquira or Bogota. No market center exists in the area and people must travel to Zipaquira for marketing purposes.

Two MCH centers exist in this town. The one examined for this study, the CARE Cajica MCH Center, began its operations in 1971. It lies a short distance away from the urban perimeter of the town. It is projected toward the rural families, many of whom have very small economic resources. The Center is open daily throughout the year and has modern, spacious, and well-lighted premises. It is staffed by an infirmary assistant, an ICBF nutritionist, a provision trustee, a kitchen assistant, and a watchman. Participants, selected on the basis of their child's age and nutritional status, their socioeconomic level, or their pregnant condition, pay a monthly fee of US\$1.17 per child, as well as US\$.29 per month for themselves. The food ration, consisting of CSM and oats for the children and flour and oil for the women, is distributed for preparation in the home. MCH staff say the ration lasts approximately eight days. Food demonstrations, as well as lectures on various subjects are also presented at the facility.

Rivera (Colombia)

Rivera, located in the state of Huila in southeastern Colombia, is an agricultural and livestock raising area. Rivera is noted for its agricultural high school and has promoted several campaigns aimed toward improving nutrition.

The El Guadual School, program school for the Rivera study, is located approximately three kilometers from the town of Rivera. It opened in 1960 and enrolls 440 students in nine grades. This school has a prestigious social reputation and it lacks space for the additional students who desire to enroll there. The building is semi-modern, with adequate school rooms for elementary and high school classes.

One of the oldest feeding programs in the study, El Guadual's program began in 1963. The program provides morning and afternoon snacks and a lunch for 180 day students. This lunch is composed of a variety of foods including fish, milk, CSM, rice, vegetables, and cheese. The school has always been able to provide food even though delays in receiving food have been frequent. Day students pay nothing for the food; they may also buy snacks at the school. Participants for the feeding program are selected according to their verified poverty, distance from home to school, and learning ability. Food is donated by PINA/World Food Program. The Instituto Colombiano de Bienestar Familiar--ICBF (Colombia Institute of Family Welfare) contributes annually the sum of US\$4,457. The principal of the school stated that the food received was insufficient to take care of the children who eat in the restaurant. Although the food should be used exclusively for the elementary school children, it is also given to high school students. Children stated that they remain hungry and mothers expressed the same opinion. The food supply was cut off in September 1973, at about the time of the survey, after the school was informed by PINA that possibly they would not receive food for the rest of the year.

The control school for Rivera, Andres Longa, is located in the urban perimeter of the town. It is an all-boys school, opened in 1943, and is housed in an old building with eight school rooms. No tuition is charged the 206 students in grades one through five. It is the only boys' school in the area and enrollment exceeds its maximum capacity of 179. An atmosphere of tidiness and order is manifest, as well as the personal cleanliness of the children. A small feeding program does exist in the school, presenting problems for its use as a genuine control school. Wheat flour, cooking oil, and milk is received from PINA. This food is sold to the students for US\$.83 per month, and cold foods and fruit juices are available nearby. The school principal reports that there is a lack of interest in school feeding on the part of parents and the community.

Pereira (Colombia)

Pereira, capital of the Department of Risaralda, is an urban area with a population of about 225,000. It is a former agricultural area, which derived its income from harvests of coffee, bananas, and sugar cane, but is now rapidly moving toward industry and service enterprises.

The Antonia Santos School, opened in 1939, was selected as the program school. It operates in a modern, three-story building, constructed in 1973. The school serves 817 girls in grades one through five in two daily shifts. This school is considered a quality school by the community; it serves families with low incomes and has a very good reputation.

The CARE-run feeding program has been operating since March 1965. All girls are fed daily, 38 weeks per year. They pay US\$.01 for the bread, but are also given a local beverage, "la coloda," daily free of charge. CARE charges 20 centavos for the bread and the school in turn charges 25 centavos. With the extra five centavos they pay for services, spices and fuel.

Food supply has been regular and usually arrives on time. However, the school administrators suggested that more food be made available for the school and admitted that tables, chairs, a central kitchen, and other facilities are non-existent.

The Manuel Murillo Toro School served as the control school for Pereira. Five grades of 700 girls enroll there as students. This old, two-story school building, which opened in 1958, is located in a residential section which has a socioeconomic level higher than that of families of the program school. Girls can buy snacks at the school but lack of cooking facilities, utensils, and personnel preclude a feeding program at this school.

Southeast of Pereira, at the edge of the Otun River, is located the San Jorge MCH Center, sponsored by CARE. This Center operates in a very small rented house of old construction which is owned by the woman administrator of the program. The Center, which began operating in March 1972, is open six days a week for nine hours daily. Food is distributed for preparation in the home and mothers pay US\$.42 monthly per child for the ration of CSM, bulgur, oil, and breadstuffs. Participants are selected on the basis of economic status, age of their children, and their attendance. No other services are provided at the Center. Lectures on various subjects of nutrition, food preparation, sanitation and family planning are provided, but field teams found these talks quite unattractive and participants stated that if there were no pressure to attend to receive the ration, they would not attend the lectures.

