

SWP507

Health, Nutrition, and Family Planning in India: A Survey of Experiments and Special Projects

World Bank Staff Working Paper No. 507

February 1982

Prepared by: Rashid Faruqee and Ethna Johnson
Development Economics Department

Copyright © 1982
The World Bank
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

The views and interpretations in this document are those of the authors
and should not be attributed to the World Bank, to its affiliated
organizations, or to any individual acting in their behalf.

PUB
IG
3881.5
.W57
W67
no. 507

FILE COPY

The conclusions and views expressed in this paper are those of the authors and do not necessarily reflect those of the World Bank Group.

WORLD BANK

Staff Working Paper No. 507

February 1982

HEALTH, NUTRITION, AND FAMILY PLANNING IN INDIA:

A Survey of Experiments and Special Projects

The paper surveys fourteen experiments and special projects in health, nutrition, and family planning in India. They fall into three broad categories--research projects, pilot projects, and service projects. The paper reviews services, workers, and population coverage to distill the lessons for some basic questions.

- o Does integration make a difference in the cost-effectiveness of services for health, nutrition, and family planning?
- o What is needed for community participation, and what are its benefits?
- o What work can paraprofessionals do?
- o Are effective supervision and training systems essential for the success of projects?
- o Do outreach and the targeting of services yield substantial benefits?
- o How does the cost of services offered by special projects compare with that of government services?
- o What is the best way to monitor the effect of services?

The answers that this survey provides are summarized in the opening section.

Prepared by:

Rashid Faruqee and Ethna Johnson
Development Economics Department

Copyright © 1982
The World Bank
1818 H Street
Washington, D.C. 20433, U.S.A.

Acknowledgements

The following people supplied information on many of the projects and experiments that we report on in this paper. We acknowledge their contribution and thank them and their institutions for their support and cooperation.

