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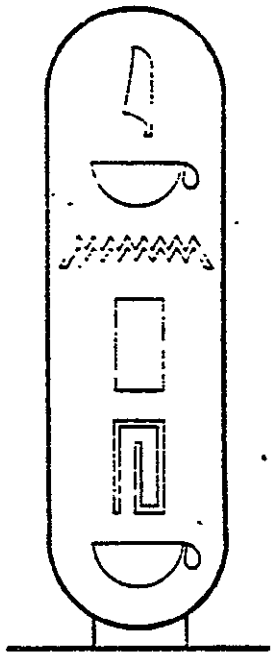

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MAKING PRIMARY HEALTH CARE NUTRITION WORK:

ISSUES RAISED IN A REVIEW OF THE RECORD

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EXECUTIVE SUMMARY

The purpose of our report is to learn what has been achieved in primary health care/nutrition (PHC/N) to date and to see what is suggested by current experiences to better ensure the success of future efforts. We do not claim to have definitive answers to these important questions. Rather, within the limitations of the review, we have sought to examine the available evidence, summarize the findings and suggest some of the more practical lessons presented.

Twenty-one PHC projects incorporating significant nutrition components were selected for review. These had data available on prevalence of protein-energy malnutrition, infant mortality rates and/or figures on coverage of nutrition activities. Ten projects were located in Asia, eight in Latin America and the Caribbean, and three in Africa. Of particular interest was how well the transition from small, more carefully controlled efforts to large-scale, government-run programs is proceeding; five projects of the latter type were included.

Our review affirms the body of evidence that PHC/N can work. In the more successful (5 out of 7) of the research-oriented efforts, infant mortality declines of 25 to 50% were registered within five years and declines in prevalence of moderate and severe malnutrition of 20-50% in 3-4 years.

There is also evidence that the transition from small-scale to large service-delivery PHC/N programs is being effectively bridged, particularly in countries with substantial experience in, and commitment to, health and nutrition improvement. Consistent gains in

coverage with growth monitoring and food supplementation are being accomplished in at least half of these projects, reaching a range of 40 to 90% of the target population. Furthermore, indications of nutritional benefit among populations served are being associated with these efforts.

While no single set of interventions could be identified as being primarily effective, a core group of interrelated PHC/N interventions stand out as most important. These are growth monitoring, food supplementation, and maternal nutrition services. Consideration should be given to their potential relevance and feasibility in given locations for inclusion in new PHC/N efforts.

Key issues in planning and implementation which appear to be related to feasibility and the ability to achieve measurable impact are highlighted by the review. These include the importance of explicitly basing strategies on assessment of local needs and resources in order to establish the relevance of project approaches; the importance of adequate attention to PHC/N support systems; the targeting of project efforts, whether in terms of individual beneficiaries in a particular program or in terms of communities to be served, in the face of limited project resources; and the vital importance of local participation and self-reliance in sustaining community-based PHC/N action.

To assess the order of achievements with respect to mortality and malnutrition leads achieved at the national level over time, we briefly review the historical experiences of three developing countries. The evidence from these "natural experiments" suggest the

magnitude of improvements possible when governments are committed to development policies which include human capital, including health and nutrition, objectives. The fact that dramatic improvements in malnutrition prevalence and infant mortality rates could be achieved and sustained amidst relative poverty indicates that important gains can be reached through equitable, targeted approaches to health and nutrition.

What conditions induce these outcomes? Once there is sustained political committment to nutrition in primary health care, and the evidence of the review suggests that such commitment is justified, the need is to ensure that efforts are truly congruent with local needs and with available resources and capabilities. Selective action may be needed at first when managerial capacity and financial resources are limited and the need is great to demonstrate effective nutrition action within a PHC system. This can provide the framework for the gradual, incremental introduction of other complementary interventions as the successful implementation of preceding steps is demonstrated.

CHAPTER 1

INTRODUCTION TO THE REVIEW

A. WHY NUTRITION IN PRIMARY HEALTH CARE?

Today a billion human beings show evidence of malnutrition due to inadequate intake of protein, energy, iron, vitamin A, and iodine. As a result, at least 12 million are permanently disabled and 11 million die from malnutrition every year. And yet, the majority of deaths, all permanent disabilities, and a large portion of the lesser degrees of malnutrition can be prevented by the health sector through primary health care services combined with nutrition interventions.

Malnutrition is a disease that leads to lowered resistance to infection, cognitive and functional impairment, and ultimately to illness and death; therefore, it is a health sector responsibility.[28]

It is also a social condition, a reflection of poverty and gross social inequity that strikes at the very root of national development. It impairs productivity, school and social performance as well as health and life expectancy.

The real answer to malnutrition lies in social development and economic growth, increasing employment opportunities and family income, and greater food availability. Such permanent solutions however, are being attained very slowly in many parts of the developing world. In the meantime, the need for direct nutrition action, in combination with primary health care, is

obviously great. Most nations of the world endorsed this improving the health and nutrition conditions of the poverty-stricken within an acceptable period of time and at affordable cost.

As such, the PHC movement should be used to its full potential. In its conception, the PHC approach should promote direct community involvement in assessment and action; and it is expected that this, in turn, fosters the awareness, hopefulness, and skills needed by communities to begin addressing themselves to both the symptoms and multisectoral causes of their distress.

We submit that the setting of the goal of Health for All by the Year 2000 is among the most fundamental of decisions taken by nations of the world, a goal to which we must recommit ourselves, as every year, millions of children die before the age of five and millions more are left physically and mentally crippled for the rest of their lives. Though PHC/N can provide tangible results in the short run, they should be maintained until social and economic development permit families to achieve self-sufficiency. Consequently, PHC/N represents a key basis on which to build for our long-range goal of Health for All.

B. THE FOCUS OF THE REVIEW

The purpose of our report is to learn what has been achieved in PHC/N to date and what current experiences suggest should be done to better ensure the success of future efforts. We do not claim to have definititve answers to these important questions. Rather, within the limitations of the review, we have sought to examine the available evidence, summarize the findings

and suggest some of the more practical lessons these projects present. If PHC/N is worthwhile, what conclusions can be drawn from the data and literature about what should be carried forth, how and for whom?

The emphasis here is on nutrition in the context of PHC. We have not attempted to explicitly review vertical nutrition interventions, such as micro-nutrient fortification, outside of PHC settings. Nor have we explicitly addressed the more clinical nutrition-related activities commonly associated with the treatment and rehabilitation of malnourished patients. Our focus is on preventive nutrition which involves educational and social, community-oriented activities. We do, however, draw selectively from the literature on these experiences when it is necessary to put specific project findings into the broader context from which substantive generalizations can be made.

We focus on the relatively well-defined PHC projects or programs which have explicit nutrition objectives and have described what was achieved. Because of the apparently strong relationship between nutritional status and mortality risk, especially during vulnerable periods in infancy and early childhood, we examine a young child's nutritional status as well as infant mortality. We leave it to the reader to determine which results are of greatest policy interest.

The twenty-one projects presented in Chapter 2 (and described in Appendix 1) were selected in large part on the basis of the accessibility of data for our secondary analysis and our judgements about the data's reliability and documentation. The scale of the effort was also of importance. Previous reviews

attempting to answer similar questions have focused on small-scale efforts operated outside of public administration frameworks. This focus was dictated in part on what was available and in part on substantive grounds, i.e., the interest in defining the potential of carefully controlled health and nutrition interventions. We wanted to also examine larger, preferably government run programs, to determine how well the transition from small to large efforts is being made to derive some operational lessons from these experiences.

Some projects fitting this description are now in progress and some outcome data are available from them. But because the evidence is still limited we have also looked at process indicators, such as nutrition intervention coverage achieved, for larger projects. In these larger services-delivery oriented efforts, we are more concerned with their coverage and the broad pattern of achievements.

Countries in which the transition from research, university-run efforts to governmental (regional or national) programs could be reviewed were of particular interest. This includes Haiti, Guatemala, Jamaica, India and Thailand. We have not shied away from selected efforts which were not able to document significant improvements in outcome measures because of the often important lessons these experiences offer. Those which we thought to have been influential, either in terms of national

PHC policy or in shaping the directions taken in the broader international PHC community, have been included.*

Finally, we attempted to achieve adequate geographic representation. This was difficult particularly with regard to Africa, in which the documentation of PHC/N efforts is notably limited. All of the projects reviewed shared the common characteristics of PHC efforts: they emphasized community-based services of low cost and high coverage provided by paraprofessionals.

In Chapter 3, we explore in greater detail the specific fincings from the projects, focusing on three main PHC/N interventions: growth monitoring, food supplementation, and maternal nutrition services. Nutrition education, an important PHC tool and technique, is discussed only briefly (due to space limitations) within the context of these three above interventions, as is the treatment of acute malnutrition and specific nutritional deficiencies.

Several key issues are identified and discussed in some depth in Chapter 4: degree of integration, importance of assessment, setting of objectives, targeting, reaching the community

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*The authors have had the opportunity to get to know nine of the 21 projects first-hand, either through direct involvement in its design, implementation or evaluation, or during visits to the project sites.

and promoting self-reliance. The chapter attempts to draw generalizations about the most critical approaches and PHC/N mechanisms.

Specific project or program experience is not the only or, necessarily, the best place to look to answer questions about the potential of PHC/N. What has been seen at the national level over time is the ultimate impact of commitment to particular health, nutrition and related policies. Historical trend data are available for selected countries which have had reasonably good, ongoing information systems in place for some time or which have periodically conducted large national sample surveys. In Chapter 5 we begin by briefly examining the data from three "natural experiments" (Chile, Costa Rica and Cuba) which elements of a PHC/N strategy have been in place and in which it is possible to see changes over time in mortality and nutritional status.

To streamline the body of the paper, we use shortened titles for the various projects. In the appendices we have presented matrices which give the full project titles and their acronyms, country of operation, and descriptive information on project orientation and services.

CHAPTER 2

CAN PHC NUTRITION WORK?

A. THE PROJECTS AND METHODS OF THE REVIEW

Twenty-one[1-21] primary health care projects are included in the review.* As mentioned in Chapter 1, they were selected on the basis of various criteria ranging from geographic representativeness, scale, inclusion of explicit nutrition objectives and the availability of outcome data. The 21 projects are described in Appendix I in terms of their setting, objectives, the services offered and selected outcomes. Ten of the projects are located in Asia, 8 in Latin America and 3 in Africa. Several pioneering countries in PHC/N have more than one project included: Guatemala, India, Thailand, Jamaica, and the Philippines.

In order to make meaningful comparisons, we separated the projects into three categories: research-oriented, pilot-service and large-scale service delivery. The first category, which includes seven projects (such well-known ones as Narangwal, INCAP-Longitudinal, and Danfa), had essentially research objectives and, except for Candelaria, incorporated quasi-experimental research designs. The larger of these projects (Petit-Goave, Danfa and SINAPS) had also important service and operational research components.

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*See Appendix I for project descriptions and for abbreviations for project names used throughout this paper.

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The second category, which includes nine projects (such as Jamkhed, Hanover, Bohol and Lampang) are less research-oriented placing greater emphasis on service. The last category represents large-scale, government-run programs presently in operation. These include programs that are nation-wide, as are the Jamaica/HMIP and Sri Lanka/Thriposha programs; multiple-state or province projects, such as the India/ICDS, and Indonesia/NIPP projects; or single, large state projects such as the India/Tamil Nadu project. The larger programs often represent up-scaled versions of earlier pilot-service efforts in the same countries.

Table 1 presents data on the outcome indicators of young child nutritional status and infant mortality. Child (1-4) mortality, an equally important indicator, is not included since most projects do not have the data available. Table 2 adds data on the coverage of growth monitoring activities and Table 3 includes coverage data on both monitoring and food supplementation activities for projects which do not yet have information on mortality.* In Tables 1 and 2, scale is defined as the number of communities provided with PHC services by the project.*

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*It was felt that in these large scale projects, it is harder to attribute changes in infant mortality to direct project inputs than in the small scale projects where more comprehensive manipulation of the environment was possible.

**Although size of target population is also important (and included in Appendix 1), the number of communities reflects the operational scale of complexity often seen as major constraints in up-scaling community-based PHC projects.