COLOMBIA: SUMMARY OF DEMOGRAPHIC CHARACTERISTICS OF STUDY SITES

Site	Principal Means of Livelihood	Urban/ Semi-Urban Rural	Average Household Size	Average Annual Household Income	Average Education Level (years)	Annual Food Consumption	Births per 1000 Population	Infant Mortality per 1000 Population	Potable Water (% of Population)	Sewer Facilities (% of Population)
Zipaquira	Factory Work Agriculture	Urban	7 (approx)	--	--	Constant	44	3	80%	75%
Cogua	Agriculture Livestock Coal Mining	Rural	6	--	5 (approx)	Constant	19	1	100%	55%
Neiva	Livestock Agriculture Commerce (some)	Urban	8	\$400	5	Constant	36	5	73%	80%
Rivera	Agriculture	Rural	6	\$350	3	Constant	17	5	95%	80%
Pereira	Agriculture Industries (service)	Urban	6	\$258	5	Constant	36	3	80%	85%
Arabia	Agriculture	Rural	7	\$250	3	Constant	22	5	90%	0
Cajica	Agriculture Livestock	Rural	--	--	--	Constant	--	--	--	--

B-11

COLOMBIA: SUMMARY OF CHARACTERISTICS OF SCHOOL FEEDING PROGRAMS

Site	Year Program Started	Number Receiving Food/Percent of Enrollment	Food Fees (U.S. Dollars/Month)	Days per Year Food Served	Sponsoring Agency	Food Served
Zipaquirá: Mariscal Sucre School	1970	167 (100%)	\$.25	150	Caritas CRS	Bread roll Coffee with milk
Cogua: Buenaventura Jauregui School	Unknown	400 (100%)	\$.33	200	Caritas CRS	Cereal soup Rice Potatoes Meat Salad/Fruit
Neiva: Alberto Suarez School	1970	80 (68%)	\$.42	200	PINA WFP	Fish Rice Vegetables Cheese Milk
Rivera: El Guadual School	1963	180 (41%)	None	200	PINA WFP	Fish Rice Vegetables CSM Cheese Milk
Pereira: Antonia Santos School	1965	817 (100%)	\$.01	190	CARE	CSM Bread La Colada (beverage)

B-12

124

COLOMBIA: SUMMARY OF CHARACTERISTICS OF MCH FEEDING PROGRAMS

Site	Year Program Started	Days per Week Opn	Food Distributed	Number of Children Enrolled for Food Distribution	Fees (U.S. Dollars per Month)	Other Services Provided	Sponsoring Agency	Average Number of Persons Eating Food per Family*	Average Number of Days Food Lasts*
Zipaquirá: San Juan de Dios Hospital	-	7	Yellow flour Wheat Oil	100	\$.75	Lectures: Cooking demon- strations	Caritas CRS	7.8	7.1
Arabia: Arabia MCH Center	1971	5	CSM Bulgur Wheat Oil Breadstuffs	172	\$.42	Lectures Cooking Demon- strations	CARE	8.6	5.9
Neiva: Santa Isabel MCH Center	1970	7	Powdered Milk Cheese Fish Corn Meal Flour Legumes	156	\$.42	Lectures Cooking Demon- strations Medical Services	PINA ICBF WFP	7.7	8.3
Cajica: Cajica MCH Center	1971	7	CSM Flour Oats Oil	200	\$.29	Lectures Cooking Demon- strations	CARE	6.6	7.0
Pereira: San Jorge MCH Center	1972	6	CSM Bulgur Wheat Oil Breadstuffs	594	\$.42	Lectures Cooking Demon- strations	CARE	8.5	8.3

*Based on interviews with mothers currently enrolled in programs.

B-13

128

PHILIPPINES

La Union (Philippines)

(See Chapter I for a detailed description of the La Union site, the school feeding study, and the food program school, Santo Rosario Elementary School in the town of San Juan.)

For comparison purposes with Santo Rosario, a control school was selected in the town of Caba on the coast and not far from San Juan. The school was San Carlos Community School. Land in this fishing community is for the most part arid and bare. The soil is too sandy and hot for vegetables and few of the homes visited had any cultivated vegetable plot. Except for the coconut trees, which are abundant, even fruit trees are scarcely seen.

The San Carlos Community School opened in 1952 and now enrolls 160 students. Six elementary grades are taught in four classes--grades one and two, and grades five and six are combined due to the lack of available teachers.

According to the field team diaries, the school grows a lush vegetable garden even though the school grounds are quite small and the soil too sandy and dry for suitable cultivation. Green leafy vegetables line the walks and provide a colorful landscape to the otherwise drab, arid school grounds. Each grade level has its own vegetable plot and whatever produce is grown is divided among the students to be taken home. This seems to be a good source of food supplements, but harvests are presently minimal.

San Carlos applied for a feeding program through CARE in February 1973, but CARE was unable to include any more schools due to cutbacks in allocations.

The MCH program of the Catholic Relief Services serves the municipality of San Juan. A nutritionist administers the center and supervises several subcenters in outlying barrios. The program, begun in 1968, has been in operation for five years. Until February 1973, the activities of this center were restricted mainly to the distribution of food supplements for home preparation. Mothers, selected on the basis of their child's age and nutrition level, and their level of poverty, pay US\$.03-1/2 per month for each child enrolled. Food is distributed one Saturday per month for two and a half hours. The MCH administrator said that the food, consisting of CSM and rolled oats, should last 30 days. Recently begun lectures center on nutrition, sanitation, child care and feeding, hygiene, and food preparation. A reorganization of old CRS centers has been taking place to implement new lecture programs. Mothers have complained that the quality of food given is not worth the money they pay--a fee raise from ₱.10 to ₱.25 was enforced September 1973--nor is the half kilometer they have to walk to get the rations. Mothers have also complained of worms in the corn and oat meal.

Manila (Philippines)

The Metropolitan Manila area houses a population of approximately four million people on a narrow strip of land bounded by Manila Bay, the Eastern Cordillera and Legume de Bay. This area was chosen as the survey site for the Tagalog ethnolinguistic group. The localities in the study included two districts of Manila (Santa Ana and Pandacan) and Pasig, a suburb in the adjacent province of Rizal.

Both program and control schools are found in Pasig, which lies east of Manila. Pasig is a growing suburban community which still retains rice fields, open uncultivated lands, few squatter districts and a relatively quiet atmosphere. Manufacturing, commerce, transportation, and construction are major sources of employment for the area and Manila in general. However, the majority of the population is unemployed in these cities or they hold temporary jobs as caddies, jeepney drivers or carpenters.