Dr. R.D. Bansal, Government Medical College, Jammu

Dr. M. Damodaran, National Institute of Nutrition, Hyderabad

Dr. H. Grewal, Christian Medical College and Brown Memorial Hospital, Ludhiana

Mr. P.N. Hans, National Institute of Health and Family Welfare, New Delhi

Dr. V.L. Narasimham, Kasturba Medical College, Manipal

Dr. K.M. Naik, Health and Family Welfare Training Center, Ahmedabad

Dr. S.C. Pal, National Institute of Cholera and Enteric Diseases, Calcutta

Dr. P. Rao, National Institute of Nutrition, Hyderabad

Dr. K.S. Sanjivi, M.A.C. Institute of Community Health, Adyar, Madras

Dr. A. Timmappaya, Kasturba Medical College Hospital, Manipal

Dr. M. Carballo, World Health Organization, Geneva

Pramit Chaudhuri, Institute of Development Studies, Sussex

Robert Chambers, Institute of Development Studies, Sussex

Charles Cooper, Institute of Development Studies, Sussex

Emmanuel De Kadt, Institute of Development Studies, Sussex

Michael Lipton, Institute of Development Studies, Sussex

Isabelle Losseau, Food and Agricultural Organization, Rome

Dr. David Morley, Institute of Child Health, London

Dr. Philip Payne, London School of Hygiene and Tropical Medicine

Pravit Sarabanchong, United Nations Children's Fund, New York

Dr. P. Senanayake, International Planned Parenthood Federation, London

Dr. Joe Wray, Harvard University, Boston

HEALTH, NUTRITION, AND FAMILY PLANNING

A Survey of Experiments and Special Projects in India

Contents

	<u>Page No.</u>
<u>Introduction and Overview</u>	iv
<u>The Setting</u>	2
<u>Framework of the Survey</u>	5
<u>Characteristics of Projects</u>	6
Services	8
Categories of Worker	9
Population Coverage	12
<u>Main Elements of the Projects</u>	16
Integration of Services	16
Community Participation	20
Use of Auxiliary Workers	23
Supervision and Training	26
Use of Home Visits	27
Selection of Clients	29
<u>Principal Findings about Costs and Benefits</u>	30
<u>Methods of Monitoring Projects and Analyzing Their Effect</u>	39
<u>Conclusions</u>	43
<u>Appendix A. Profiles of Fourteen Studies</u>	46
Narangwal Nutrition Project	47
Narangwal Population Project	51
Alternative Strategies in Family Planning, Bangalore	54
Mandwa Rural Health Research Project, Maharashtra.....	57
Integrated Health and Nutrition Project, Kasa	58
Project Poshak	63
Integrated Health Service Project, Miraj	65
Indo-Dutch Project for Child Welfare	68
No-Birth Bonus Scheme, South India	70
Comprehensive Rural Health Project, Jamkhed	74
Applied Nutrition Program, Kerala	77
Special Nutrition Program, Coimbatore, Tamil Nadu	80
Special Nutrition Program, Andhra Pradesh	84
Mid-Day Meals Program, Madhya Pradesh	86
<u>Appendix B. List of Additional Studies and Special Projects</u>	94
<u>References</u>	95

Tables

<u>Text</u>	<u>Page No.</u>
Table 1: Structure of the Health Care System in India	3
Table 2: Experiments and Special Projects	7
Table 3: Main Elements of Experiments and Special Projects	18
Table 4: Reported Costs and Benefits of Projects	32
<u>Appendix A</u>	
Table A.1: Mortality Rates by Experimental Group and Age Group at Narangwal, 1970-73	50
Table A.2: Practice of Family Planning at Narangwal by Experimental Group	53
Table A.3: Activities of Community Health Workers at Mandwa	59
Table A.4: Immunization Status at Kasa	62
Table A.5: Improvements under the Integrated Health Service Project at Miraj	67
Table A.6: Service Coverage by the Indo-Dutch Project	70
Table A.7: Crude Birth Rate 1969-70 to 1976-77, South India	73
Table A.8: Comparison of Project and Nonproject Areas, Jamkhed	76
Table A.9: Mean Heights and Weights of Children by Age, Coimbatore	82
Table A.10: Weight of Children by Age in Months, Coimbatore	83
Table A.11: Mean Heights and Weights of Supplemented and Unsupplemented Children Aged One to Five by Tribal Group, Andhra Pradesh	87
Table A.12: Weight of Pre-School Supplemented and Unsupplemented Children by Tribal Group, Andhra Pradesh	88
Table A.13: Classification of Nutritional Status of Children by Program Efficiency, Madhya Pradesh	92

INTRODUCTION AND OVERVIEW

The World Bank has been collaborating with Johns Hopkins University in analyzing data collected from a field experiment on various combinations of health, nutrition, and family planning provided from 1969 to 1974 in Narangwal (Punjab), India. The purpose of this paper is to place the Narangwal experience in the perspective of other special projects and experiments in India. We obtained information on many of those projects and experiments by writing to their sponsors in India. We also obtained information from the materials presented at the Primary Health Care Conference that the Indian Council of Medical Research (ICMR) organized in New Delhi in April 1980. Even so, a systematic evaluation and comparison of special projects and experiments in India is hampered by the lack of complete data. Only one or two projects had rigorous monitoring and evaluation.

Guided by three factors, we selected fourteen projects for review. First, we included the projects that have attracted the most attention, as evident from the proceedings of ICMR Conference in 1980. Second, we considered the availability of data from published reports, documents, and articles and from correspondence with managers or sponsors of the projects in India. Third, we focused on recent projects and therefore excluded old experiments (Khanna, for example), even though they were well documented.

There are many gaps in knowledge about these projects and about the potential contribution of project services, particularly that of primary health care. The service packages adopted the contributions of various factors to project accomplishments, and the final effects of different interventions still are not fully understood. The potential for replicating

services on a large scale also needs to be assessed with a focus on cost, institutional requirements, and problems of implementation.

It generally is believed that small projects do better than the large projects both in the public sector and in the private sector (for example, see Pyle 1979). Although this review finds some validity in this point of view, the advantages of the small projects need to be weighed against a few qualifications, which this review brings out. First, there is comparatively less information on smaller projects--because of the inadequacy of their systems for collecting data and for monitoring and evaluating progress. That precludes systematic analysis of what projects have achieved and what interventions have meant for the population covered by services.