TABLE 1

YOUNG CHILD MALNUTRITION AND INFANT MORTALITY
SELECTED RESEARCH-ORIENTED PHC PROJECTS WITH NUTRITION COMPONENTS

Country/Project (Years)	Number of Communities	WEIGHT RETARDATION IN UNDER FIVES					INFANT MORTALITY RATE (Deaths/1000 live births)				
			Treatment Areas		Control Areas			Treatment Areas		Control Areas	
		Years	%	(N)[d]	%	(N)	Years	Rate	(Births/Yr)	Rate	(Births/Yr)
SMALLER SCALE											
Colombia/Candelaria (1963-74)	1	1963	14.8a	(1094)							
		1964	9.8	(1201)	15.7[a,g]						
		1968	7.5	(694)							
		1970	6.2	(1350)							
		1972	4.8	(1430)							
		1974	2.7	(1192)	8.3[g]	(1407)					
Guatemala/INCAP Longitudinal (1969-77)	4						1960-63	162	(±125)		
							1964-68	124	(±125)		
		1969-73	4.5kg[e**]	(145)	3.7kg[e]	(66)	1969-72	69	(±110)	85	
							1973-76	54	(±110)		
India/Narangwal (1968-74)	10	1969-73	15 [c,f**]	(542)	25-30[c,f]	(542)	1970-73	81	(300)	128	(724)
Guatemala/Patulul (1977-80)	12	Nov '78	32.3[a]	(539)	34.6[a]	(424)	1972-77	160	(±350)		
		Feb '80	37.4	(428)	33.3	(460)	1977-78	90	(±350)		
		Feb '81	19.1**	(330)	26.1	(537)					
LARGER SCALE											
Haiti/Petit-Goâve (1975-78)	±160		Area I		Area III[h]			Area I		Area III[h]	
		Nov '75	41.2[a]	(859)	26.3[a]	(1106)	1974	142	(224)	132	(190)
		Oct '78	28.6	(1118)	25.0	(1568)	1978	109	(268)	100	(260)
			Area II					Area II			
		Oct '75	30.9[a]	(563)			1974	174	(213)		
		Oct '78	24.0	(858)			1978	100	(224)		
Ghana/Danfa (1970-79)	±200		Area I		Areas II-IV			Area I		Areas II-IV	
		1972	±33[b]				1971-74	71	(±700)	115	(±2000)
		1975	±19[ns]		±19[b]		1975-77	97	(±700)	92	(±2000)
Guatemala/SINAPS (1979-82)	300	1979	13.7[a]	(170)	17.6[a]	(164)	1979	92	(303)	123	(211)
		1981	14.4[ns]	(85)	15.8	(139)	1980	130	(278)	114	(201)

* Sig ($p < 0.05$) ** Sig ($p < 0.01$) ns Not Sig ($p > 0.05$) ± Our estimation
[a] Under 75% expected weight-for-age; [b] Under 80% W/A; [c] Under 70% W/A; [d] N=number of all children weighed
[e] Ave. weight increment between 12 and 36 months of high supplemented vs. low supplemented children
[f] All children at around 36 months
[g] National sample surveys, taken in 1966-67 and 1977-80
[h] "Non-demonstration" area rather than control area

TABLE 2-

YOUNG CHILD MALNUTRITION, INFANT MORTALITY AND NUTRITION ACTIVITY COVERAGE
SELECTED PILOT-SERVICE PHC PROJECTS WITH NUTRITION COMPONENTS

Country/Project (Years)	Number of Communities	WEIGHT RETARDATION IN UNDER FIVES					INFANT MORTALITY RATE (Deaths/1000 live births)			NUTRITION ACTIVITY COVERAGE		
		Years	Demonstration Areas %	(N)	Non-Demo. Areas %	(N)	Years	Demo. Areas Rate	Non-Demo. Areas Rate	Years	Growth Monitoring %	(N)[e]
SMALLER SCALE												
Nigeria/Imesi (1960-)	1	1966-67	38[b]	(±1200)	49[b]		1966-67	57	91	1966-67	95	
Haiti/RHDS (1981-)	55	Oct '81	33[a]	(1000)						1983	45.8	
		Dec '83	27.2	(1031)								
India/Jamkhed (1971-)	70	Apr '80	5[c]	(101)	65[d]	(222)	1971	97	90			
							1980	30	192			
LARGER SCALE												
Thailand/IVNAP (1980-82)	90	Jul '81	16.5[a]	(478)								
		Dec '81	8.2	(522)	15.0[a,f]					1979-83		(2 mil)
Tanzania/Hanang (1977-82)	113	May '80	11.1[b]	(1915)	10.1[b]	(7990)						
		May '82	2.8	(1748)	9.5	(7444)						
Jamaica/Hanover (1972-75)	153		Area I									
		Jul '73	10.9[a]				1973	47	26			
		Jul '75	6.2				1975	11	23			
			Area II									
		Jul '74	13.0[a]									
		Jul '75	6.6									
Philippines/ Bohol (1976-79)	±250	Oc-Nv '76	26[a]	(3157)			1970-74	58-72	68	1976	18-50	
		Jn-Fb '79	29	(4833)			1975-78	64	56		Area I[g]	
										1974	3.1	
Thailand/Lampang (1979-81)	592	1977	25.8	(1598)			1972-74	53	62	1979	51.7	
		1979	25.1	(553)			1977-79	35	52		Area II	
										1974	5.9	
										1979	41.8	
Philippines/PUSH (1979-)	300-600	1979	37[a]	(12417)						1979	40	(31044)
		1982	32	(16653)						1982	60	(16653)

± Our estimation [a] thru [c] Same as Table 1-A
[d] Under 13.5 cm arm circumference; reliability of measurement differences between two areas questionable
[e] N=number of all targeted children being monitored
[f] National sample survey, April '82
[g] % of target children using nutrition/child health services

TABLE 3

YOUNG CHILD MALNUTRITION AND NUTRITION ACTIVITY COVERAGE
SELECTED LARGE PHC PROGRAMS WITH IMPORTANT NUTRITION COMPONENTS

Country/Project (Years)	Number of Communities	WEIGHT RETARDATION IN UNDER-FIVES					NUTRITION ACTIVITY COVERAGE OF UNDER-FIVES				
		Demonstration Areas			Non-Demo. Areas		Growth Monitoring			Food Supplementation	
		Years	%	(N)	%	(N)	Years	%	(N)[g]	%	(N)[g]
Indonesia/NIPP (1978-82)	180-258	Area I									
		1978	64[d]	(270)	53		Jul '82	62.2	(71970)	64.5	
		1982	54	(309)	52						
		Area II									
		1978	61	(282)	57						
		1982	56	(455)	57						
India/ICDS (1975-)	3300-15000	1976	46.1[c]	(27726)			1975-76			Rural 18.7	
		1979-80	37.0	(15882)			1978			57.3	
		1982	26.9	(30034)						Urban 26.3	
							1975-76			48.1	
							1978			All Areas[e] 63.3	(±9500)
							1982				
India/Tamil Nadu (1980-)	4000	Sep '82	19.3[c]	(350)	25.3[c]	(350)		District A		Districts	
		Aug '83	12.6	(350)	30.0	(350)	Mar '83	92.4	(5822)	A 90.6	(±3200)
										B 80	
										C 68	
Jamaica/HMIP (1981-)	National	Parish I						Parish I			
		Apr '78	11.1[a]	(108)	7.9[f]	(2920)	Oc-Dc '82	35.4	(1808)		
		Jn-Mr '82	6.0	(1676)							
		Oc-Dc '82	4.0	(1808)							
		Parish II									
		Apr '78	9.5[a]	(161)							
		Jn-Mr '82	5.6								
		Oc-Dc '82	4.6								
		Parish III						Parish III			
		Apr '78	7.2[a]	(849)			Mid '83	57	(19923)		
		Mid '83	3.2	(19923)							
Sri Lanka/Triposha-MCH (1973-)	National	1979-81	After[g]		Before[g]						
		0-1 yr	14.9[c]	(161)	17.3[c]	(724)				±40	
		1-2 yr	29.3	(481)	43.9	(565)					
		2-3 yr	32.9	(541)	45.4	(346)					
		3-5 yr	40.7	(599)	58.7	(155)					

± Our estimation [a] thru [c] Same as Table 1-A
[d] Under 90% weight-for-height, under three's
[e] Includes only areas with over 2 yrs. in ICDS project
[f] National sample survey [g] N=number of all targeted children being monitored; beneficiaries of food programs

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The source of the outcome data on the smaller research-oriented PHC projects came from their own internal data collection systems which had reasonable quality controls. All the other seventeen projects, with the exception of Philippines/PUSH, have had to depend upon sample survey studies to produce reliable project information systems in their design, such as Danfa, SINGPS, Haiti/RHDS, Hanang, Bohol, Lampang, Tamil Nadu and Jamaica/HMIP but most of these were unable to generate data adequate for monitoring project achievements.

The available data presented on nutritional status refers to the prevalence of weight retardation* in the project area population as a whole. The exceptions are the INCAP-Longitudinal and Thriposha data, which compare participants versus non-participants. Data on recuperation rates of the initially screened malnourished children were usually not reported, nor were the incidence rates (i.e. new cases per time period).**

The basic method of analysis for the non-experimental design programs uses a comparison of frequencies (e.g., prevalences) over time between groups residing in treatment or demonstration areas and those in similar control or non-demonstration areas.

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*Expressed as a percentage of the national or international weight-for-age standard as selected.

**It is more difficult for a project to affect prevalence rates (and, to a greater degree, on incidence rates) in the general demonstration area than to affect just the target children directly benefiting from the interventions. Thus prevalence rates are considered a more conservative measure of project impact, and an important indicator for public health policy consideration.

The two areas are chosen as similar before the program begins, and "before", "during" and "after" measurements are taken. The analysis of change in frequencies can lead to conclusions about the adequacy of declines in nutritional status or increases in coverage, as judged with respect to program objectives or specific targets.[22] While no direct attribution of direct program impact can be presumed, the "adequacy" of the differences in trends between the two areas are suggestive, particularly to decision-makers.

Caveats and particularities of the data sets are briefly included in the project-specific notes section appended to Tables 1-3. Tests of statistical significance are included for the quasi-experimental projects for analysis of differences between treatment and control areas. Most of the other large service-oriented projects present baseline and endline outcome data in the project demonstration areas, and sometimes include data on comparable non-demonstration areas for the same time period.

5. THE OVERALL FINDINGS

Of the six quasi-experimental projects, four (INCAP-Longitudinal, Narangwal, Patulul and Petit-Goave) showed statistically significant and important declines in both infant mortality and young child malnutrition not observed in the control areas. Infant mortality fell by about one-half in a five-year span in the Guatemalan projects, and second and third degree malnutrition fell by about one-third to one-half in Petit-Goave, Patulul and Narangwal. The two other projects, Danfa and SINAPS, which happen to be largest in scale in this group, showed no

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significant infant mortality or malnutrition declines in the treatment areas as compared with the control areas.* The seventh project, Candelaria (with a non-experimental research design), achieved large and consistent declines in second and third degree malnutrition over a twelve year period, and prevalence rates lower than in comparable areas in Colombia.

In Table 2, data on nutritional status, infant mortality, and growth monitoring coverage are presented for the nine pilot-service PHC projects included in the review. While the data are of somewhat lesser quality than for the more research-oriented projects, when taken together certain trends can be discerned. Clear differences in the prevalence of malnutrition are observed between non-demonstration and demonstration areas during the project period in four of the nine projects (Imesi, Jamshed, Hanang and IVNAP) and in the infant mortality rates in Imesi, Jamshed, Hanover, and Lambang. Four projects (Haiti/RHDS, IVNAP, Hanang and Hanover) revealed important declines in prevalence within only a year or two of project start-up. Again, the largest scale rojects in this category did not show important declines in malnutrition: Bohol, a small increase in two and a half years; Lambang, no change in two years; and PUSH, a small decline over three years. Lambang also showed little difference near the end of the project in prevalence rates between the nutrition treatment and non-treatment areas.

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*SINAPS, as well as Petit-Goave, Narangwal and INCAP-Longitudinal, did show significant declines in child mortality.

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The findings within both the research and pilot-service, that larger scale projects showed less improvement than those of smaller scale, merits attention and may reflect the greater operational obstacle in implementing such projects.

The five large-scale PHC programs presented in Table 3 all show important declines in malnutrition prevalence. Impressive "before-and-after" age-standardized declines were registered in Tanjpeha (from 44 to 29 percent drop in 1 to 5 year olds) although the project investigators believed the data came from the better run clinics which have better data and presumably more effective programs.[21a] A similar situation exists with respect to the Jamaican/WMIP data. A significant four-year decline from 44 to 27 percent was achieved in ICDS, although it may have been affected by inclusion of expanded and better-off population base in this time period. The decline observed over a 18-month period in a random sample survey of 350 children in the original treatment block in Tamil Nadu (19.3 to 12.6% is striking when compared with the lack of improvement found in a matched sample of 350 children surveyed in a non-treatment block (25.3 to 30.0%)* Finally, while modest declines were observed in two NIPP project areas, in the nutrition communication component of the same Indonesian Nutrition Development Project, 533 children aged 0 to 2 showed significant nutritional status improvements over the 362 control infants, particularly in the mild to moderately malnourished categories.[43]

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*More recent data confirms this initial and impressive finding.

In Figure 1, those projects with declines in the prevalence of young child protein-energy malnutrition in the project demonstration or treatment areas are shown by the three categories of projects. Percentage declines in the 2-5 year period of implementation ranged from over 60% in Hanang and Candelaria to under 16% in Haiti/RHDS, PUSH and NIPP. Within each category, the lower the initial level of prevalence, the greater the percentage decline in the weight-for-age indicator, recorded irrespective of duration of the project. This unexpected finding also merits attention and may reflect a threshold* prevalence level below which it is more likely to have program effect.

The data on change in coverage of nutrition activities during project implementation are also presented in Tables 2 and 3. In some smaller and larger projects alike, over 90% of the target children have been covered by growth monitoring: Imesi, Hanover Area II and Tamil Nadu District A. In most of the other projects for which there are coverage data, over 45 percent coverage in growth monitoring was achieved. Fewer data are available on coverage of food supplementation. The two Indian projects have achieved over 60% coverage of the pre-school children targeted. Thriposha's coverage is estimated at around 40%. And, while there are no adequate data available for NIPP and HMIP, it has been observed that the coverage has been quite variable from one area to another also relatively untargeted.