The first program school selected was Gotamco Elementary School in Pasig City with a CRS-sponsored feeding program. However, due to the poor match between this school and the control school (finding a control school was a problem as nearly all the schools in the area have nutribun feeding programs), the Santolan Elementary School, with a CARE-sponsored feeding program, was chosen as the program school.

Established in 1923, Santolan now enrolls 1,290 students in six elementary grades. No tuition is charged, although children pay the equivalent of US\$.67 yearly in fees. The nutribun program began in October 1972 and feeds 1,250 children, all of whom are malnourished according to weight-for-age standards recorded by the school. All children may purchase the bun and the children pay ten centavos (about one and one-half cent U.S.) for a whole bun and five centavos for half a bun. One first grade teacher reported that she divides the buns in half on a rotational basis so that all children receive a share. Buns are distributed 43 weeks during the school year. The school has had no problems providing the food on time and a wide variety of foods are also available to the students at or nearby the school. The owner of the bakery did register complaints that the transport of the flour leaves it subject to infestation by weevils and that the lack of water at the facility made mixing difficult.

The Ugong Elementary School, located in the industrial barrio of Ugong, was selected as the control school. This school, built around 1919, enrolls 1,234 students in six elementary grades. Students pay monthly fees of US\$.31 but there is no tuition. Children may purchase hot and cold dishes at or near the school for lunch. After the floods in 1972, the school was given nutribuns through CARE's emergency feeding program but, due to limited supply, all children could not purchase them. Although the school has applied for the program, no action has been taken by CARE due to reductions in allocations.

The Santa Ana MCH Center is located in Santa Ana on the southwest periphery of Manila. Originally middle class residential areas, these localities have increasingly witnessed the influx of squatter and slum dwellings. The area now is swampy and unsanitary. Houses are cramped, but clean, with very poor ventilation. Most houses are constructed of light, salvaged materials. Recent floods in 1972 damaged roads and dwellings and made the area more swampy than usual.

THE MCH Center in Santa Ana is basically a social welfare agency with a staff of social workers and volunteers. Its only activities related to maternal and child health care are those connected with the feeding program (lectures and distributing food supplements). The Center receives its food commodities from the National Council of Churches of the Philippines (NCCP) and serves the areas of Suak Bayan Nickel in Santa Ana, and Liveriza, Manila. The center opened in 1965 and has currently registered 156 people, of which 22 are mothers and the rest are children.

Participants pay 25 centavos per quarter (US\$.01 per month) for the bulgur wheat, CSM, and rolled oats which are distributed for preparation in the home or eaten at the subcenter. As of October 1973 the ration had been reduced for bulgur and rolled oats; no CSM was available for distribution. Participants are selected by reason of their socioeconomic status, and age and nutrition status of their children. Most MCH mothers said that the rations were not enough to last them an entire month. The MCH administrator also stated that the food lasts only two weeks because other family members also eat the rations.

The area of Nickel (MCH-subcenter) is very unsanitary. According to the field team in the area, the grounds are dirty, most parts are swampy and muddy, and houses are elevated above stagnant waters filled with flies, mosquitoes and similiar living things. Garbage and human waste can be found on unpaved, rutted streets and outside houses. The houses are cramped and poorly ventilated but some occupants manage to keep them quite clean inside.

The squatter locality in the control area of Pandacan is similar to Nickel. The field team reported that dwellings are congested but still a few lots are devoted to vegetable gardening. Wooden bridges are used as pathways in swampy areas which attract numerous insects. In terms of sanitation, it is almost a replica of Nickel. No health facilities are available. Noise caused by passing trains is also irritating but residents have become accustomed to it as they have to the strong odor of dead mice which permeates the environment.

Naga (Philippines)

Naga City, of the Bicol Region of the Philippines, is located on the southernmost tip of Luzon. People inhabiting this region comprise the fifth largest cultural-linguistic group in the country. The area is largely agricultural and rural. Rice, maize, coconut, and abaca are leading crops, with mining, fishing and logging making major contributions to the economic activities of the region. Naga, capital of the province of Camarines Sur, is the region's major metropolis.

Three barrios in the heart of the city, namely Sabang (program school), Santa Cruz (control school and MCH center), and San Francisco (MCH control area), were the focus of the study. Each barrio is less than a kilometer away from the next barrio studied.

The Sabang Elementary School, first opened in 1929, serves a population of 1,014 distributed among six elementary grades. The school is composed of several one-story structures and land devoted to rice cultivation and vegetable gardening. Most of the food harvested is sold, providing the school with a substantial income.

The nutribun feeding program, begun in October 1971, serves the total school population. Four-fifths of the children are malnourished, according to weight-for-age standards available at the school, and the school has had to close its gates to keep mothers whose children are not enrolled from coming in to buy the buns. The program suffered interruptions from July to October 1972 and from September to November 1973 due to delays in the shipment of commodities. Food is served daily, 21 weeks during the year, for which the children pay US\$.01 per month.

Inadequate utensils, storage areas, water, frequent delays and interruptions, and food infestation were all cited as problems by the school principal. Other problems have also been observed in this program. Several bags of flour and milk have been used for Girl Scout campaigns or have been distributed among the teachers. Others remain unaccounted for. Proceeds from nutribun sales are not limited to facility improvement but support such expenses as snacks for visiting school officials.

The sampled children live in a low-income area with inadequate toilet facilities, poor drainage, and houses built on stilts just above water level. In spite of the dirty surroundings, interiors of houses are kept neat and clean.

The Santa Cruz Elementary School, serving a population of 1,484 in six elementary levels, opened in 1920. The area surrounding the school building is also planted in rice and vegetables and little playground is left for the children. The school does maintain a lunch counter with vegetables grown at the school as major ingredients.

No tuition is charged, although monthly fees of US\$.22 are paid. During the 1972-73 school year the school was able to purchase several baskets of nutribuns but the amount was minimal.