Second, the coverage by small projects has been insignificant in relation to the population to be eventually served. In relation to their coverage, however, these projects get undue attention. For example, all the special projects in Maharashtra cover only about 400,000 people, or less than 0.8 percent of the state's population. Third, most of these projects are the results of the initiative and drive of individuals. In addition to this intangible factor, the costs of replicating small experiments and special projects on a national scale are high.

Despite these qualifications about the small experiments and special projects, several lessons learned from them have general applicability.

The integration of services for health, nutrition, and family planning is more cost-effective than delivering separate services, whether projects are multipurpose or single-purpose. According to the well-documented results of the Narangwal research, the effects of integrated services on growth, morbidity, mortality, and family planning acceptance are all

significant. The Mandwa project combined prenatal and postnatal care with nutrition and immunization programs to achieve better birth weights, avoid neonatal tetanus, and reduce infant mortality. In the Jamkhed project, women who had just delivered and who had three to four children were encouraged to adopt family planning while the children in the family received continued care and follow-up. The acceptance rate among these women was very high. In the Kasa project, groups at risk were identified through regular surveillance visits, which then helped in designing various health and nutrition services. Even the experiences of the single interventions underline the need for integration. For example, the Special Nutrition Program--launched by the government in 1971 with the main objective of providing supplementary nutrition for preschool children, pregnant women, and nursing mothers--had problems. Concerns have been expressed about whether the feeding-only strategy of the project adequately addresses the health and nutritional needs of the target groups.

Community participation, where stressed, leads to better handling of community health and welfare problems, better acceptance of health care services, and generally more equitable distribution of the benefits of services. But the experiences of the projects reviewed show that community participation did not lead to success in all cases. If the basis of participation did not go beyond the established power structure in the villages (for example, beyond the gram panchayats), the success was limited. At Mandwa, local health committees of village leaders were formed. Those leaders used their involvement to further their position in the village hierarchy, something that enhanced rather than decreased inequalities. At Jamkhed and

Narangwal, community participation went beyond established village committees: the Jamkhed project enlisted local community groups, such as Young Farmers Club; at Narangwal, efforts were made, before and after the projects were launched, to inform communities and to encourage their participation. In these projects community participation proved extremely useful.

The success of community participation depends not only on who in the community is involved but on when the communities are involved. Results were better if the communities were involved in planning (such as in the Applied Nutrition Program at Kerala). The experience of the Indo-Dutch project reinforces this point. The approach in that project was to provide clinics, health care, and nutritional supplements without any community input. Four years after the start of the project, project organizers asked the local communities to contribute toward health care services and to pay membership fees for women's groups and child care services. The response was sluggish. In fact, because of this experience, the leaders of the expanded project in Hyderabad approached the community before providing services.

In most projects, paraprofessional staff deliver preventive and simple curative services and do promotional work in the villages. Most of the successful projects worked on the primary-health-care principle that village health workers, indigenous to the area, should provide health, nutrition and related services at the periphery of the health system. In the Narangwal project, for example, family health workers treated simple conditions and provided health care and follow-up to children receiving services. The Kasa, Miraj, and Jamkhed projects used the skills of traditional midwives and practitioners; the Indo-Dutch and Mandwa projects recruited new cadres of workers and trained and assigned them to villages they came from.

Female staff were generally preferred, primarily because many services are more acceptable if delivered by a woman. There is no clear picture about the preferred background in education, and experience of workers recruited in the project. But even illiterate workers performed well with training.

The more successful projects seem to develop an effective supervisory and training system. Generally, the smaller the project, the better the supervision and the more impressive the results. For example, in the Narangwal population project, family health workers offered various services to groups of villages, and the project's impact on contraceptive use was measured longitudinally. At Jamkhed and Kasa, workers could be involved in planning and implementation--for example, in setting priorities, identifying community problems, and delivering services to groups at risk. This produced encouraging results.

Emphasis on outreach generally leads to better use and better coverage for the population at risk. The Narangwal experience shows that the greater the reliance on home visits, the greater the use of services by low-income groups. But one important lesson of these projects is that it is difficult to adhere to a selection criterion fixed at the outset of a project. Nutrition and health criteria, even age criteria, cannot be strictly followed. A certain amount of flexibility is needed but this often leads to much less coverage of the target group than desired. And the the total absence of a selection criterion can lead to a serious problem (as in the Applied Nutrition Program): the failure to reach low-income families, the neediest members of the community.