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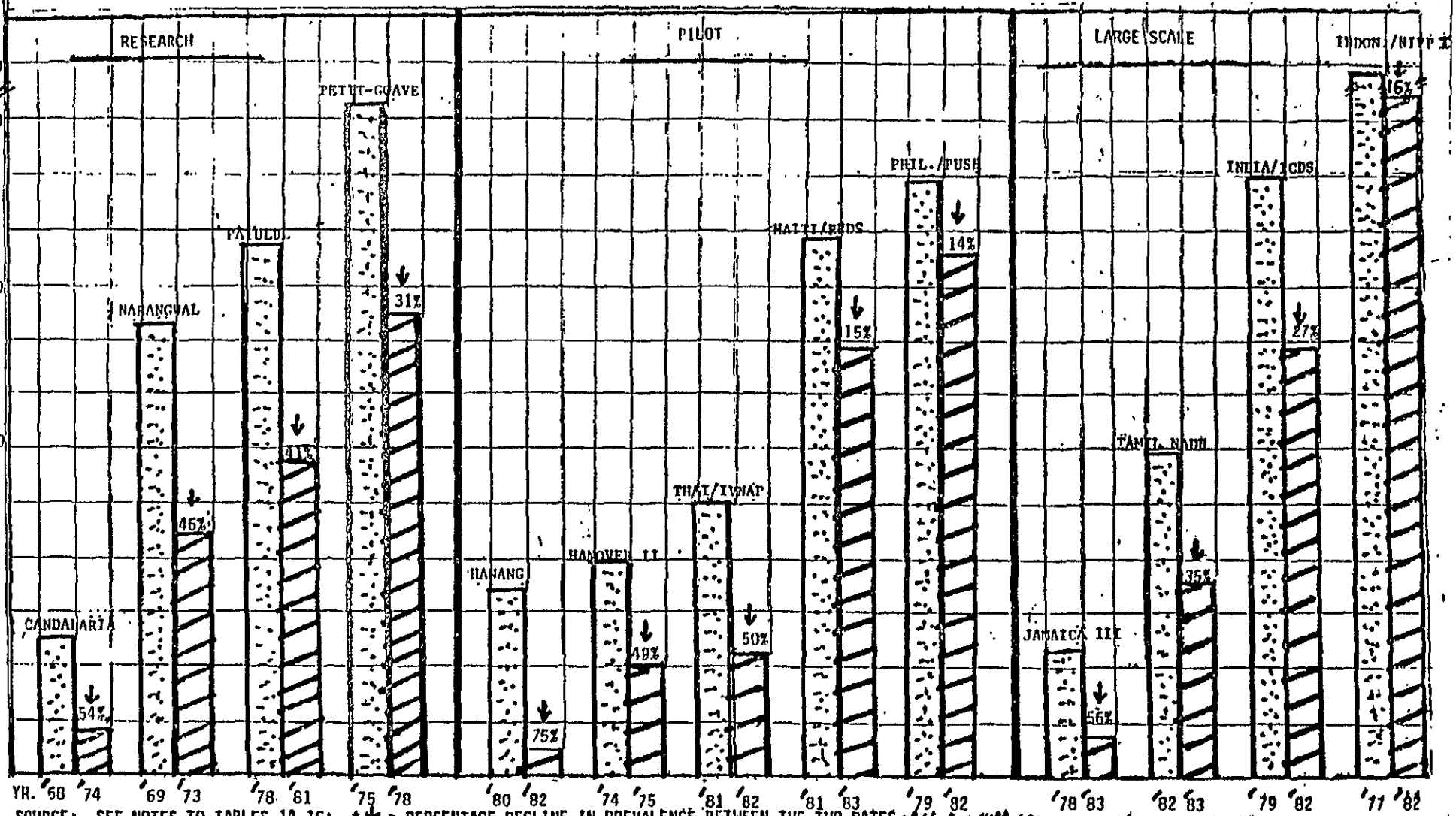
*An approximate threshold level suggested by these data is about 30-35% in second and third degree malnutrition.

FIGURE 1

DECLINES* IN PREVALENCE OF MODERATE-SEVERE YOUNG CHILD MALNUTRITION IN PROJECT AREA BY TYPE OF PROJECT



SOURCE: SEE NOTES TO TABLES 1A-1C; * ↓ = PERCENTAGE DECLINE IN PREVALENCE BETWEEN THE TWO DATES, ALL BUT NTTP ARE WEIGHT/AGE INDICATORS.

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Some of the projects which measured little or no impact on overall prevalence of protein-energy malnutrition in the project area population did show important effects on sub-groups targeted for special attention in home-based programs. In Guatemala/SINAPS, a follow-up of 40 of the 45 children identified in the baseline survey as moderate-to-severely malnourished revealed that one year later only five percent were still in this malnourished category.[7a] In the Indonesia/INDP Nutrition Communication and Behavior Change project, there were half as many (10%) moderately-severely malnourished children under two in the program group than in the the comparison group (19.4%).[43] In the Haiti/RHDS project children 6-24 months who regularly attended the local health rally (weighings and nutrition education) showed almost twice the average monthly weight gain (229 grams vs. 131 grs.) of their neighbors of the same age who attended much less frequently.[9a] In Petit-Goave, the younger siblings of malnourished children whose mothers attended mothercraft center and nutrition foyers experienced infant/child death rates 85% lower than in the non-demonstration group.[5b] And in Jamaica/HMIP, 86.5% of the children 0-3 years in one Parish had adequate weight gain; of those who began the year malnourished, 77.3% achieved adequate weight gain throughout the following year.[20a]

We reiterate that interpretation of these data must be made with caution, as the notes to tables 1-3 indicate. Five (Candelaria, INCAP-Longitudinal, Narangwal, Patulul, and Petit-Goave) of the seven research-oriented projects have provided

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sufficiently rigorous evidence of positive infant mortality and nutrition status outcomes. Declines in infant mortality were of the order of one-quarter to one-half, and in malnutrition, one-fifth to one-half within a three to four year period. Moreover, in the more operationally difficult, larger-scale service projects, seven (Jamkhed, IVNAP, Hanover, ICDS, Tamil Nadu, and Thripasha) of the 14 such projects seem to have been relatively successful in achieving adequate coverage and nutritional outcomes. In these seven, prevalence of second and third degree malnutrition declined over one-third within two to six years.

CHAPTER 3

FINDINGS REGARDING THE PHC NUTRITION INTERVENTION

What can be said about the effectiveness of specific PHC/N interventions? While it is not possible to draw conclusive generalizations on the basis of the evidence presented here, initial answers are available from two sources: the components consistently included in operational programs for which there is some evidence of success, and the interventions which warrant greater attention on the basis of findings of more research-oriented efforts.

With respect to more operational programs, two PHC/N interventions stand out: growth monitoring and food supplementation. These represent the core of most of the contemporary PHC/N efforts we studied. As intervertions, they appear to be the most consistent with PHC strategies of equity and access. Growth monitoring is a tool which can promote coverage and, as a means of targeting, the rationalization of the use of scarce resources. Food supplementation can promote the utilization of associated services in addition to its clearly redistributive role. Because these two interventions were so consistently included, however, it is often not possible to differentiate their individual contributions to the impact achieved.

More concrete evidence is available from project research findings on what specifically works, although generally not in operational contexts. The importance of maternal nutrition services is indicated by project findings confirming the central

role of the mother in infant and young child survival and nutritional status, both directly through biological determinants and indirectly through her social, economic and educational status. That such evidence exists does not necessarily mean that the intervention in question will receive as high a priority as it should -- only a handful of projects adcressed this apparently crucial constellation of services in the comprehensive manner that appears to be warranted.

Nutrition education is an element of these three interver-tions; without appropriate promotion, communication or counseling activities none of these can be fully effective. Nutrition education is discussed as such in the following sections.

A. GROWTH MONITORING

One of the nutrition activities that is widely used in PHC programs is growth monitoring.[27,28] The pre-Alma Ata projects that have led to the development of growth monitoring were Imesi, Naragwal, Candelaria, and Hanover. Now, countries such as Indonesia, Thailand, India, Chile, Costa Rica and Jamaica are trying to institute the monthly weighing of children nationwide.

There appears to be increasing interest in using growth monitoring activities as a management device to extend PHC coverage to the hard-to-reach at-risk groups. The coverage of under-fives by routine growth monitoring in the early 1980's was over 80% in Tamil Nadu and SINAPS, and over 45% in Haiti/RHDS and NIPP (tables 2 and 3) - all great improvements over the coverage in basic health services in the 1970's which often did not include growth monitoring. Other preventive and promotive

services, such as immunization, oral rehydration therapy, family planning, health education, and nutrition counseling and demonstrations become more relevant when frequent monitoring provides parents with evidence that such services affect a child's growth and health. [29]

One important issue revolves around who will carry out growth monitoring - MOH personnel, community volunteers, the mother, etc. Many feel that weighings done at home on a regular monthly basis are ideal and that CHWs (or TBAs) should be the responsible personnel. However, several projects have found that growth monitoring is a time-consuming, if not so costly, PHC activity that requires on-going training and supervision. Often, because of the lack of the latter, growth monitoring has been reduced to a perfunctory data gathering task of weighing and recording, and thus stripped of its diagnostic, educational, targeting and integrative roles.

Some projects have found it difficult for CHWs to consistently do monthly home weighings of all under-fives, and have opted to do growth monitoring less frequently, to the higher risks, and/or in mass meetings or campaigns, (e.g., HMIP and SINAPS), in clinics (Hanang, INCAP Longitudinal), at village rally posts (Haiti/RHDS, Petit-Goave), or at village nutrition centers, (IVNAP, India/ICDS, NIPP, Tamil Nadu). Often CHWs, who cover large populations, do not have enough time and thus nutrition volunteers or communicators have been trained to do the weighings (Lampang, NIPP, IVNAP). An exception has been the PUSH project, where many village health workers have increased their surveillance coverage by leaving the health post to weigh in the

homes. If scales and growth charts are too expensive or difficult, arm circumference bands have been used instead (SINAPS, Hanang).

A major issue arising out of our review is whether growth monitoring can be considered in itself as a discrete intervention with nutritional impact or as primarily a tool within a broader "Road-to-Health" strategy? In those situations where young child malnutrition is influenced more by socio-cultural factors than by scarcity of resources, the educational and motivational aspects of frequent growth monitoring could have direct impact on nutrition and mortality (as claimed by Imesi, Hanover, and several Haitian and Indonesian project reports). However, the direct evidence regarding nutritional impact of growth monitoring in itself has not become clearly apparent in this review of the available data.

Our reading of the record is that growth monitoring can be a useful activity for PHC and contribute to the "Road-to-Health" strategy in the following ways:

1. Early detection of young children at risk to becoming malnourished, and frequent follow-up of those at highest risk;

2. Monitoring of the general health of the child, and increasing parent and CHW self-sufficiency in health promotion;

3. Targeting at-risks for other nutrition and PHC interventions;

4. Teaching parents how diet and illness can affect nutritional status of their young children; and

5. Providing data for evaluation of the nutritional impact of a project/program.

The importance of linkage between growth monitoring and other nutrition activities has become apparent in the project review. In numerous projects, periodic weighing of children serves as a screening device to select beneficiaries for food supplementation programs (SINAPS, Thriposha, Hanang, India/ICDS, Lampang, IVNAP), and tool to indicate when the children can be taken off of the program. It is also used to select mothers to participate in nutrition education and food demonstration courses (foyers) in order to make food supplementation efforts more effective (Haiti/RHDS, Petit-Goave, NIPP). In more comprehensive growth monitoring activities, frequent weighing becomes a educational tool through which both parents and CHWs learn to relate factors in the child's environment during the past month to weight-gain performance (NIPP, Tamil Nadu, Haiti/RHDS).

Though growth monitoring can be an effective educational and management tool for PHC/N, health personnel find it time-consuming to do systematically on a monthly, home-to-home basis. Ways have been found to overcome such constraints by using volunteers, health rallies, TBA's or the mothers themselves: This has translated into greater coverage and more self-reliance.

B. FOOD SUPPLEMENTATION

Seventeen of the twenty-one projects reviewed included some form of food supplementation as an element of project services. Some of these did so specifically to investigate some aspect of its impact on pregnancy outcomes, young child growth,

and development or mortality; among these are the Narangwal, INCAP Longitudinal, and Patulul projects. A number of others, such as Hanang and Haiti/RHSD, are pilot projects testing approaches for possibly wider replication. The balance, such as HMIP/Jamaica and Thriposha, are service-delivery projects aimed at providing the best complement of services possible under local circumstances.

What can be learned from these numerous project experiences with respect to the benefits and practical implications of food supplementation as an element of PHC/N efforts? We review the major findings of the projects which had specific research objectives, focusing first on maternal supplementation, then on supplements for infants and young children. Next, we look at the approaches taken in the larger, service-delivery programs and their implications for future efforts.

Maternal Supplementation, Birth Weight, and Infant Survival.[29] While there is considerable variation based on ethnicity, socio-economic status, and other factors, studies from many parts of the world confirm the strong and close relationship of birth weight and survival. A host of factors appear to determine birth weight, including environmental, genetic, social, and importantly, nutrition-related biological determinants. Maternal nutritional status, both before and during pregnancy, significantly influences pregnancy outcome. Numerous studies indicate that maternal weight gain during pregnancy is also clearly associated with birth weight achieved.[30] And, while the evidence is not entirely conclusive, the INCAP Longitudinal project as

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well as dietary supplementation studies in India, Colombia, and Mexico indicate that supplementation is associated with increased pregnancy weight gain.