Barrio Santa Cruz is low and a large portion is under water most of the year. Footbridges interlace the area and connect the elevated one-story wooden structures with roofs of woven rushes or galvanized iron. Sanitary conditions vary--some parts are clean and well-kept, while in others, stagnant water and unsanitary conditions are evident. Fresh water is lacking in the area.

The Santa Cruz MCH Center began operations in January 1972 as a follow-on to relief measures brought about by CRS-donated typhoon relief in 1971. The center is open daily throughout the year. Monthly rations of rolled oats and CSM are distributed for preparation in the home for which participants pay US\$.04 monthly per child. Demonstration meals are also common at this center and food supplements are distributed twice a month to program participants. The center provides nutrition and child care-oriented lectures, as well as family planning, nursery, and adult education classes. The Center also sponsored a BGC (anti-TB) inoculation campaign in December 1972. Problems with storage facilities and infestation of food supplements have also burdened the program. The Center would like to expand activities but supplies are severely limited.

Barrio San Francisco is the control area for the Naga MCH study. It is located on the Briol River and is characterized by small two-story row houses and dark narrow alleys. The community is inhabited by transients and migrants. Alleys are kept clean of litter and the area does have access to potable water and sewage. A puericulture center for health services is available but understaffed and unresponsive to the needs of the community.

Iloilo (Philippines)

Iloilo is the southernmost and largest province of Panay Island in the central Philippines. Iloilo City, the capital, is a compact urban area with a population of about 335,000, with ricefields and beaches not far distant. The people of Iloilo are employed principally in crafts and industry.

The program school selected for study, Iloilo Central Elementary School, opened in 1908, services the central part of the city and serves as a pilot school for those in the surrounding area. Well-maintained buildings, surrounded by grounds green with vegetables and plants, house a total of 2,567 enrollees in six grades. Special classes for gifted students, and hearing impaired students as well as itinerant classes for those with behavioral problems and the blind are available. The school serves lower income families within a one kilometer radius of the school. Tuition is free and monthly fees are US\$.24 per child. Principals in both program and control schools agree that well-to-do families send their children elsewhere to school.

A CARE nutribun feeding program began in 1969 with the small targeted bun in use since November 1972. No major problems have been apparent in food service. The school has its own bakery, which began operating in 1972, which takes rations for nine other schools. All children in the school receive the bun, for which they pay US\$.21 per month. According to the field diaries, many students reportedly come to school without breakfast, hence the nutribuns become breakfast, rather than a supplementary food. Children may also purchase other foods at or nearby the school for lunch.

The Jaro Elementary School, control school for Iloilo, was opened in 1900 and now enrolls 3,161 students in grades one through six, including an itinerant class for the blind. No tuition is charged, but students pay monthly US\$.24 in fees. The school had a CARE-operated feeding program five years ago, but the program was stopped due to the absence of a bakery or warehousing facilities. However, a variety of food, including hot lunches, is available at or near the school from local vendors. The school also has a garden from which vegetables may be taken home by the children.

The St. Paul MCH Center began in 1967 and has been run as part of St. Paul's Hospital out-patient services. This center is open six days per week throughout the year. Four doctors, one registered nurse, and several social workers staff this center which also provides hospital and medical dispensary services, vitamin and mineral supplements and family planning assistance. Food is distributed for preparation in the home for which mothers pay US\$.03 per child. Food is said to last three days per week, and consists of CSM and rolled oats. Until recently the center also distributed bulgur wheat, flour and milk.

This MCH Center is run by an energetic 60-year old Sister Raphael under the sponsorship of Catholic Relief Services. Sister Raphael is described in the field diaries as a "Robin Hood type of hustler who gets food, shoes, medicine, even lumber for a house! for her indigent friends." When team members went to visit the Sagrado MCH Center and found supplies had run out, they checked other MCH centers and found only Sister Raphael with enough supplies for another couple of months. Sister Raphael states that beneficiaries prefer the St. Paul MCH because "here they are sure they will find an ample supply of rations plus medical services." In point of fact, the field team found that St. Paul MCH center is run to a great extent as a charity service of St. Paul Hospital. The only criterion for admission to the center is indigence. Lectures, according to Sister Raphael, are given on all subjects (nutrition, child care, sanitation, etc.), but in reality the field team reported that lectures consist mainly of prayers and discussions about religion.

Misamis Oriental (Philippines)

Misamis Oriental, located on the northern coast of the island of Mindanao in the southern part of the Philippines, represents the major ethnolinguistic group on the island. Misamis Oriental has a coastline extending from east to west. The climate is pleasant. The topography of the province is rough, although its mountains, covering 47 percent of the total area, are relatively low. Farming, fishing, hunting, and logging are the major occupational activities. Coconut, banana, coffee, rice, corn, and tobacco are the major crops of this province. Backyard vegetable gardens are frequently encountered, and fruit trees are plentiful.

Field team diaries report, "Houses in the Iponan area are big and clustered around each other. Most of the respondents live in small houses made of nipa and wood. General surroundings are clean, including the streets, which are cleaned by the barrio people during weekends in their 'Food for Work' program. This is a people's live barrio and many residents hold blue collar jobs in the city. They have a higher educational level than other areas in the sample.

"In Alo homes are small, made of mixed materials, and located close to each other. The immediate surroundings are clean--waste is thrown in the sea and in the far swampy areas. The sitio has an abundant supply of fresh air from the sea.

"Houses along the shores are generally dirty. Garbage is thrown everywhere along the shores and children throw their waste in the sand where they play. The houses are generally made of mixed materials and most have nipa palm roofs.

"In Opol, the swamp area, houses are similar to those in Iponan. There are not many fruits and vegetables and the people depend on the city market, Cagayan, for their vegetables and other commodities."