In general, the per capita expenditure is fairly low in smaller projects that combine health, nutrition, and population, but it still is higher than that by government. The range in the projects surveyed was between \$0.47 and \$2.73 per capita (Rs 3.70 and Rs 21.30). At Narangwal the annual cost per capita for nutrition services was between \$0.80 and \$2.00, for population services between \$1.16 and \$2.84. These costs are nearly four times higher than the cost of government services. At Poshak the annual costs per child were also higher than those of other government nutrition programs. In general, nutrition projects cost more per capita than health and family planning projects. In some, especially those with strong community participation, part of the cost could be recovered.

Measurement in these projects is complicated, however, by the problem of valuing financial and social costs. Many of the projects used highly skilled personnel to collect data, undertake various service functions, and manage the project's activities. Moreover, the cost of goods and services on local markets in India does not reflect their real costs because of distortions in the economy. So it is difficult to evaluate the extent to which projects could assign costs to services in a way that reflects the social opportunity cost of labor.

Measuring benefits is much more difficult than measuring costs because the output (the immediate result) and outcome (the final result) cannot always be clearly defined. Even when outcome measures can be defined, they cannot always be clearly ascribed to the use of services. Thus cost-benefit analysis was inappropriate for evaluating these projects.

Few of the studies collected comprehensive data for outcomes, but many did for outputs. These data relate to coverage of the target populations

and the use of services. But even for projects with formal controls, it is difficult to demonstrate that project inputs were responsible for changes in growth, morbidity, or infant and child mortality. The output data for many of the better-documented projects show, in general, that a comprehensive program of integrated services for health, nutrition, and family planning appears to be more cost-effective than many of the large single interventions.

Most projects use output variables (such as service coverage) to monitor coverage, but none of the projects surveyed developed an effective system of measuring the impact of services. Only a few even attempted to measure impact. Retrospective surveys and before-and-after surveys were taken to measure changes in outcomes (health, nutrition, or family planning). But these changes could not be attributed to services with any degree of confidence without control groups. Even for projects with control groups, it is difficult to attribute changes in outcomes to services.

In sum, a few guidelines for future Bank projects in population, health, and nutrition can be highlighted on the basis of this survey:

- o First, the integration of health, nutrition, and family planning services is desirable, as far as possible, in project design.
- o Second, community participation, if it is properly designed and if it begins at the planning stage, can be very helpful.
- o Third, paraprofessional staff, with little or no experience and education but with an appropriate supervisory and training system, can effectively deliver services.
- o Fourth, a rigid selection criterion for targeting services is not possible, but the lack of a selection criterion distracts the project from its goals.

- o Fifth, although the lessons of the projects are relevant, none of them can be exactly replicated.
- o Sixth, cost-benefit analysis is impossible because of the difficulty of measuring benefits. Cost-effectiveness analysis, is possible, however, and it appears to be a useful tool.
- o Seventh, a simple system for monitoring progress is desirable for all projects. But only well-designed field experiments with heavy research components should be used to develop guidelines for analyzing impact of services.

HEALTH, NUTRITION, AND FAMILY PLANNING

A Survey of Experiments and Special Projects In India

In August 1980 the Indian Council of Medical Research (ICMR) and the Indian Council of Social Science Research (ICSSR) published Health for All: An Alternative Strategy. That document started a nationwide debate on health--including nutrition and family planning--by highlighting the limitations of health policies and programs. It recommended that three programs should be vigorously pursued during the next two decades to reach the goal of health for all:

- o Integrated community development, including family planning.
- o Improvements in nutrition, health education, and the environment.
- o Adequate health care services for all through an alternative health care system.

An alternative system, also outlined in the document, stresses primary health care, preventive services (including surveillance), maternal and child health (MCH) services, and the use of community health volunteers. Implicit in this are four principles: first, integrating health, nutrition education, and family planning services; second, encouraging community participation in the planning and delivery of health care services; third, establishing a pyramidal system of health care, with referrals to the upper layers; and fourth, using indigenous resources and health personnel. These principles are not new, and their usefulness has been demonstrated in many settings. Nonetheless,

evaluating the Indian experience in implementing these principles not only can further demonstrate their usefulness; it can provide some information about implementation. That is the objective of this survey.