In Guatemala, food supplements for lactating mothers lec to improved physical growth during the first six months of life and reduced infant mortality, probably through improved breast-feeding performance. Investigators in the Guatemalan INCAP Longitudinal and SINAPS projects conclude that planned dietary change for pregnant and lactating women, as one component of integrated PHC services, can result in significantly improved growth and survival.

Early Childhood Nutrition, Physical Growth and Mortality. The results from several of the projects included in this report, as well as findings from other studies, indicate a clear relationship between nutritional status and mortality in early childhood, as well as with the number and severity of infectious episodes. [32,33,35]

While many young child supplementation programs conducted outside of PHC contexts have not been able to demonstrate measurably-favorable outcomes, the review of evidence from projects which offered food supplements as an element of health and nutrition services for children demonstrates that such efforts, when properly designed and implemented, can significantly reduce young child mortality and the prevalence, although not the

incidence, of malnutrition in addition to improving physical growth.

The SINAPS and Petit-Goave projects demonstrated that adaptations of nutrition rehabilitation approaches which featured community-based, supervised feeding and intensive nutrition education could save lives. A secondary analysis of the Hanover project revealed that significant mortality reductions were attained through close nutrition surveillance and selective nutrition rehabilitation. [12a]

Evidence from several of the projects reviewed indicates that physical growth and the prevalence, of malnutrition can be improved by the provision of health and nutrition care, of which food supplements are one part. In the Hanover project the number of children below 75 percent of weight-for-age standards was reduced from 11-12 percent to 6-7 percent within one year of project initiation. In Naraangwal, children at three years of age were 6-7 percent heavier and 1-2 percent taller than children in control villages; those receiving nutrition supplements grew most rapidly of all. [4a] Food supplementation is thought by project investigators to have been important in the statistically significant reductions in weight retardation in the Patulul and Candelaria projects. And in the INCAP Longitudinal project, those who regularly received the food supplements grew 10-15 percent more rapidly. [1b]

<u>Broader Project Experience</u>. Supplementation has a central role in a number of the pilot or service-delivery PHC/N efforts now going on for which there are data suggestive of positive outcomes

greater than could be expected in their absence. Among these are the INVAP, INDIA/ICDS, NIPP, Thriposha, Tamil, Nadu, PUSH, and Jamkhed projects. In addition, the Hanang project has been carried out in close coordination with an MCH and a school feeding program to which Hanang participants have probably had particularly high access. [16a]

In the SINAPS project, significant improvements in the nutritional status of those identified as moderately or severely malnourished children were achieved through supplementation. However, measurable impact at the population level could not be demonstrated over a relatively short period of time and in the face of dramatically rising food prices and continuing, poor environmental conditions.

The already completed Bohol project, judged by its investigators not to have had significant impact, did not include supplementation services. Another more recent effort giving little emphasis to supplementation, the HMIP project, has not yet registered substantial gains in outcome measures. There is, on the other hand, initial indication of impact for the Haiti/RHDS project which has not yet completed the implementation of a food demonstration and supplementation component patterned, in part, on national experience with mother-craft centers.

What are to be the most salient characteristics of the food supplementation approaches taken in the more apparently successful projects mentioned above?

First, many of the efforts seem to be effectively tapping supplementation efforts. The provision of food supplements acts as an incentive for families to attend local health centers at which time other services are made available. In screening for those eligible for food supplementation, referral can be made to essential complementary services such as ORT, growth monitoring and nutrition counseling, immunization, the treatment of con current diseases, and family planning.

Investigators in the Guatemalan INCAP Longitudinal and SINAPE projects report that the effect of supplementation on mortality declines was two-fold, acting directly as well as through increased health care utilization. The impressive gains registered in the coverage of supplementation activities in recent years in the India/ICDS and Tamil Nadu projects, along with initial evidence of impact on physical growth, suggest that these operational benefits may be being brought to bear in large populations through service-delivery programs.

In addition, these projects are attempting to resolve the major obstacles to effective implementation historically experienced in many supplementation efforts by emphasizing targeting to achieve greater preventive orientation, limiting the period of supplementation to that necessary for prevention or recovery, and promoting self-sufficiency.

The Tamil Nadu and Thriposha projects have defined and are using eligibility criteria designed to limit the availability of supplements to those most likely to respond, namely, those whose

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growth is faltering or those who are recovering from frank malnutrition.

Limiting the period during which foods are made available is another departure taken from standard supplementary food program procedures. In Tamil Nadu, supplements are generally made available for a ninety-day period, possibly to be increased to 120 days, after which the need for continuation is reappraised.

Other projects have experienced difficulty in this regard, however. The initial participation period in the NIPP project had at first been set at ninety days. Problems in erratic food supply, coupled with concern for bringing newly-identified, needy children into the program, have resulted in participation periods of only thirty to sixty days.

Self-sufficiency is an important element in the Jamkhed, IVNPP and Ranang-associated supplementation efforts, involving both the use of locally-produced foods and the preparation of the supplement within the community. In IVNPP and Jamkhed, among others, indigenous food supplementation approaches are directly linked to community development efforts.

For all the apparent gains achieved relative to supplementation, a number of important issues, beyond our scope to discuss here, await fuller resolution if the full benefits of supplementation are to be realized. Among these are the definition of the most indicative at-risk criteria; the appropriate timing and composition of supplements for pregnant and lactating women; and, more broadly, how to reduce costs and logistical problems by further increasing the participation of communities. It would also appear that considerably more attention to maternal

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supplementation is warranted, a frequent omission which is discussed in the following section. And the trend toward more targeted, discrete and self-sufficient efforts appears to be a positive one if measurable impact is to be achieved.

C. MATERNAL NUTRITION SERVICES

The findings of projects included in the review lend support to the growing body of evidence which identifies the mother as a key actor in the complex web of factors which determine child health.[32,33] As discussed in the preceding section, maternal nutritional status during pregnancy affects birth weight and infant survival. In addition, evidence from some countries suggests that the nutritional and health experience of the mother during important periods of her own growth and development, as reflected in maternal stature and pre-pregnancy weight, may also have important bearing on pregnancy outcome.[33]

The influence of the mother appears to work through more than purely biological mechanisms, however. Evidence points to a strong relationship between the educational level of the mother and the birth weight and survival of her children.[33,35]

The causality of the relationship of maternal education and child survival and nutritional status has not yet been established, and the exact nature of the relationship is still speculative. Caldwell cites evidence from West Africa which suggests that a possible mechanism is through changed perceptions of the role of the mother, both on the part of herself and other

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family members, which ultimately lead to greater authority and ability to act in decisions crucial to child health. [34] With education, he suggests, women are likely to take more initiative in child care, seeking the assistance of available health care services not only during illness, and pushing for reallocation of family resources in favor of those who are most vulnerable.

The role of the mother in generating income for the family may also importantly influence child welfare. It has been observed that the nutritional status of the malnourished does not necessarily improve when overall family income rises, because how the additional resources are used depends on who brings them into the family. [36] Evidence from Africa and other parts of the world suggests income generated by the mother may have a differential impact on child health, being more likely to go toward more food and other basic needs. [34,42]

All of this argues for a comprehensive approach and high priority to the needs of mothers in PHC/N efforts. Of the fourteen pilot or service-delivery projects, eleven undertook food supplementation efforts, and most of these planned to provide food and nutrient supplements to mothers. However, the move from planning to actual implementation appears to have been less well bridged for maternal supplementation than other project services. Despite the available evidence regarding the positive effect on infant survival of maternal supplementation during pregnancy, there is clearly insufficient emphasis on this activity both in project design documents regarding specific implementation plans and in reports on project achievements. And as other reviews have found, it appears that less well detailed plans are less

likely to actually be carried out. [24,30] The NIPP and Tamil Nadu projects, both of which included innovative approaches to child supplementation and nutrition education, had plans to provide maternal supplementation; the lack of information in the reports on this component suggest that it has received less emphasis in project implementation.

There are important exceptions. It appears that the India/ICDS and Thriposha projects have given considerable attention to maternal supplementation, defining anthropometric, health, and socio-economic risk criteria to determine eligibility for substantial food and nutrient supplements. The ICDS data indicates that iron and folate distribution coverage has risen from 28 to 47% and food supplementation coverage from 18 to 35% of pregnant women in the ICDS project. And in the Thriposha program, some 25% of supplement recipients are reported to be pregnant or lactating women.

The service most often provided to women in the projects reviewed is nutrition education, especially breastfeeding promotion. Of the fourteen, eight planned to provide guidance to mothers on breastfeeding, weaning and other important elements of child nutrition care. The importance of maternal diet was emphasized in a few programs, most notably in the INDP/NCBC project. Broader maternal nutrition needs, both before and between pregnancies, and in adolescence and other critical periods, have generally not been focused upon.

The INDP/NCBC is about the only project which has provided direct evidence of the effectiveness of nutrition education

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strategies. Here, the nutrition education component aimed at changing nutritional behavior through growth monitoring, in-depth problem-solution identification, and a comprehensive communiction strategies in the trial period, pregnant women and mother of young children at high-risk met individually with interviewers to agree on a set of dietary modifications that the family then tried out. Women applied the knowledge gained in the program to feeding their children more of the recommended foods. It is felt highly likely that maternal nutrition and breast-feeding messages also had significant positive effects. In program areas 87 and 83 percent of the children consumed more than half of the recommended calorie and protein intake, respectively. For the children in the comparison sample, the figures were 63 and 60 percent respectively.[43,17A] By the end of the weaning age (at 24 months), 40 percent of the program children were better nourished than comparison children. The success of the field program was attributed to thorough research, a careful conceptualized media strategy, good implementation of the initial phase, and evaluation from the outset.[17a]

A few of the more recent service-delivery projects are attempting to provide services which entail active roles for women and which may bolster their social and economic power. In Tamil Nadu where mothers' clubs were formed to provide liaison with the project and advocacy for the village, women have taken an active and enthusiastic role; means are now being sought by which they might support the project while at the same time earning income for themselves. In the IVNAP project women's

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income-generating actions are a key element being carried out with a strong community development orientation.[37]

Priority attention to women's nutrition-related needs through a comprehensive, although not necessarily complex approach, seems warranted on the basis of all the available evidence. Such an approach might include, where relevant and feasible, supplementation for at-risk mothers along with pre- and post-natal care emphasizing the mother's as well as the infant's needs.

Attention to the nutrition and health needs of the woman during important periods of her own growth and development is also needed. While it is essential to act on behalf of the mother and the infant during the critical period surrounding birth, it is not the best point at which to correct long-established patterns of insufficient food intake and inadequate health care. More attention needs to be given, for example, to the potential role of supplementation targeted to young girls during crucial growth periods in early childhood and adolescence, which might be particularly needed where substantial gender differentials in malnutrition and mortality rates occur.[33]

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CHAPTER 4

KEY FACTORS IN PLANNING AND IMPLEMENTATION

With evidence in hand that PHC/N can work, questions remain regarding the effective translation of these experiences to other social, economic, and epidemiological contexts. What are the planning and operational issues whose resolution seemed most important in determining whether a project worked or not? The following section attempts to generalize from the diverse experiences, and to indicate where such generlizations might be detrimental to the success of new efforts.

A. THE IMPORTANCE OF ASSESSMENT

Assessment of needs and resources has long been recognized as an elementary step in the planning of PHC and other development programs. The experiences of the projects reviewed confirm the essential role of assessment, both as an initial step in program design and in the continuing process of formative evaluation. The experiences reviewed also suggest, however, that the purposes of assessment are often incompletely understood and the benefits are, therefore, not fully realized. Most importantly perhaps. Assessment is essential in establishing the relevance of project approaches to local needs and conditions. In a candid analysis of the reasons significant outcomes were not achieved in the Bohol project, Williamson[13a] cites among other possibilities, an inadequate fit between the mix of services and contemporary health problems; she notes that the project probably should have begun with more careful stucy of current local causes of death

and developed project strategies to address the priority health problems identified.

Unfortunately, assessment is not always perceived favorably by those designing and implementing PHC/N efforts.[24]* Dedicated project leaders may view assessment as merely the first step in evaluation, a less than essential use of project resources. They may believe, understandably, that the project's full effort should be to provide services to those in need. Yet, it is precisely because resources are limited that setting relevant priorities and developing explicit strategies to achieve them is so imperative.

Assessment need not necessarily be complex and frequently the needed data already exist. With information in hand on the etiologies of priority health problems, the severity of their outcomes, and the social and demographic characteristics of those most affected, it is possible to define appropriate target groups and project approaches which are responsive to local conditions. Assessment of the health system's development and the resources available is important in determining the level of PHC nutrition effort which can be sustained. Recent and promising approaches to health system analysis[25] can offer guidance in this regard.

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*This review of service-delivery PHC projects in sub-Saharan Africa found that the design of nutrition components appeared to be based more on currently fashionable PHC/N approaches rather than on analyses of local needs, conditions and resources.