The CARE-operated feeding program in the school of El Salvador began in October 1971. Located in a rural agricultural and fishing area, this school, built around 1924, serves 725 students in six elementary grades. The school is in a convenient location within 2.5 kilometers of students' homes. No tuition is charged students, but monthly fees of US\$.15 are collected.

Nutribuns are served daily, 48 weeks per year, to students who can afford the US\$.08 per week charged each recipient and who are younger and low in weight. Not all students receive the buns and students with additional money may buy more as well as purchase other foods available at the school. The nutribun is served in the mid-morning and observers agree that there are fewer absences in the morning than afternoon.

The school bakery was built in 1971 and serves 14 other schools. The school also has a garden from which vegetables are eaten at the school, taken home, or given away. The delivery of flour had been delayed from July through October 1973. This gap was so wide that many children could not remember when they last received the bun.

The Baliwagan Elementary School in the municipality of Balingasay served as the control school for Misamis Oriental. This school, built in 1945-46, is also in a rural agricultural area. There is no electricity in the area, health facilities are minimal, and village life was interrupted when the market burned. A combined enrollment of 564 elementary and high school students attend the school. Students pay no tuition and not all students pay the US\$.07 per month fees assessed grades one and two or US\$.11 per month fees assessed grades three and four. Children cannot buy food at the school. A home economics supervisor recommended the school for a nutribun program at one time, but changed her mind in favor of a poorer school.

In the area of Barra, the Opol MCH Center serves 326 participants with a CARE-operated program, begun in November 1972. Food is distributed once a month for home preparation. The MCH Administrator estimated that the food lasts one week or less.

Recipients pay US\$.04 per child each month for the ration of CSM and rolled oats. During a three-day seminar held in November 1972 when the program began, instruction was provided on general nutrition, food preparation, and the types of foods to prepare for proper child feeding. No mention was made of additional lectures since that time, and it seems that in general services are minimal. Enrollees in the sitio claim they are not receiving the correct amount of rations from the center now even though they pay the same amount as before.

PHILIPPINES: SUMMARY OF DEMOGRAPHIC CHARACTERISTICS OF STUDY SITES

Site	Principal Means of Livelihood	Urban/Rural	Average Household Size	Average Annual Household Income	Average Education Level (years)	Annual Food Consumption	Births per 1000 Population	Infant Mortality per 1000 Population	Potable Water (% of Population)	Sewer Facilities (% of Population)	Major Ethno-linguistic Group
Naga (San Francisco, Santa Cruz, Sabang)	Laborers Merchants Professionals Govt. Employ	Urban	5.5	\$ 526	--	Constant	37	46	100%	90 - 95% 50% (Santa Cruz)	Bikol
Iloilo	Craftsmen Laborers Professionals Service	Urban	--	\$ 478	--	Constant	28	64	70%	None	Ilongo
Misamis Oriental (El Salvador, Opol, Balingasag, Villanueva)	Farming Fishing	Rural	6	\$ 357	5.5	Constant	65	70 (El Salvador) .6 (Balingasag) 14 (Villanueva)	70% Range: (50-90%)	64% Range: (30-80%)	Cebuano
La Union (San Carlos, Santo Rosario)	Farming	Rural	6.5	\$3,299	--	Constant	31.9	55.3	9% (San Carlos) 63% (Santo Rosario)	52%	Iloko
Manila (Santa Ana, Beata, Ugong, Santolan)	Factory Labor Jeepney Drivers Market Vendors Services Unemployed	Urban	8	\$ 597	7	Hungry Season: June - Sept.	53.7	72.9	100%	58% Range: (3-93%)	Tagalog

B-23

135

PHILIPPINES: SUMMARY OF CHARACTERISTICS OF SCHOOL FEEDING PROGRAMS

Site	Year Program Started	Number Receiving Food/Percent of Enrollment	Food Fees (U.S. Dollars/Month)	Days per Year Food Served	Sponsoring Agency	Food Served
La Union: Santo Rosario Elementary School	1970	110 (38%)	\$.30	200	None* (local input)	Hot Lunch* (rice with vegetables and/or meat)
Manila: Santolan Elementary School	1972	1,250 (97%)	\$.30	215	CARE	Nutribun
Naga: Sabang Elementary School	1971	1,014 (100%)	\$.01	105	CARE	Nutribun
Iloilo: Iloilo Central Elementary School	1969	2,567 (100%)	\$.21	200	CARE	Nutribun
Misamis Oriental: El Salvador Central School	1971	705 (88%)	\$.24	240	CARE	Nutribun

* CARE nutribun program also operated from June 1969 to July 1973, two months prior to the study.

PHILIPPINES: SUMMARY OF CHARACTERISTICS OF MCH FEEDING PROGRAMS

Site	Year Program Started	Days per Week Open	Food Distributed	Number of Children Enrolled for Food Distribution	Fees (U.S. Dollars per Month)	Other Services Provided	Sponsoring Agency	Average Number of Persons Eating Food per Family*	Average Number of Days Food Lasts*
La Union: San Juan MCH Program	1968	1 day per month	CSM Rolled Oats	49	\$.037	Lectures	CRS	5.0	4.1
Manila: Santa Ana MCH Program	1965	7	CSM Rolled Oats Bulgur Wheat	134	\$.012	Lectures Cooking Demon- strations	CWS	5.7	8.0
Naga: Santa Cruz MCH Center	1972	7	CSM Rolled Oats	304	\$.04	Lectures Cooking Demon- strations	CRS	8.5	11.1
Iloilo: St. Paul MCH Center	1967	6	CSM Rolled Oats	148	\$.03	Lectures Cooking Demon- strations	CRS	6.0	4.5
Misamis Oriental: Opol MCH Center	1972	1 day per month	CSM Rolled Oats	40 (Estimate)	\$.04	No other regular services	CRS	6.4	12.0

*Based on interviews with mothers currently enrolled in programs.