THE SETTING

At independence in 1947, the government system of health care hardly reached the rural areas, which were served by health facilities administered by local councils and foreign missionaries. Since then, a vast network of health services has been built, often incorporating and strengthening nongovernment agencies. In 1952 primary health centers were established as part of the national program of community development, and a system of comprehensive health care was introduced. Also in 1952 the official Indian family planning program got under way, first as a family planning program, later as a family welfare program.

Today the organization of medical care comprises primary health centers and subcenters, rural district hospitals, and the large teaching institutions and specialty hospitals in cities (table 1). The health system pyramid, with primary health centers and subcenters at the base, gives health workers the opportunity to refer patients to higher levels. A primary health center provides care to 80,000 to 120,000 people; a subcenter, to 10,000. In 1978 India had 5,407 primary health centers and 37,690 subcenters. These facilities provide many services, including nutrition, sanitation, family planning, health education, maternal and child health, the control of communicable diseases, and the collection of epidemiological and other relevant data.

Along with pyramidal health care, vertical health programs were launched regionally and nationally: campaigns against malaria, tuberculosis,

Table 1: Structure of the Health Care System in India

Level	Staff	Villages served	Population served
District hospital	District medical and health officer; chief medical officers for medicine, health, and family planning	1,200-1,800	1,500,000
Primary health center	Medical officers, nurses, midwives, pharmacist, and laboratory technician	80-100	80,000-120,000
Group of three to four subcenters	Health supervisors: one male and one female	25-40	30,000-40,000
Subcenter	Health workers: one male and one female	8-10	10,000
Village	Community health workers (proposed) and indigenous midwives	1	500-1,500

Source: Sharma and Chaturvedt (1979).

and smallpox among them. Staff were recruited and sent to do special work with the staff of primary health centers. This arrangement led to operational and administrative difficulties. Cadres of specialized or unipurpose workers pursued the targets set for their programs, but they neglected basic health services. In the family planning program, aggressive measures to persuade Indians to adopt permanent contraceptive methods were strongly resented--and the bad feelings about family planning affected the performance of health workers. The result was that special programs slowed the development of basic health care.

The organization and composition of health teams changed in the late 1970s. First, a multisectoral approach has increasingly been recognized as needed to solve the problems of the community, and the coordination of various sectoral activities--such as agriculture, education, housing, and health--has been encouraged. Second, unipurpose workers have been converted to multipurpose workers, and vertical health programs have been integrated with basic health care. Third, community participation has been encouraged through the recruitment of village and community health workers, chosen by the village people and in some instances paid by them.

According to the revised national health policy, one community health worker provides basic medical services in each village. More complicated cases are referred to the primary health center or subcenter. Services are integrated, and the package includes health, nutrition, and family planning. The revised policy also includes provision for directing services to groups at risk in the community: target populations served by special programs.

Despite such changes in the organization and composition of health teams, access to health and related services leaves much to be desired. More than 85 percent of the population does not have easy access to health services (Antia 1980). Although there now are many more hospitals and medical professionals, preventive and promotive health services have not been sufficiently developed to reach the large rural population. The infant mortality rate is estimated at 110 per 1,000 live births. Of all deaths 30 percent are during the first year of life, 14.6 percent in the next three. Protein and calorie malnutrition are big health problems, as are infectious and parasitic diseases. Malaria and tuberculosis still are major health hazards.

The ICMR-ICSSR document, in reviewing health problems in India, had this to say about the health care system: "its benefits do not reach the poor or the bulk of the rural people. As it is devoid of a participatory element, it has actually increased the dependency of the people. Its costs are exorbitant; and on this basis, the country will not be able to provide good health care to all its citizens" (1980, p. 5).

FRAMEWORK OF THE SURVEY

Many experiments, special programs, and research projects have attempted to identify problems and determine ways of achieving better health, particularly in the rural areas. Some of these efforts are designed to test the appropriateness and effect of a package of services that is acceptable to the people. Others are designed to test one component among many services. Outcome data are needed to evaluate a strategy systematically and to compare it with others; but these data are not available for most of the special

projects. Even so, the projects can be assessed to see what lessons they offer for future directions in health, nutrition, and family planning.