B. SELECTIVE OR COMPREHENSIVE PHC/N APPROACH

Integration and comprehensiveness are cornerstones of the PHC approach. As defnied in the Alma Ata Declaration, PHC entails making a range of essential health-related services universally accessible. In addition to the commitment to equity, the provision of minimal comprehensive services makes sense on solid epidemiological grounds, especially with regard to nutrition. The multiple causation of ill-health and mortality in much of the developing world, and particularly the synergistic relationship of malnutrition and infection, have been well established. The malnutrition/diarrhea complex is a good example of one which requires action in a number of areas - nutrition, rehydration, safe water supply, sanitation and hygiene - for impact to be achieved in the long run.

But how feasible are comprehensive, integrated approaches in the face of the limited national health budgets, weak health infrastructure and management capacity, and fragmented sectoral responsibilities often found in the poorer developing countries: The experiences of some of the projects reviewed suggest that comprehensive approaches are often not at first possible.

The Haiti/RHDS project has been instrumental in the MOH decision that community-based health rallys featuring nutrition monitoring and surveillance should serve as the basis for the national PHC/N model. However, the MOH has also concluded that the use of Ministry of Agriculture extension agents in the rallys for food production demonstrations, originally an important

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careful attempts to keep the scope of the SINAPS project consistent with MOH capacity, ultimately the resources and personnel were not available to sustain the effort or to extend it to other regions of the country.

The need to scale-back comprehensive approaches has been experienced in a number of other projects, including the HMIP[20c] and Hanang[16a] projects. The Hanover and the Indonesian Nutrition Communication and Behavior Change projects are examples, on the other hand, of ones which appear to be having impact while offering a limited set of PHC services.

The apparent lesson to be drawn is not new: considerations about the needed range and intensity of services must be counterbalanced by feasibility concerns. By taxing to a lesser degree the limited physical and management infrastructure, and by allowing greater focus on a limited set of tasks, the selective implementation of a few, carefully targeted PHC/N interventions may better ensure that successes are achieved.

Of course, selective and comprehensive approaches are not mutually exclusive; in many cases, the former is the appropriate starting point and the latter the ultimate goal. Selective action may be needed at first when resources and capabilities are limited and the need is great to demonstrate that effective nutrition action is possible. This can provide the framework for the gradual introduction of complementary interventions as the effectiveness of preceding steps is demonstrated.[39]

C. ATTENTION TO PHC/N SUPPORT SYSTEMS

In a number of projects reviewed, the focus has been on the service-delivery level with less attention given to needed back-up systems. The evidence from these projects confirms the need for adequate PHC support systems in such vital areas as training and supervision, supply and transport, referral and counter-referral. Equally important is the management capacity to coordinate these essential efforts, especially in large, government-run programs of considerable operational complexity. Investigators in the Lampang project, for example, cite weaknesses in support and supervision among the factors responsible for the small impact on nutrition outcomes. Improvements achieved in support systems since then, as well as in inter-sectoral coordination in national planning, have been identified by program directors as crucial to the promising IVNAP program.

Interministerial coordination has been important in some of the larger successful programs. Linkages built into the design of the Tamil Nadu project, for example, in terms of training, referral, and record-keeping, as well as in the conduct of village health and nutrition rallys, facilitate the complementarity of the services of community nutrition workers and multi-purpose health workers operating under different ministerial auspices.

Making full use of the resources and capabilities of existing community institutions was highlighted in several of the more successful efforts. In Indonesia, an existing network of

family planning supply posts with greater coverage and more effective support systems than the health care system, was used as the basis for PHC.[29] By gradually adding components and using a mix of paid and volunteer staff, the network of contraceptive resupply posts was gradually transformed into a PHC system of high coverage with growth monitoring, ORT, Vitamin A and iron supplementation, and immunization services.

D. TARGETING

Defining appropriate target groups to include those most in need and most capable of responding to intervention, and the eligibility criteria to direct services to them, appear to be two essential elements in providing measurably effective services.

Targeting to individuals entails both theoretical and operational difficulties, however. As discussed in the preceding chapter, while some studies on the effects of food supplementation suggest that the greatest response is seen in those most at-risk as defined by anthropometry or pregnancy history, more needs to known about the most indicative risk criteria and about such locally-important factors as seasonality and workload considerations.

Carrying out targeted services can also be problematic, especially for food supplementation. Food substitution as a result of facility-based programs and sharing of supplements among family members in take-home programs are obstacles commonly faced. In addition, social pressure may be great to include all children; this has been experienced in the NIPP project, for example.

In the Tamil Nadu project, preventively-oriented eligibility criteria are being used with apparent success in providing food supplements for young children. By emphasizing weight gain rather than static measures of anthropometric status, limited project resources are focused on those who are, or are about to become, malnourished rather than on those who are already stunted. Thus, the food supplements go to those who are both in need and likely to respond. The Thriposha and India/ICDs projects are among other interesting efforts which have given considerable attention to targeting of food supplementation activities.

Food supplementation is not the only PHC/N intervention which appears to benefit from careful definition of project strategies and target groups. Systematic assessments of the sociocultural dynamics of malnutrition were conducted as the foundation for carefully designed and targeted mass media nutrition messages components of the Indonesian Nutrition Communication, Behavior Change and the Haiti/RHDS projects.

Targeting project resources available for growth monitoring and surveillance activities to at-risk communities in the PUSH project followed out of extensive national experience. In the face of limited resources, the emphasis was placed on reaching all children in the most vulnerable communities frequently rather than on more widespread coverage with less frequent weighings.* The HMIP project recently decided to adopt this approach after

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*Such as the Philippines Ministry of Health's mass weighting program, Operation Timbang.

finding that resources have been spread too thin to support growth monitoring activities of adequate quality in all communities.

E. REACHING THE COMMUNITY AND PROMOTING SELF-RELIANCE

Probably the single most important strategy of PHC is to extend coverage to the entire population. It is now recognized by many countries that the involvement and active support of the community are necessary conditions if PHC is to reach all communities on an equitable and self-sustaining basis. Extending coverage through community involvement is particularly important for the success of nutrition activities. The promotive base of such activities can be carried out with greater levels of participation in the home and community than in the clinics. Moreover, the intersectoral nature of the food and nutrition problem can often be more effectively coordinated through community level development committees than national planning ministries.

An important approach towards self-reliance is the "road-to-health strategy" which, in the projects under review, was first tried out in the 1960's in Imesi, and further developed at the community level in the 1970's in Hanover, Petit-Goave, and Indonesia/UPGK. The first entry point is usually growth monitoring on a frequent and periodic basis, followed by nutrition counseling, food supplementation and medical treatment for the higher risk individuals. Here the responsibility for the promotion of good nutrition is being place more directly on the mothers themselves.

The projects reveal a shift from urban-centered, low volume nutrition rehabilitation centers to village-based nutrition

centers or neighborhood food demonstration foyers. Petit-Goave provides evidence of the superior cost-effectiveness of the foyers.[5a] In the NIPP, IVNAP, ICDS, Lampang, and Tamil Nadu project, community nutrition centers have been established. These centers become the focal point for developing self-reliant means of feeding high-risk children, providing maternal nutrition services, and monitoring the recuperation of the malnourished.

In our review of the record, there is still little evidence that community PHC food actions have had any independent or combined effect on the nutritional situation in demonstration areas. One of the reasons is that many of the projects reviewed did not implement this type of PHC/N activity. Those that did concentrated on one of three types of activities: home gardens,[38] staple food quality improvement, or weaning food production.* Recent projects reviewed in India, Tanzania, Thailand and Indonesia are including efforts to organize community groups (e.g., women's working groups, teen clubs, farmers cooperatives, school children) to produce and distribute food supplements to high-risk children. One of the most innovative efforts is being carried-out in the IVNAP project village in Thailand. Here Local committees have adopted a simplified supplementary food formula made from local raw materials and are

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*For home gardens, the only study we encountered that provides some information on the nutritional effect of home garden PHC intervention found that there was little effect on the prevalence of clinical vitamin A deficiency.[26]

involved in their production, promotion, and distribution. This supplementary food production process is becoming an income generating incentive for the community. While distributed free to second and third degree malnourished children, it is sold to the villagers in general.

Finally, does greater community involvement and participation in the planning and implementation process help contribute to increased coverage and improved nutrition levels in the long run? It is too early to answer this question, and serious efforts need to be made to evaluate the issue. However, in the larger projects under review, coverage rates for monthly or quarterly growth monitoring, where there is active community participation, are much higher (92% in Tamil Nadu, and over 63% in ICDS, PUSH and NIPP) than where the communities have been relatively passive (e.g., under 20% overall in Jamaica).

What seems apparent from the review of the record is that most of the projects with evidence of little nutrition status impact (Danfa, SINAPS, Bohol, Jamaica/HMIP) are not noted for their high degree of community involvement. In view of the many apparent advantages to extending PHC/N coverage through the participatory process, good operational research seems warranted on how best to increase participation.

CHAPTER 5

"NATURAL EXPERIMENTS" AND IMPLICATIONS OF THE REVIEW

Our review of projects affirms the body of evidence that PHC/N can work. Evidence regarding the translation of successful, smaller-scale efforts to government run service-delivery programs, and the gains that could be achieved in that context, has been more limited.

Five large-scale PHC programs have been included in the review. These represent the culmination of significant historical experience in, and political commitment to, the provision of basic health and nutrition services. Data available suggest that the process of program implementation is being sustained to a significant degree. Data on weight retardation rates provide promising indications that nutritional gains may be associated with these efforts.

To assess the order of achievements with respect to mortality and malnutrition possible at the national level over time, when countries take direct action to ameliorate health and nutrition conditions as one part of broader social and economic development policies, we briefly review the historical experiences of three countries, Chile, Costa Rica and Cuba.

The evidence from these "natural experiments" suggest the magnitude of improvements possible when governments are committed to human and economic development policies including health and nutrition objectives. Despite different political systems, these countries share important similarities in the ways in which this

commitment has been reflected in education, employment and welfare policies. Main economic and social indicators are comparable, as are their overall population structures. And for these three countries, data reliable enough to permit conclusions regarding trends are available on nutritional status and infant and early childhood mortality over a period of two decades.

The principal similarity among the national approaches to health and nutrition has been the priority given to equitable access to basic health services incorporating a strong preventive orientation. Milk distribution to pregnant and lactating women and children under five years has been a notable element of the approach to nutrition taken in Chile and Cuba. In Costa Rica, widespread growth monitoring carried out through home visits and a family food allowance scheme have been the primary focus of nutrition efforts.

The prevalence of moderate to severe malnutrition and infant mortality rates for the three countries from 1965-1983 are presented in Table 4. The prevalence of malnutrition has improved dramatically in Chile and Costa Rica, and acute malnutrition has practically disappeared in these two countries. Gains in infant mortality have been striking in all three: from 107 to 23 in Chile; from 76 to 16 in Costa Rica; and from 47 to 17 in Cuba.[40,41] The fact that such achievements could be sustained amidst the relative proverty of these three countries indicates that important gains can be obtained through equitable, targeted approaches to health and nutrition without significant concommitant increases in income.

TABLE 4

Trends in Nutritional Status and Infant Mortality in Three Latin American COntries, 1965-1983

Country	Date	Growth Retardation[1]	Date	Infant Mortality (dths/1000 lv. bths.)
Chile	1965	23.7	1965	107.0
	1975	4.1	1970	79.3
	1980	1.9	1975	55.4
			1978	39.7
			1981	27.2
			1983	23 (Prov.)
Costa Rica	1966	13.5	1965	76.0
	1975	12.3	1970	61.5
	1978	8.6	1975	37.9
			1978	24.0
			1980	19
			1983	16 (Prov.)
Cuba			1969	46.7
			1975	27.5
			1978	22.6
			1981	18.5
			1983	16.8

Sources: National Statistics; PAHO, 1982; Horwitz, 1983[40]; Monckerberg, 1981[41]

1. < 75% of standard.

What are some of the main conditions inducing these outcomes?

- Sustained political decision that ascribes priority to the nutrition problem
- Long-term planning and adequate investment in human nd material resources in order to cover the entire country
- Health and nutrition interventions implemented through a PHC strategy to reach the indigent

In these three "natural experiment" countries - Chile, Costa Rica and Cuba - strong health infrastructures were developed and even in the face of severe economic crises, health and nutrition interventions have been sustained with concommitant long-term declines in mortality and morbidity. A second group which more recently has made a national level commitment to PHC/N - Thailand, India, Jamaica, Indonesia and Philippines - are implementing large scale PHC/N interventions which can also be expected to have a positive influence on national trends in health and nutrition status <u>even</u> under the present international recession.

The direct relationship between health status and socio-economic development is beyond doubt. Where the national development process confronts severe constraints, sustained political commitment to nutrition intervention is still justified, particularly through PHC strategies. The process of social and economic development is often imbalanced and not smooth, while the PHC movement can continuously mobilize community involvement and tap their tremendous potential for additional resources and their available capabilities.

Selective action may be needed at first when managerial capacity and financial resources are limited. There is also a great desire, initially, to demonstrate the effectiveness of nutrition actions. Here community assessments and experiences of felt need should provide an adequate basis for selecting program priorities. These can then provide the framework for the gradual, incremental introduction of other complimentary interventions as the success of preceeding steps are recognized.