137

KENYA

Ngong (Kenya)

Ngong is a rural community a few miles southwest of the capital city of Nairobi. Between Nairobi and the Ngong hills people depend on farm produce for their livelihood, and beyond the hills pastoral people depend on livestock. Most people in the area are low class; the majority are Masai and Kikuyu.

The Ngong Red Cross MCH Center was selected for study. The center runs twice a week and serves about 400 children with take-home food distribution and an additional 200 with medical services. Children between the ages of six months and five years receive food. According to the field team in Ngong, "most of the mothers we interviewed at Ngong were squatters. Some of them were widows whose husbands died during the 'Emergency'...other mothers were divorced. The land they occupy belongs to the Masai who have leased it to them... One major setback to our recruiting at the MCH center was the low attendance because most mothers could not afford to pay the fees required for the forms and cards. Some of the mothers live far away, and had to walk ten kilometers...The administrator is usually in Ngong for only three hours, otherwise the rest of her time is in Nairobi."

Like all feeding programs studied in Kenya, Ngong's food is supplied by Catholic Relief Services. The food consists of milk, bulgur wheat, and oil. MCH staff estimate that the food lasts the mothers about seven days. In addition to distributing food, the center offers maternity, medical, and family planning services. Demonstrations and lectures on nutrition, food preparation, sanitation, and child care are provided. Mothers pay 2 shillings per month (US\$.29) per child. Poverty is the main criteria for admitting families to the program.

Tala (Kenya)

Tala is a rural community located on the plains east of Nairobi in the Machakos district. It is a predominantly Kamba tribal area. Although the land is very dry for cultivation, farming and livestock production are the principal means of livelihood. The dryness of the area causes the feeding program school in Tala to attract children because of its water tank. It is said that the water is as much an attraction for the children as the food. Field interviewers working in Tala reported, "Drinking water was very scarce. In most cases, mothers collected water from very far, if the rivers have not dried out...the homes we visited were either one single room or one bedroom and a living room. The homes were thatched with grass and the walls were of mud."

Tala Catholic Primary School was selected as the food program school for this site. In October of 1973, when the survey was conducted, the school had an enrollment of 620 students, all girls, in standards one through seven. Because the area is predominantly Catholic, students are attracted to the school because it is a mission school. Water and the food program are other attractions. Unlike most other schools in Kenya, remission of fees is allowed. Fees are 20 shillings per term (US\$.94/month).

The school has been running a feeding program since 1962. All children participate in feeding, and pay 3 shillings per term (US\$.15/month). The food consists of bulgur wheat, milk, and a beans and carrots preparation. It is served five days per week, 40 weeks per year. According to the school's headmaster, there are seldom reasons for the food not being given to the children, such as delivery delays, and few problems are encountered in the preparation and serving of the food. Field interviewers at the school reported, "The way in which the school food is made is not appetizing at all. The place where the food is prepared is not clean and materials for serving food were inadequate. Because there was no lunch room some kids had to eat in the field and others in the classroom. The quantity of food was adequate because some kids couldn't finish what they had so they took it home with them to share with other children."

The control school for the Tala site was the Tala Salvation Army School. This school opened in 1940, and had an enrollment of 675 students in October 1973. Standards one through seven are taught, with both girls and boys attending. According to the school's headmaster, Tala Salvation Army School leads area schools scholastically, but he said that "when Catholic Relief began there was a blow to all schools" and he persuaded parents to let children bring food to school in order to better compete with Tala Catholic School. No food is available at the school for the children to purchase. Fees for the Salvation Army School are the same as those for the fed Catholic School, 20 shillings per term.

Kanzalu (Kenya)

Kanzalu is a very fertile, hilly rural area in Kangando, Machakos District. It is less than twenty miles from the Tala site, but the contrast is striking. While Tala is dry and on the plains, Kanzalu is high in the hills with rich farmland--coffee, maize, and beans grow well here. Most of the people earn their living from the farm produce, and there are a number of people from the upper class living in the area. Kambas are the dominating tribe in Kanzalu.

Field interviewers reported, "In Kanzalu we were impressed by the houses; there were quite a number of brick houses with iron roofs, and they were relatively large--two or three bedrooms...There was plenty of fertile land for cultivation. It was no wonder that the children from such homes looked healthy and smart."

St. Francis Girls Primary School was selected as the feeding program school in Kanzalu. It opened in 1949 and had an enrollment of 700 girls at the time of the survey. Standards one through seven are taught. It is a Catholic school and is central to most homes in the area, which is attractive to the Catholic families which dominate the area. School fees are 20 shillings per term (US\$.94/month)--the same as Tala.

St. Francis has been running a feeding program since 1966, with all 700 girls participating; however, if food fees are not paid the children are not given food. These fees amount to 7 shillings per term (US\$.35/month). At the time of the survey, only bulgur wheat was being served. The food is served three days per week, 28 weeks per year. According to the school's headmaster, there are frequent food shortages--at the time of the survey the school had been without food for two weeks. The headmaster reported no problems with preparing and serving the food.

The control school for the Kanzalu site was Unyuani Primary School. This school began operating in 1956. Standards one through seven are taught, with an enrollment of 506 students in November 1973. Like St. Francis, Unyuani is a Catholic school. School fees are 20 shillings per terms (US\$.94/month), the same as the fed school. No food is available for the children at the school.

The MCH center studied in Kanzalu was the Kanzalu Child Welfare Center. This center opened in 1969, and now operates six days per week, with a group of 60 mothers and children attending each day. It serves about 1,400 children in total, and is the only MCH center in the Kanzalu area. Mothers pay 2 shillings per child (US\$.29) per month. Food is distributed only for home preparation, and consists of dry milk, oil and bulgur wheat. Catholic sisters who staff the center estimate that the food lasts the mothers about seven days. The Kanzalu MCH center offers a number of services in addition to food. A clinic is operated with a special children's ward. The center provides lectures on nutrition, feeding, sanitation, hygiene, child care, and pre-natal and post-natal care.