We have chosen fourteen from a large number of field experiments and special projects completed or under way in primary health care, nutrition, and family planning. Many of the projects provide health, nutrition, and family planning services. Several are concerned primarily with infant, child, and maternal care and with morbidity, mortality, and growth. Some are nutrition or population projects linked to the primary health care system. Few had rigorous monitoring and evaluation. Our selection was guided by published documents, reports, and articles about the projects. We focused on recent projects and therefore excluded old experiments (Khanna, for example), even though they were well documented. We naturally wanted to include as many recent projects as possible, but we ended up concentrating on research, pilot, and service projects of government and voluntary organizations. Appendix A has profiles outlining the background, design, and effect of the experiments and special projects. Appendix B lists other projects in India for which some general information is available.

CHARACTERISTICS OF PROJECTS

The experiments and special projects surveyed in this paper fall into three categories (see table 2):

- o Experimental-research projects to identify new strategies, to test new theories of health, nutrition, and family planning, and to compare service components and their achievements.
- o Pilot projects to test the feasibility of a strategy and its replication.

Table 2: Experiments and Special Projects

Kind of project	Implementing agency	Dates	Main services provided	Coverage
<u>Experimental-research</u>				
Narangwal Nutrition Project, Punjab	Indian Council of Medical Research/Johns Hopkins University	1968-74	Nutrition/health care/education/surveillance	10,500 <u>/a</u>
Narangwal Population Project, Punjab	Indian Council of Medical Research/Johns Hopkins University	1968-74	Nutrition/health care/family planning services	21,700 <u>/b</u>
Alternative Strategies in Family Planning, Bangalore	Population Center, Bangalore/Government Health Services	1974-79	Primary health care/family planning	1,760,000
Mandwa Rural Health Research Project, Maharashtra	Foundation for Research in Rural Health, Grant Medical College, Bombay	1973-	Primary health care/MCH/leprosy/TB control	30,000
<u>Pilot</u>				
Kasa Integrated MCHN Project, Maharashtra	Institute of Child Health, Grant Medical College, Bombay	1974-77	Supplementary feeding/education/health care/family planning	56,364
Project Poshak, Madhya Pradesh	State and local government/CARE	1971-75	Health care/education/supplementary feeding	15,000 <u>/c</u>
Miraj Integrated Health Services Project, Maharashtra	Miraj Medical Center	1973-77	Health care/family planning/leprosy/TB care	230,329
Indo-Dutch Project for Child Welfare, Hyderabad District, Andhra Pradesh	Foundation for Research in Community Health/State government	1969-	Health care/education/creches/supplementary nutrition/family planning/rural development	39,672
No-Birth Bonus Scheme (The "UPASI Experiment" on three tea estates in South India)	United Planters Association of South India	1971-	Family planning/no-birth savings scheme/MCH	521 <u>/d</u>
<u>Service</u>				
Comprehensive Rural Health Project, Jamkhed, Maharashtra	Comprehensive Rural Health Project, Jamkhed	1971-	Nutrition education and supplements/medical services/family planning/leprosy/TB services/rural development	100,000
Applied Nutrition Program, Kerala	State government	1963-	Nutrition education/supplementary feeding/production program/health checks/immunization	81 C.D. <u>/e</u> Blocks
Special Nutrition Program, Coimbatore, Tamil Nadu	State government	1971-	Feeding program	7,000 children
Special Nutrition Program, Tribal Areas, Andhra Pradesh	State government	1970-	Feeding program	140,000
Mid-Day Meals Program, Madhya Pradesh	State government	1965-	Feeding program	575,179 <u>/f</u>

/a Excludes control groups.

/b Excludes control groups.

/c Beneficiaries only.

/d Members in 1977.

/e No figures available for participants.

/f Beneficiaries only.

- o Service projects to provide services in response to community needs.

Although the differences between categories are not always substantial, the classification is helpful--for it shows the focus and the scope, two determinants of replicability. Experimental-research projects test the efficacy of strategies and are not meant for wide replicability. Pilot projects test an approach and a system expected to be widely replicated. Service projects respond to a felt need and are not designed or evaluated for replication.