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REFERENCE TO TABLES 1 - 3

Notes on data presented on project included in tables 1-3
(See matrix in Appendix I and References for further detail)

Table 1

Colombia/ Cancelaria[3]	All children 0-48 months in one town weighed at home (Wray and Aguirre, 1969b; J. Wray, personal communication, Dec. 1983. Drake et al., 1980).a Control area data from national sample surveys, 1966-67 and 1977-80 (Mora, 1982[c]).
Guatemala/ INCAP Longitudinal[1]	All children in 4 medical care villages (2 receive high protein-energy liquid supplement, 2 low energy beverage) followed between ages 12 and 36 months. Weight increment in this 24 month period compared those who ingested daily average of 200 Kcal/day vs. those of less than 50 Kcal/day (Klein 1976[d]; Lechtig, 1982[d]). Infant mortality data from dual records (retrospective pregnancy history and vital registration system), represent multiple year averages (Delgado 1982)[c]. Control area infant mortality is the official national figure.
India/ Narangwal[4]	All children's growth monitored at regular intervals in four sets of study villages. Two sets had nutrition intervention (one with and one without medical services), a third had just medical service, a fourth were control villages. In table 1, the first two sets with nutrition services are considered "treatment" areas for purposes of comparability with other projects, approximations +- of % below 70% W/A of Harvard standards were taken from pg. 107 of draft document (Kielmann et. al., 1984 in press)[c]; and refer to preschool children at around 36 months of age. For infant mortality data, treatment area is nutriion and med. services villages. Control area is strictly control villages (Taylor and Singh, 1975)[b].
Guatemala/ Patulul[2]	All children 0-60 months whose anthropometry was taken regularly every 3 to 5 months. Treatment areas in 1978 were medical care plantations; in 1981 and 1982, three medical care plantations that received high protein corn (Opaque-2) supplement from Oct. '79 to March '81. The control plantations received neither medical care nor Opaque-2 corn. It is important to note that there was a very great increase in the minimum wages (from $1.12 to $3.20 per day) which was effective in all

plantations around May, 1980. (Valverde et al., 1983)[d]. The mortality data from 1977-78 reflect the first phase (medical care) of the project (Delgado et al., 1980)[a].

Haiti/ Petit-Goave[5]	All children under five were weighed at 3 month intervals in all three project aeas, which were served equally by basic preventive health services. Area I (Meilleur) was served by mother-craft centers and Area II (Grand Goave) by nutritional foyers or health centers, is called the "non-demonstration" area. (Berggren, W., et al., 1981[b] and G. Berggren, personal communication, Dec. 1983).[c]. Mortality data come from retrospective study of fertility histories and project vital registration systems. Berggren, W. 1981[b] and G. Berggren, personal communication, Dec. 1983)[c].
Ghana/Danfa[6]	Anthropometric data collected in three cross-sectional villages health surveys, 1972, 1975, and 1977. Data from the last survey unpublished due to unreliability ("faulty scale suspected"). Year to year variability in anthropometric data was greater than anticipated, and thus the decline observed between 1972 and 1975 should be interpreted "with great caution". Area I (Danfa) is considered the treatment area (integrated MCH/ Nutrition/FP), while Areas II-IV, where no nutrition program was carried out, the "control" or comparison area. The weight retardation estimate for the control area of +-19% ((80% W/A) is assumed based on the statement in the final report that "improvements of similar magnitude were seen in all four project research areas" Univ. of Ghana, 1979, pp. 6-71)[a]. Mortality data were generated from both survey and project vital registration data. Techniques for dual registration system age-specific adjustments were made by the project authors. (Univ. of Ghana, 1979, 22-29)[a]. We further smoothed the data for treatment (Area I) and comparison (Areas II-IV) areas by calculating three-year running averages (unweighted).
Guatemala/ SINAPS[7]	Arm circumstance for screening of children and mothers were taken at bimonthly mass immunizations and regular household visits in the community. Weight and mortality data were obtained in external evaluation sample surveys at baseline (mid-1979) and endline (early -1981) points in one experimental and one control district selected from each of the three project health areas (ministry of Health, 1982[b]; Deman, H. et al., 1983)[a] Food supplementation program

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was implemented only 5 months before beginning of endline survey.

Table 2

Nigeria/ Imesi[6]	Pioneering under-fives clinic weighed children and recorded on "road-to-health" card. A nearby village, Oke Mesi, is the non-demonstration area. Anthropometric and mortality data were collected at the beginning and end of a year-long study period (1966-67) (Cunningham, 1969)[a]. It was estimated that by the mid-60's, more than 95% of Imesi children were visiting the clinic every other week (Swatkin et al., 1982)[21].
Haiti/RHDB[9]	Weighings done at monthly village health rallies. Baseline sample survey of pilot South Region done in Oct. 1981. (DPHP/MSH, Nov. 1982)[c]. Endline survey carried out in Les Cayes District project areas in Dec. 1983 (E. Genece and J. Rhode, MSH/ DPHP, personal communication, Jan. 1984). Growth monitoring data come from Dec. 1983 survey and refer to children who have project road-to-health weight cards.
India/ Jamned[10]	Weighings taken every month by village health worker. Arm-circumference and mortality data collected in a project village of 1022 and in a non-project comparison village of 1422 in April of 1982 (Arole, n.d.)[a]. Infant mortality data for 1971 reported in Swatkin et al., 1982[21].
Thailand/ INVAP[11]	All children under five are targeted to be weighed monthly, but no data have been available to the authors. The nutritional status data presented in Table 2 came from one of the INVAP areas, Kamsakaesang District in Nakornratchasrisima Province (Nondasuta, 1983)[c]. The non-ceno area nutrition data is the national average taken from the April 1982 National Nutrition Survey, using the Thai National Standard Norm (Nondasuta, 1983)[c]. No infant mortality data are available from the 92 village project area. From 1979-1983, over two million children are estimated to have attended the weighing program for at least one weighing. One-half or 25,000 villages are targeted for the extended INVAP approach by 1986. (Nondasuta, 1984)[a].
Tanzania/ Hanang[16]	All children were initially measured in baseline and the malnourished in follow-up survey of project villages. Malnourished children were continually monitored in home visits using arm bands. All children were encouraged to attend

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	and referred to the MCH clinics where weighings were done and plotted in road-to-health charts. Data in Table 2 come from MCH clinic record weighings and compare children under 6 coming from 10 Hanang project areas (demo areas) with children from the entire Hanang district. (Teller, Wilcox 1982)[a]. No reliable data are available on coverage of home-based arm band monitoring activity, although in some villages it was nearly universal during the initial phase of the project. (Diamond and Moshi, 1982)[b]
Jamaica/ Hanover[12]	Children weighed in field clinics, with follow-up visits to homes of malnourished. Data on prevalence collected in initial screenings (July '73 in Areas I, eastern Hanover, July 1974 in Area II, western Hanover). Endline data collected in field survey employing same screening methodology (Alderman et al., 1978[a]; Swatkin et al., 1982[3]). Mortality data from Parish's vital registration system, with a modest under-registration of deaths (Alderman op. cit.; B. Hanna, personal communication, Feb. 1983). Monitoring data from project records. (Alderman, 1978)[a]
Philippines/ Bohol[13]	Midwives conducted periodic weighings of children under 0-4. Prevalence of malnutrition in children under six was obtained through two sample surveys in five different ecological communities typical of the Bohol Project Area, one conducted about six months into the project operation (late 1976), the second in early 1979 (Reynes and Davis, 1978)[b]. Mortality data come from two probability samples of pregnancy history surveys, the first (1976) of 1183 women, the second (1978) of 2104 women. (Williamson, 1979)[a]. Growth monitoring data are from the Project zones collected through Operation Timbang in which the midwives are supposed to weigh all children twice a year. (Reynes and Davis, 1978)[b].
Thailand/ Lampang[14]	Weekakorn paraphysicians, with the assistance of three types of community health workers, carried out nutritional surveillance, concentrated in village-based child nutrition centers. The malnutrition prevalence data were gathered in the Community Health Survey. Complete baseline and survey data are only available from the seven Project Area Two districts, as data from the other intervention area and two control areas were felt to be unreliable. (Thailand, MOH, Vol. III, 1981)[a]. Mortality data gathered in the community health survey are 3 year averages

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and felt to be underestimated by 25-50%. There are two control areas, one inside the province, the other outside monitortoring data came from sample surveys on integration of nutrition and well-child services, and include the first two project intervention areas. (Thailand, MOH, Vol. I, 1981)[a].

Philippines/ PUS-[15]

The Barangay (village) health workers (BHWs) weigh either monthly or quarterly, sometimes at the BHW stations, but most in house to house visits. Records of the weighing programs are being kept by the BHW and updated after every weighing activity. The nutritional status and growth monitoring data presented here are probably from the village nutrition surveillance program (PUSH Status Report, 1982)[a] representing the 200 PUSH project villages in operation from 1979 through June 1982. No data are available on infant mortality rates, although the vital registration system reported that deaths due to malnutrition were reduced by 50% in between 1980 and 1981 in the first 50 project villages (PUSH Status Report, 1982)[a].

Table 3

Indonesia/ NIPP[17]

Village volunteers (Kaders) monitor pre-school child growth. The nutrition status data presented here come from a baseline and resurvey in the two districts where the program was first implemented--Bongonegoro (Area I) and West Lombok (Area II) Djumadias Abumain and Abas Jahari. ("Study of Impact of NIPP in two Kabupatens, Center for Research and Development in Nutrition (CRDN), Bogor, 1984)[a]; a similar finding appear in [d]); T. J. Ho, World Bank, personal communication, Dec., 1983 and May 1984[c]. The growth monitoring and food supplementation data come from all seven project districts as of July 1982. (Project Coordinating Office, Jakarta through T. J. Ho, op. cit.)[c]. Data on food supplementation refer to the percent of children referred to the rehabilitation center who were being fed.

India/ICDS[18]

VHWs (Anganwadi) carry out monthly growth monitoring. The prevalence data presented are from the 1976 New ICDS Projects Baseline survey, a resurvey of the same 22 project areas in 1979-80, and a third survey in an expanded group of 40 project areas in 1982 (Tandon, 1983)[c]. No data growth monitoring coverage are available. The 1975-78 data on food supplementation are from a

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stratified random sample of 10% of the villages (Tandon et al., 1981)[a,b] and the 1982 data come from the 1982 survey of 28 percent areas (Tandon, 1983)[c].

India/ Tamil Nadu[19]	Community nutrition workers monitor growth monthly either at the community nutrition centers or at home. The data on prevalence of malnutrition were collected in a survey of 350 children in the pilot area (Kottampatti Block) and a comparison sample of 350 children in a non-demonstration area (Ponnamarathy) between Sept. '82 and Aug. '83 (Jim Green, World Bank, personal communication, Dec. 1983)[a]. Growth monitoring coverage data are from the pilot district (A), and food supplementation data also include two new districts (B&C) incorporated into the project in 1982. (J. Green, op. cit.[a].
Jamaica/HMIP[20]	Community health aid (CHAs) regularly weigh preschool children both in the clinics and at home. Prevalence of malnutrition data in 1978 come from a national household survey; for 1982, the first full year of the project, first and last quarter data come from the flow sheets of the CHAs in Parish I (St. Thomas) and Parish II (St. James) (Teller, 1982)[a]. In mid-1983 a mass weighing campaign was carried out by the PHC team in Parish III (KSAC) (K. Rainford, MOH Jamaica, personal communication, Dec. 1983)[c]. Data on growth monitoring coverage from Parish I come from the quarterly report of the Nutrition Assistant (E. Grant, personal communication, Feb. 1982) and from Parish III, the weighing campaign (Rainford, op. cit.). Irregular implementation of food supplementation program prevents collection of meaningful data.
Sri Lanka/ Thriposha[21]	The targeted food supplementation program run by the MOH is Thriposha offered to infants and preschoolers weighing less than 70% of the NAS (USA) standard, exhibiting weight loss or showing other clinical signs (MPI, 1983)[b]. The nutritional status data were collected by teams of university students on 1799 children from 42 health clinics. These clinics tended to be the better run and/or better staffed. "The research design called for the comparison of the nutritional status of children of a given age who had been receiving services for a sustained period of time to the nutritional status of children of the same age who had had exposure to the program services." (Drake et al., 1982)[a]. The data in Table 3 compares children in a given age group just

entering the program to children in the same age group who have a history of participation in the program. It is estimated that the program is serving about 40% of the country's needy preschoolers. (Drake, et al., 1982)[a].