Nakuru (Kenya)

(See Chapter II for a detailed assessment of the Nakuru school feeding study, with descriptions of the site and of both program and control schools.)

The MCH center studied in the Nakuru site was the Nakuru Holy Rosary Pre-School Clinic, which began operations in 1968. The center is open 13 days per month and serves about 330 children with take-home food distribution, consisting of bulgur wheat, milk, and oil. MCH staff estimate that food lasts families about two weeks. Per child fees are the equivalent of US\$.29 per month. In addition to food distribution, the center provides lectures to mothers on nutrition, food preparation, feeding, sanitation, hygiene, child care, and pre-natal care. No medical services are offered.

Nyeri (Kenya)

Nyeri is a rural district in Central Province, about 100 miles north of Nairobi, at the foot of Mt. Kenya. It is agriculturally productive with much small-scale farming and dairy cattle raising. Field interviewers described MCH participants as follows: "most of the mothers we interviewed had very small pieces of land which could not cater to the large families they have. Some had no land of their own and lived on borrowed land. Some lived on government land... Round houses with grass thatched roofs and mud walls are common, and occasionally there are rectangular houses with corrugated iron sheet roofs and timber walls...In some cases people chose to build temporary houses because they did not know when the owner might ask them to vacate their land. The little they get from their daily labor on other people's land is not enough to feed, clothe or educate their families...Houses were generally untidy with many flies. In most cases there were no latrines...The area is very densely populated and unemployment is a very big problem...Some heads of households were employed as casual laborers on farms, which is very seasonal. No cash crops were grown due to lack of land."

The MCH center surveyed in Nyeri was the Ngandu MCH. It is a small center that started in 1971. It is open two days a week, and feeds about 500 children with take-home food distribution consisting of powdered milk, oil, and bulgur wheat. The Catholic priest in charge of the center estimates that the food lasts mothers about 12 days. Ngandu MCH charges 2 shillings per child (US\$.29) per month to participate in the program. In addition to distributing food, the center operates a clinic and provides lectures on nutrition, feeding, sanitation, hygiene, child care, and pre-natal and post-natal care. It also provides cooking demonstrations. Food delivery interruptions have been a problem for the center, according to MCH staff. Field researchers interviewing MCH mothers said, "The usual comment was that food intended to last a month at the MCH centre was hardly enough for two weeks. They claimed that rations had recently been drastically reduced." At the time of the survey, food was still being distributed at the center, although MCH staff estimated that it could not last for more than two weeks. The criteria for admission to Ngandu MCH are very restrictive. The field team reported that only Catholics are accepted, and if a mother misses attendance for whatever reason her name is struck from the enrollment list. Enrollment is limited to families with children under five years of age.

Kigumo (Kenya)

Kigumo is a rural community in Central Province, not far from Nyeri and Mt. Kenya. Small-scale farming is the principal means of livelihood--maize and beans are grown, and the principal cash crop is coffee. The field team in the Kigumo area described it as follows:

"Most of the farms in the Kigumo area are very small and too steep to support any crops, and most farms are less than an acre. Where the ground was less hilly, crops were raised and so were a few animals. On very steep land, wattle trees did quite well and were the only source of income. For cash crops, tea and coffee are primary...Most homes had a few cattle, although they cannot keep many animals for lack of grazing land...A few chickens provide eggs for the family, although most of the mothers prefer to sell eggs for the money to buy other foodstuffs. Mothers claim that with such large families, the quantity of food is a more important consideration than the nutritional value."

Mutheru Primary School was chosen for study as the food program school for Kigumo. The school opened in 1959, and has a current enrollment of 700 students in standards one through seven. Children pay 36 shillings per term (US\$1.88/month) to attend school.

Mutheru's food program began in 1970, and serves about half of the students--only those able to pay the food fee of 10 shillings per term (US\$.50/month). The food is served five days a week, 40 weeks per year, and at the time of the survey consisted of maize, beans, and supro. Mutheru's headmaster reported that there are frequent delays and interruptions in food deliveries, and at times "food has not been available for weeks." When there is not food at school, the children go without lunch.

The control school for Kigumo was Mariira Primary School, which is within a couple miles of the fed school. According to field interviewers in the area, "both of the schools are situated on small hills and look more or less like watch towers. The school ground, situated on a very poor site, runs steeply on both sides and the school children do not have a good playground...Most of the classrooms have now been built with stones, although some still have mud walls... Their water was received from small rivers running just near the schools, fetched by the school pupils." Mariira opened in 1960 and at the time of the survey had an enrollment of 536 pupils. Proximity of children's homes to school is the principal reason for families choosing one school or the other. School fees are considerably less at Mariira than at the fed school--22 shillings per term (US\$1.06/month). No food can be purchased by children at the school.

Eldama Ravine (Kenya)

The Eldama Ravine site occupies the whole of South Baringo in the Rift valley Province. The area is rural. Most families till small plots of land on which they grow maize, beans and cabbages. Some cattle, sheep, goats and chickens are raised. Many people work as laborers or do petty trading; there are a large number of people unemployed. The area is hilly and some parts of it are very mountainous with rich vegetation and almost no roads. It is predominantly Kalenjin, although the majority of school children surveyed were Kikuyu, the largest tribe in Kenya.

The food program school selected for study in Eldama Ravine was the Shimoni Primary School. It opened in 1967, teaches standards one through six, and had an enrollment of 253 students at the time of the survey. Tuition fees are high at Shimoni--102 shillings per term (US\$4.96/month).