APPENDIX I

Project Descriptions

Project Abbreviations

Guatemala/INCAP	The INCAP Longitudinal Study
Guatemala/Patulul	The Patulul Project
Colombia/Candelaria	The Candelaria Project
India/Narangwal	The Narangwal Project
Haiti/Petit-Goave	The Integrated Project of Health & Population
Ghana/Danfa	The Danfa Project
Guatemala/SINAPS	Integrated System of Nutrition and Primary Health Care
Nigeria/Imesi	The Imesi Project
Haiti/RHDS	Rural Health Delivery System
India/Jamkhed	The Comprehensive Rural Health Project, Jamkhed
Thailand/IVNAP	Innovative Village Nutrition Activities Project
Jamaica/Hanover	The Hanover Project
Philippines/Bohol	The Bohol Project
Thailand/Lampang	The Lampang Health Development Project
Philippines/PUSH	Panay Unified Services for Health Project
Tanzania/Hanang	Hanang District Health Project
Indonesia/INDP	Indonesia Nutrition Development Project
Indonesia/NIPP	Nutrition Improvement Pilot Project
Indonesia/NCBC	Nutrition Communication and Behavorior Change Component

Indonesia/UPGK	National Nutrition Program
India/ICDS	Integrated Child Development Services
India/Tamil Nadu	The Tamil Nadu Project
Jamaica/HMIP	Health Management Improvement Project
Sri Lanka/Thriposha	The Thriposha Programme

PROJECT DESCRIPTIONS

Project Date / AUSPICES, ORIENTATION	PROJECT SETTING: Location	PROJECT SETTING: Size of population observed	PROJECT OBJECTIVES AND APPROACHES: Objectives	PROJECT OBJECTIVES AND APPROACHES: Service Delivery Approach and Personnel	PROJECT SERVICES: Services	PROJECT SERVICES: Coverage Actually Achieved
INCAP Longitudinal-Guatemala 1969-1977 INCAP/NIH,AID, Rockefeller (Research)	4 villages in Highlands of Guatemala, 30 to 100 km northeast of Guatemala city	3,000 people in 4 villages. 1275 in study, 1399 in control group	Concerned primarily with assessing the impact of mild to moderate malnutrition on mental and physical development. Operational objective was to determine whether a nutrition supplement could help improve mental performance.	Nutrition supplements provided in all villages as follows: 2 villages received high calorie supplement (atole) while other 2 received lower calorie, protein free supplement (fresco) Supplementation centers open twice a day, women come to centers to eat supplement, ad. lib. operation of feeding centers handled by paraprofessionals.	-Nutrition supplements available to children up to 7 years old and to pregnant and lactating women. -Medical services (immunization and ambulatory care) provided by paramedics.	1536 children under 5 years old and 851 pregnant women received supplement.
PATULUL, Guatemala 1976-1981 INCAP/AID (Research)	Coffee growing region located in "Boca Costa" in the Department of Suchitepequez, between Chicacao and Patulul, which is 118 km from Guatemala City.	7720 in 12 coffee plantations (fincas) (2204 in 3 villages for OPAQUE-2 corn) (1881 in control villages).	-To determine the relative importance of energy and protein for populations with a high consumption of cereal staples. -To compare the impact of corn and beans, opaque-2 corn, and a high energy cookie on food consumption patterns, physical growth and morbidity.	-Auxiliaries (promotors) collect and map census information. -Each promoter covers 5 sectors composed of 20 families (100 persons). Home visits made every 15 days in concentrated communities, every 30 days where population is scattered. In home visit, promoter detects disease and refers high risk cases to clinic.	Originally 4 study groups (1) Control (2) High energy cookie supp (3) Opaque-2 corn (4) More common corn and beans Plus - Medical services for Opaque-2 group and largest control fincas from 1/77; for 2 other controls, 1978. - Water improvements for all end of 1978 -Increase in minimum wages Nov 1980 Opaque 2 corn provided in place of common corn through plantation owners.	An average of 3-4 visits made annually by participants. Feb. 1980 672 children (0-60 mth) received medical care, 461 in control group Feb. 1981 330 children (0-60 mth) received opaque-2 corn; 833 controls
CANDELARIA, Colombia 1963-64; 1968-74 Universidad del Valle, Cali/AID (Research)	Candelaria, 30 km from Cali	1973 Census: 1952 families 8773 inhabitants estimates children below 6 is 20-25% of population, i.e., 1750-2190	Major purposes: to prevent disease as well as to reach children before any illness had progressed to a point requiring extensive and costly medical treatment.	Services provided by health volunteer workers (Promotoras) - Complimented by Health Service Unit	10 promotoras visited all families with children 6 years old every 2 months. Provided health and nutrition education, promoted use of health services, weighed and measured children referred sick children to Health Service Unit. Pregnant and lactating mothers provided with pre and post natal care.	1840 families participated (Average: 921 families/year 1392 children 6 years

oject Data SPICES, RIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achiev
ARANGWAL - India 1968-1973 ndian Council of edical Research ohn Hopkins Univ. Research/Pilot)	Agricultural area of Ludhiana District, Punjab, about 150 miles northwest of New Delhi	10 villages 10,500 population (1,000 under 3 yrs. old)	To explore the effectiveness of nutrition and health interventions, especially the operational implications of the synergistic relationship between infection and malnutrition.	Paramedical family health workers provide most of the care through home visits. Physicians, nutritionists, and public health nurses provide supervision and support.	3 forms of service: -One group received nutrition care only (nutrition monitoring, selected foods supplementation for children and pregnant women, nutrition education) -second group received medical care only (daily visits by field workers to provide curative services, emphasis on immunization, oral rehydration treatment of respiratory infections). -Third group received combined care	Each health worker in combined care village was responsible for 65-75 children and their mothers, in the other villages each was responsible for 90-110 children. 12-15 health workers employed at any one time. They were able to reach almost all children, providing 5-7 minutes of service on the average once a week.
APS - Guatemala 79-1982 tional Health Servic d INCAP/AID ilot/Service)	Eastern Guatemala 3 experimental districts	63,960 people in 300 communities children 0-5 yrs old approximately 13000	8 specific objectives which aim at: -reducing infant mortality and mortality related to whooping cough, polio, tetanus and measles -reducing incidence of low arm circumference in newborns, children under 5 by 30%. -reducing morbidity related to tetanus, measles -improving environmental sanitation by improving water supplies and installation of latrines. Community participation encouraged. -Satisfying demand for modern contraceptive methods.	-Primary health care services provided by promoters (community health workers) and traditional birth attendants -District nursing and technical team train and supervise auxiliaries. Promotors at community level supervised by Rural Health Technician. TBA supervised by auxiliary nurse. -Bimonthly mass meetings for detection and monitoring of children and mothers at risk.	Immunization, oral rehydration perinatal surveillance, food supplementation for children and pregnant/lactating women at risk, family planning, promotion of health and environmental sanitation.	Food supplementation program: Measurement coverage (May 1982) 83.6% for children 5 yrs. 59.7% for pregnant women 61.1% for newborns Baseline measurement coverage 1834 of the 1859 (99.7%) Malnourished children received food supplements and education 207 of the 208 (99.5%) malnour women received food supplement and nutrition education.

Project Name SUPPORT, ORIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieved
BANFA-Ghana 1970-1979 University of Ghana Medical School, UCLA, HOH/AID (Research/Service)	4 areas north of capital city	Approx. 36,000 (estimate based on following 1972 figures: 263 TBAB = ratio of 1:137 population) Area I - 61 villages other areas: no data available	-Objectives of 1st phase related to staff training and infrastructure development -Primary health service objective is the demonstration of several cost-effective health system models that include family planning as an integrated component. -Objectives of maternal and child program is to reduce maternal mortality and reduce fertility Nutrition objective is to prevent malnutrition in mothers and children by identifying and rehabilitating the malnourished and identifying those at risk.	Satellite health clinics and village-based activities (eg., malaria prophylaxis, immunization, health care) form main strategy. Village volunteer used to extend service.	Health center and village based services implemented in 3 phases: Phase I - Health education - Nutrition - Sanitation - Training of traditional birth attendants Phase II - Malaria prophylaxis - Immunization Phase III - Development of community-based programs using village health workers	1st 15 months of VHW program, 20 volunteers involved in 14,015 encounters. -Following establishment of satellite clinics 85% of population lived within 4 miles of health services, compared to 34% previously. -Residents seen in Area I, rose from 29% in 1970-71 to 16% in 1973 -Utilization of child and prenatal clinics doubled.
PETIT GOÂVE - Haiti 1974-1978 (Integrated Project of Health and Population) Dept. of Public Health and Population Division of Family Hygiene (Research/Service)	3 service regions plus control area included in mid point in each with an appropriate population of 10,000.	Trou Chouchou 9572 (1900 under 6) Grand Goâve Region 10,343 (1900 under 6) Meilleur Region 12,175 (2200 under 6) -Control cluster samples from surrounding area, 10,000.	To provide health services to a rural population in southern Haiti. • To reduce the most frequent preventable causes of illness and death in a cost-effective way.	-Family registration by community collaborators in each village. -Road-to-health weight cards established for each preschool child. Mother keeps weight card. Records also held in health clinics. Home visits made by "agent communautaires". -Quarterly rallies held to provide immunization, deworming and nutrition monitoring. Demonstration-education centers and foyers in villages carried out by eighth grade level monitrices.	-Nutrition surveillance carried out by home visitors. -High calorie milk powder provided for malnourished children. - Demonstration education using locally available foods to rehabilitate malnourished children	December 1976: -96% of under 4 population had received full DPT immunization. -88% of under 4h received BCG -45% of under 14h received polio immunization.

PROJECT DATE AUSPICES ORIENTATION	PROJECT OBJECTIVES AND APPROACHES				PROJRECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieved
JAMKHED, India 1971-Ongoing Local Government (Service)	Jamkhed, Maharastra (400 km southeast of Bombay)	70 villages, approximately 80,000 people	-To provide PHC -To reduce IMR by 50% -To provide adequate antenatal and maternal care. -To reduce the birth rate by at least 40/1000 to 30/1000 -To bring under control chronic illness such as leprosy and T.B. -To prevent blindness	Village Health Workers provide basic services, supplemented by care from mobile teams of health professionals in the village or Jamkhed clinic Mobile team consists of 2 physician, auxiliary nurse-midwife, social worker and paramedic.	Under five's clinic provide nutrition supplement, immunization, semi-annual provision of vitamin A. Prenatal and postnatal care for pregnant women. Basic curative care also offered .	1978: 65,000 in 30 villages served. 4000 children received food supplements and Vit. A.
RHDS - Haiti 1979-Ongoing Ministry of Health/AID (Service)	Pilot in South Region	400 villages Rally post areas approx. 5000 0-5 yr. old children	Overall purpose is to reach 70% of rural Haitians with low cost preventive and curative services. 4 specific nutrition surveillance objectives. -To prevent severe PEM -Continuous growth monitoring to promote health -Provide information for decision makers -To develop an information system that will establish linkages between the health sector and other sectors.	Rural Health Delivery System health agent screens all children, refers malnourished to dispensaries. Auxiliary nurse initiates growth chart and determines what kind of intervention is needed. (e.g., routine follow-up, surveillance, educations directives for family, education for mother in a nutrition foyer, agricultural extension, supplementary feeding or intensive rehabilitation in nutrition center or care in a hospital). Home visits made for eduation on use of home resources.	Nutrition Surveillance Nutrition education for mothers and family. Supplementary feeding as required. Nutrition Rehabilitation Agricultural extension curative care also offered.	Nutrition surveillance component had estimated 45.8% coverage of children 0-4 yrs. old

Project Data AUSPICES, ORIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achiev.
ANANG - Tanzania 977-1982 edical Missionaries o ary administered rojects/AID funded	Ngarenanga District, Arusha Region	240,000 in 113 villages 95 villages accepted for project	To provide a model for the MOH in extending the health delivery system to the village level.	Village health workers and village health leaders make home visits, monitor nutritional status using arm band.	-Nutrition Status monitoring -Cooking demonstrations -Promotion of ORT -Referral of acutely malnourished.	No village-level data availabl
IMESI-Nigeria 980- eagley Guild Hospital Service)	Imesi village approximately 100 miles north of Lagos	6,000 people (1200 infants and children)	To study nutrition and health conditions and the effectiveness of intervention measures in ameliorating them.	Under fives clinic for both ill and well children -once weekly for 0-3 mth old -once monthly for 3-36 mths. -once every 3 months thereafter and when necessary for specific problems Services provided by existing staff - nurses & midwives with additional support from a physician	-Diagnostic, preventive, and curative services for all children under five. -Children weighed, weight and other information recorded on 'road-to-health' card. Nutrition education and supplements provided for those showing growth failure. -Routine smallpox, DPT and BCG immunizations. Antenatal & obstetric care also provided for women. -House calls made for serious cases.	8-9 years after project initiat more than 90% of Imesi Children were visiting clinic on average of once every two weeks. 80-90% coverage for immunization 90% of all deliveries handled by clinic
PUSH -Philippines 1979-1982 Philippines Govt/ AID (Service)	Island of Panay	2.4 million people 600 villages Children under 6 yrs 1979 37,044+ 1982 27,755+	-To reduce TB, tetanus and gastrointestinal infections by 25% -To immunize at least 70% of target population -To reduce infant mortality by 25% -To increase use of contraceptives and reduce crude birth rate -To reduce 2° and 1° malnutrition to 70% and 40% respectively, among children aged 6 and below. -To rehabilitate at least 10,000 malnourished cases. -To provide safe water to 80% of project household -To provide an integrated health service in 600 depressed barangays in Panay	Barangay health workers used to extend services provided by Rural Health Unit RHU's responsible for services described in next column as well as maintaining vital statistics records and organizing community actions.	-Environmental Sanitation improvement -Family Planning Services -Nutrition Services, includes weighing, nutrition counselling and supplementary feeding -Control of communicable diseases -Curative health services	June 1982: Services implemented in 200 villages. Children (0-6 yrs) weighed: Baseline(79) June'82 Total 31,044 27,745 Children weighed 12,417 16,653 % Weighed (40%) (60%) Children (0-6) immunized: Baseline June'82 Total 31,044 27,779 BCG 5,242 10,917 (17%) (39%) DPT(1st) 3174 3883 (10%) (14%) (2nd) 1483 1310 (47%) (9%) Booster 540 619 (30%) (42%) Polio 1830 5101 (60%) (18%)