Shimoni started its food program in 1967 and currently feeds only children in the first three standards--about 157 students. The food is served five days per week and 36 weeks per year. At the time of the survey, the ration consisted only of bulgur wheat. Milk had been previously supplied, but had been suspended altogether since September 1973, two months before the survey. The headmaster at Shimoni said the wheat alone is not enough for the children and he would like more variety of foods. Children must pay 2 shillings per term (US\$.10/month) to participate in the food program. The headmaster reported that there are frequent delays in food deliveries to the school, but there are no problems in preparing or serving it. He also said that some parents are not willing to pay for the food program. The school is building new facilities for the food program and anticipates problems in having parents bear the cost burden.

The control school for the Eldama Ravine site was the Eldama Ravine Full Primary School. This school opened in 1950, serves standards one through seven, and had an enrollment of 450 students in November 1973. For day school students, which includes standards one through three, the tuition is 75 shillings per term (US\$3.62/month). This tuition is high in relation to other schools in Kenya, but not as high as the food program school for the Eldama Ravine site. According to field interviewers at Eldama Ravine, "the school has modern buildings and has a good reputation for its performance in public examinations...Generally mothers of these school children were slightly more well-to-do than mothers of Shimoni school children. This generalization was based purely on the material possessions and home environment observed by the interviewers."

The MCH center studied in Eldama Ravine was Mercy Hospital. The center began operations in 1967. It is open only one day a week. Food for home consumption is distributed to about 240 children. Bulgur wheat, oil, and dry milk is distributed; the MCH administrator estimates that the wheat lasts families about one day, and the oil and milk last about seven days. Mothers pay 2 shillings per child (US\$.29) per month to participate in MCH. The center also offers lectures on nutrition, sanitation, hygiene, child care, pre-natal care, post-natal care, and disease and infection prevention. The center also offers cooking demonstrations. "The centre does not teach family planning methods," reported the field interviewers, "because the Catholic approach to family planning is too complicated for most of the enrolled mothers to understand...About two years back, some nurses from the centre used to visit homes of enrollees, but at the moment the number of enrollees is so large that the MCH staff cannot possibly manage to visit all homes."

KENYA: SUMMARY OF DEMOGRAPHIC CHARACTERISTICS OF STUDY SITES

Site	Principal Means of Livelihood	Urban/Rural	Average Household Size	Average Annual Household Income	Average Education Level (years)	Annual Food Consumption	Births per 1000 Population	Infant Mortality per 1000 Population	Potable Water (% of Population)	Sewer Facilities (% of Population)	Major Tribe
Ngong	Farm Produce Livestock	Rural	6	\$ 14	4	Constant	66	28	86%	12%	Kikuyu Masai
Tala	Business Farm Produce	Rural	10	\$ 21	4	Hungry Season: Mar. - July	50	25	40% (approx)	0	Kamba
Kanzalu	Coffee Growing	Rural	8	\$ 43	8	Hungry Season: Sept. - Dec.	58	30	80%	0	Kamba
Nakuru	Wage Earners Crop Farming	Urban	5	\$348	6	Vegetables Scarce: Jan. - Feb.	50	24	99%	85%	Kikuyu Luo Luhya
Nyeri	Small-Scale Farming Dairy Cattle Crop	Rural	5	\$ 51	5	Constant	50	24	50%	0	Kikuyu
Kigumo	Small-Scale Farming Food Crops Coffee	Rural	5	\$ 43	4	Hungry Season: Nov. - May	55	25	0	0	Kikuyu
Eldama Ravine	Work in Forests Livestock Petty Trades	Rural	6	\$ 87	4	Hungry Season: July - Nov.	50	25	50%	5%	Kalenjin Kikuyu

D-14

146

KENYA: SUMMARY OF CHARACTERISTICS OF SCHOOL FEEDING PROGRAMS

Site	Year Program Started	Number Receiving Food/Percent of Enrollment	Food Fees (U.S. Dollars/Month)	Days per Year Food Served	Sponsoring Agency	Food Served
Tala: Tala Catholic Primary School	1962	620 (100%)	\$.15	200	CRS	Bulgur Wheat Milk Beans/carrots
Kanzalu: St. Francis Girls Primary School	1966	700 (100%)	\$.35	84	CRS	Bulgur Wheat
Nakuru: Flamingo Primary School	1967	670 (100%)	\$.78	180	CRS	Bulgur Wheat Soup Potatoes Milk
Kisumu: Macheru Primary School	1970	325 (46%)	\$.50	200	CRS	Maize Beans Supro
Eldama Ravine: Shimoni Primary School	1967	157 (62%)	\$.10	180	CRS	Bulgur Wheat

KENYA: SUMMARY OF CHARACTERISTICS OF MCH FEEDING PROGRAMS

Site	Year Program Started	Days per Week Open	Food Distributed	Number of Children Enrolled for Food Distribution	Fees (U.S. Dollars per Month)	Other Services Provided	Sponsoring Agency	Average Number of Persons Eating Food per Family*	Average Number of Days Food Lasts*
Ngong: Ngong Red Cross MCH Center ?		2	Bulgur Wheat Oil Dry Milk	400	\$.29	Lectures Cooking Demon- strations Medical Services	CRS	2.8	5.5
Kanzalu: Kanzalu Child Welfare	1969	6	Bulgur Wheat Oil Dry Milk	1,400	\$.29	Lectures Medical Services Clinic	CRS	5.3	4.1
Nakuru: Nakuru Holy Rosary Pre- School Clinic	1968	3	Bulgur Wheat Oil Dry Milk	830	\$.29	Lectures	CRS	2.9	7.2
Nyeri: Ngandu MCH	1971	2	Bulgur Wheat Oil Dry Milk	500	\$.29	Lectures Cooking Demon- stration Medical Services Clinic	CRS	2.6	8.8
Eldama Ravine: Mercy Hospital	1967	1	Bulgur Wheat Oil Dry Milk	240	\$.29	Lectures Cooking Demon- strations	CRS	4.8	6.7

* Based on interviews with mothers currently enrolled in program.