Project Date AUSPICES, ORIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES			
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieved
BOHOL - Philippines 1976-1979 MOH, Philippines/UNFPA (Service/Pilot)	Northwestern half of Bohol island, located 350 miles south of Manila.	420,000 people in 22 municipalities 47,900 women were considered "priority women." 67,600 "priority children", i.e. children below 5 years of age.	Immediate objectives were: -To develop and improve the quality of health services for mothers and children. -To introduce and improve family planning through MCH program -To improve the MCH/FP training and supervision of health personnel. -To undertake operational studies on the above.	Key service provided are midwives. -First task is to list and map all households in zone. -Primary health care provided by midwives-services include immunization, health and nutrition education, environmental sanitation, family planning, prenatal and postnatal care -Spends 2 days a week at Primary Health Care Center, rest of week spent in home or community visits Complicated cases referred to Rural Health Units	Maternal services related to pregnancy, delivery and lactation. Nutrition education in one component child services mainly immunization (BCG,DPT)	October 1976-January 1979: -88% of priority women received some kind of health service. -care at delivery improved: (% of deliveries attended by untrained hilots: Oct. 76= 6 to 18%; Jan. 79 = 3%) -mothers attendance at clinics increased (Oct. 76 = 66%, Jan. 79 = 78%). -more women receiving tetanus toxoid. Children -82% of "priority children" received health services at least once. -roughly 3000-4000 well children and 2,500 sick children under 5 yrs. seen monthly -more children immunized. 76 = 25%; 79 = 72%
LAMPANG - Thailand 1974-1979 GOT-APHA/UH/AID (Experimental, using health care delivery system).	Lampang Province in Northern Thailand	1978 population: 660,000 Has 11 districts 75 subdistricts 592 villages	To expand health care coverage to at least two-thirds of the rural population, to establish an integrated health care delivery system, that is cost effective & one which can be replicated nationwide within the limitations of resources available to that government.	2 experimental & 2 control areas. Village based PHC network linked to GOT's health care system was established. Village health committees and 3 types of village health volunteers responsible for village-based activities. Community health paraphysicians (wechakorn) assigned to rural health facilities to provide curative services at the periphery. Community participated in improving water and sanitation facilities. Provincial health service infrastructure re-organized.	Family Planning services integrated with maternal, child nutrition and other basic health services, targetted at women and children under 6. Wechakorn provide curative services, health HPVs provided basic PHC services Health communicators provide counselling and health information.	1979: 100% increase in coverage in villages with Health Posts and H.P. volunteers. -coverage in villages with trained traditional midwives was 59% (no baseline) -No change in coverage in villages with midwifery section -15% increase in coverage in villages with child nutrition centers. -33% increase in coverage in subdistricts with Health Center -40% increase in coverage in districts with district hospitals

Project Date AUSPICES, ORIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieve
HANOVER - JAMAICA 1973-1976 Government of Jamaica, with University of West Indies and Cornell University Medical College/AID	Hanover Parish in north-western Jamaica	1973: 60,000 people (6,500 children 0-4β months)	To provide modest, and appropriate health and nutrition services, using community personnel and resources. Goal is to reduce mortality and improve the nutritional status of each young child in the district.	153 community health aides responsible for anthropometric monitoring of all children under 4 and in-home nutrition and hygiene education and demonstrations. Supervision provided by public health nurses, 2 faculty members Field clinics held for weighing. CHAs visited homes of malnourished for nutrition and health counseling. Senior medical students augment existing clinical services.	Anthropometric monitoring and in-home nutrition and hygiene education. Food supplements available for malnourished, but supply was sporadic.	Baseline survey covered 86% of target population (Children 0-48 months) in eastern Hanover, 97% in Western Hanover, Eastern Hanover, number seen = 2879. Western Hanover, number seen 3,000 No data found for attendance thereafter.
TVNAP-Thailand 9HI-1982 MOH/World Bank, AID, Unicef (Pilot/Service)	3 northeastern provinces	90 villages 150,000 people (24,000 infants and preschool children, 6,750 pregnant and lactating women)	To improve the nutritional status of infants and pre-school children by reducing 2nd and 3rd degree malnutrition by 25%	-Village health volunteers and communicators weigh all under 5 children monthly. They chart weights and guide mothers in interpreting the chart. -Community involved in production, promotion and distribution of food supplements.	-Nutrition surveillance of children under 5 -Food supplementation for severely malnourished children, using local foods. -Nutrition education, using weight chart as a guide.	No data available.

AUSPICES, ORIENTATION	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achi
NNIP - Jamaica (Nutrition component) 1981 - Ministry of Health/AID	Entire country	2-2 million people under 3 yr. old = 167,000	-To design an expanded nutrition surveillance system -To upgrade the technical skills of nutrition and PHC staff -To coordinate national efforts to re-design supplementary feeding programs -Developing new nutrition education strategy	Community health aide weighs all children in her area and records weight on "flow-charts." All children under 1 and malnourished children are weighed monthly. Normal children and those over 12 months are weighed quarterly. Grade II and III children are referred to the Parish Nutrition Assistant for follow-up home visit and to special clinics, where food supplements are available. Midwives provide anemia screening and iron supplementation for pregnant women.	Nutritional surveillance staff training Supplementary feeding for children Supplements for pregnant women	Weighing of children St. James Parish: 1981: 18% of CHA's weighed children regularly 1983: Increase to 47% St. Thomas Parish 1982: 62% of 5110 children under 3 yrs weighed an average of 5 times
THRIPOSHA, Sri Lanka 1973- Govt. of Sri Lanka (Service)	All health clinics	About 550,000 children under 5 and pregnant, and lactating mothers	Primary thrust is the integration of targeted supplementary feeding into the health care system of Sri Lanka Goals are: To obtain a satisfactory weight gain of 20-26 lbs in antenatal mothers, To reduce by 75% the number of babies with weight under 2500 gms, To reduce by 90% nutritional anemia in women, To ensure successful lactation, To reduce 3 PEM by 90% and 2 PEM by 50% in infants and preschool children	Services provided by Ministry of health staff Food grant program administered by CARE	Pre-cooked supplementary food. THRIPOSHA, provided for children with 2nd and 3rd degree malnutrition (< 70% WA, NCHS-CDC standard). For pregnant and lactating women who are anemic, malnourished or having problems with milk production 50g ration of THRIPOSA provided daily (190 cal, 10g protein + Fe + vitamins)	1981: CSF estimate that 812,649 persons reach (4 out of 5 preschool child benefiting not targetting criteria) 1982: Estimate that 40% of Sri Lanka' one million needy preschoolers served. GOSL estimate that coverage between 1977-1981 was: Pregnant women - 15 - 19% Lactating women - 9 - 10% Infants - 8 - 10% Preschool children 62 - 60% 600,000 recipients annually since 1981

Project Data AUSPICES, ORIENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieved
NIPP-Indonesia 1977-ongoing MOH/World Bank Pilot/Service	7 Kabupatens Bojonegoro (East Java) West Lombok (NTB) OKI (South Sumatra) Karang Anyar (Center Java) Tasikmalaya (West Java) Gunung Kidul (DI Yogyakarta) Gianyar (Bali)	1981: 180 villages 1983: 258 villages -30,000 children under 3 and 17,000 pregnant and lactating women for supplementary feeding -100,000 families	NIPP component was designed to test new ways of delivering nutrition and health services to children under 3 and pregnant and lactating women. Nutritional objectives are -to reduce morbidity and mortality resulting from PEM in children under 5 and pregnant and lactating women -to reduce incidence of iodine and iron deficiencies.	-Nutrition centers (Taman Gizi) constructed and equipped. Each village had 2-5 centers, depending on population size -Staff and cadres recruited and trained -Target population registered -Cadres under charge of a VANPO. Cadres weigh patients and issue food supplements weekly or fortnightly. VANPO responsible for issuing Vit. A, Fe and Iodine supplements and for making referrals. Nutrition education, centered on growth, given by cadres to village communities.	-Immunisation for 10,000 children -Supplementary feeding for 30,000 potentially severe and moderately malnourished children under 3, and for 17,000 pregnant/lactating women -Nutrition education for 100,000 families -Supply of iodized salt -Vitamin A and iron supplements to at risk population	-Over 800 Taman Gizis (nutrition centers) have been established -200,000 direct beneficiaries of nutrition activities -original target of 180 villages exceeded, now 258 villages included

Project Date AUSPICES, IMPLEMENTATION	PROJECT SETTING		PROJECT OBJECTIVES AND APPROACHES		PROJECT SERVICES	
	Location	Size of population observed	Objectives	Service Delivery Approach and Personnel	Services	Coverage Actually Achieved
TAMIL NADU - India 1980-Ongoing State Government World Bank (Service)	State of Tamil Nadu, has 14 districts	1983: 78 blocks covered estimate* 2.6 million children 6 -36 mths 4000 villages (*based on following: 7% reduction in rates of malnutrition equivalent to 183,000 children)	Project focus on improving the outreach, quality and efficiency of the state's nutrition and related health delivery systems. Objectives are to reduce the incidence of malnutrition among children under 3, reduce infant and child mortality rate, reduce the incidence of vitamin A deficiency among children under 5 and to reduce the incidence of anemia among pregnant and lactating women.	-Village nutrition centers, staffed by a locally-recruited worker, provide basic services. -More complex cases referred to health workers or primary health centers Health workers visit community health workers fortnightly or weekly -Women's Working Groups, consisting of village women, the local leaders, midwife and teacher formed. They promote participation in the program.	-Growth monitoring and surveillance -Short-term supplementary feeding for children with poor growth -Education using mass media and inter-personal techniques -Health care include diarrhea management, deworming, immunization	April 1983: community nutrition workers installed in more than 4,000 community centers 85% coverage for growth monitoring and food supplementation 361 subcenters built, ante-natal registrations, maternal tetanus innoculations, assisted deliveries increased
ICDS-India (1975-Ongoing AIIMS-State Governments (Pilot/Service)	1979: 33 Project Areas (18 rural blocks 11 Tribal blocks 4 urban slums) 1980 extended to 150 community blocks	Rural: 100 village per block Tribal: 50 village per block Urban: Approx. 100,000 population in each slum 1980: 12.3 million people 2.2 million children under 6	(1) Improve nutritional and health status of children 0-6 yr. old (2) Lay foundations for proper psychological, physical and social development of the child (3) To reduce the incidence of mortality, morbidity, malnutrition and school drop-out (4) To achieve effectively coordination of policy and implementation amongst the various departments to promote child development (5) To enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education	Anganwadi worker (AWW) main provider of services through Primary Health Centers. There is 1 AWW for each 500-1000 people Services provided at a central point in a village (Anganwadi) supervision of Anganwadi done by Auxiliary-nurse-midwife.	-Immunization -Non-formal pre-school education -Curative care for minor diseases -Health and nutrition education to women -Supplementary feeding for 40% of children and pregnant and lactating women belonging to poorer families for 300 days/year. Supplement will provide 300-350 calories and 12-15g protein to children, and 600 calories and 18-22g protein to women daily	1982 survey on sample of 43,108 children in 59 projects, covering 354 Anganwandis, approximately 35 million people Children receiving food supplement New projects: 10.7% (N=13,074) 1 yr. old projects: 59.5% (N=8,447) Over 2 yr. old projects = 63.3% (N=21,857)

Appendix II

Annual Per Capita Cost Estimates of Selected Projects

Project/Country*	Year	Nutrition/Component ($ U.S.)	Overall/Project ($ U.S.)
SINAPS/Guatemala (7b)	1981	.07[a]	1.19[b]
	1982-	.07	.86
IVNAP/Thailand (11c)	1982	.27[h]	.54[h]
Danfa/Ghana (6a)	1973(Area I)	.50[e]	2.49
	1976(Area I)	.64	5.05
Jamkhed/India (37)	1970's		1.25-1.50
Imesi/Nigeria (37)	1960's		1.50
Narangwal/India (4a)	1970-73	1.70[e]	2.99[c]
HMIP/Jamaica (20d)	1982	2.09[i]	
Lampang/Thailand (14a)	1979(M.C.)	3.49[g]	.82[g]
	(H.C.)	3.27[g]	.70[g]
Longitudinal/INCAP Guatemala (37)	1969-73		$3.50
RHDS/Haiti (9b)	1982 (South)	4.04[f]	
Tamil Nadu/India (19[b])	1982 (weighing)	12.34[k]	
	(feeding)	20.76[k]	
ICDS/India (19a)	1983	15.74[d]	
Indonesia (17a)	1982 (weighing)	12.74[j]	
	(feeding)	20.76[j]	

*Sources of data are numbered in parentheses next to project title and can be found in References.

Notes: [a] Nutrition education related to food supplementation

[b] Additional costs of SINAPS implementation.

[c] Nutrition intervention villages only.

[d] Includes food and overhead operating costs.

[e] Health education component which included nutrition.

[f] Cost per health/weighing rally; our calculations.

[g] Per service contract, paid and volunteer workers, excludes child nutrition center contacts as part of each facility's service output; nutrition component cost is calculated separately from total cost. M.C.=midwife center, H.C.=health center.

[h] Initial external resource input in nutrition surveillance and food supplements, our calculations

[i] Our estimates based on April 1983 Evaluation Report.

[j] Annual cost per beneficiary, Bojonegoro area.

[k] Annual cost per beneficiary, Madurai District, block level