Services

The experiments and special projects offer services in primary health care, nutrition, and family planning--and if not directly responsible for all services, they have close links with parallel services. In the Applied Nutrition Program, the staff of the primary health center worked with that of the nutrition program by selecting clients and providing health checks and immunizations for children. The No-Birth Bonus Scheme, primarily an incentive plan for family planning acceptors, was closely allied with the Comprehensive Labor Welfare Program, which provided maternal and child health services and educational services on tea estates.

The main services of the projects, already summarized briefly in table 1, can be classified in three ways: (a) those that provide comprehensive services for health, nutrition, and family planning; (b) those that provide an integrated set of services for health, nutrition, and family planning and in addition are engaged in rural development; and (c) those that have specific nutrition or population objectives and that may have links with complementary services.

Projects in the first category include the Mandwa, Miraj, Kasa, and Narangwal projects and to a lesser extent the experiment in family planning in Bangalore. The thrust of these projects has been preventive and promotional work in maternal and child health and in nutrition, with less emphasis on curative care. Services have for the most part been provided by the health workers in villages. Projects in the second category are the Comprehensive Rural Health Project at Jamkhed and the Indo-Dutch Project for Child Welfare, which sponsor a broad range of health-related services and broader development activities. Broadly falling into the third category are Project Poshak in Madhya Pradesh, the No-Birth Bonus Scheme in South India, and the nutrition projects in Kerala, Andhra Pradesh, Tamil Nadu, and Madhya Pradesh. Each of them has specific objectives for nutrition or family planning.

Categories of Worker

The manpower structure in primary health care encompasses many village health workers. The pyramidal hierarchy central to this system includes several levels of health workers, each providing support and supervision for those at lower levels. All workers are trained and qualified to perform particular tasks suited to their education and competence. This structure is efficient in the use of scarce manpower and ensures easy referral of complicated cases to higher levels. When this system of referral works, people in remote rural areas have access to the most sophisticated of health services.

Although no consistent pattern of recruitment, training, and responsibility is apparent, many of the projects have a hierarchical structure similar to that for primary health care. Close communication and supervision,

coupled with ongoing training, have been an integral part of several projects. Many inappropriate features of the western system of health care have been avoided. Generally, the manpower structure is not top-heavy with health professionals.

Many of the projects have been planned and developed by doctors who have wide experience in rural health care. Physicians generally play a central role by supervising and training paraprofessionals and by treating complicated medical cases beyond the capabilities of paraprofessionals. The hierarchical structure in the Kasa, Miraj, Mandwa, Jamkhed, Narangwal, and Indo-Dutch projects--essentially the small-scale projects--has been developed along these lines. At Jamkhed, for example, the Aroles have been directly involved in designing and administering the training program for village-based health workers. 1/

Many of the small projects have training courses for village health workers, courses that emphasize practical skills and preventive and promotive health work rather than curative skills. In Maharashtra many of the projects sponsored a short course, usually lasting three to six weeks, to train village workers in identifying and diagnosing illness, malnutrition, and infectious diseases. The workers were also trained in prenatal and postnatal care, in giving immunizations, and in other preventive work. Because many projects emphasize ongoing training, the workers can build on the knowledge already gained through practical training and field experience.

1. Drs. Mabelle and Rajanikant Aroles worked in a Maharashtra hospital from 1962 to 1966. Having subsequently gained three years of clinical experience and having taken a one-year course in public health abroad, the Aroles returned to Maharashtra and initiated the Jamkhed project.

The intermediate staff generally includes people with wider experience and longer training, such as auxiliary nurse midwives, paramedical workers, and multipurpose health workers. They provide the technical guidance, support, and encouragement for village workers and regularly visit the villages to supervise health activities. Generally based at the primary health center or unit, the intermediate workers participate in clinic activities with doctors, nurses, and other staff.

The findings from most of the small-scale projects suggest a relatively flat organization that features close communication between levels. At Mandwa, for example, the project is administered by a local doctor who supervises the work of auxiliary nurse midwives and community health workers. Each auxiliary nurse midwife supervises the work of five community health workers; a doctor visits the health subcenters once a week. This system of supervision is both efficient and effective in reaching people in villages.

Findings from the large service programs, particularly the Special Nutrition Program and the Applied Nutrition Program in Kerala, highlight several problems associated with staff. The worker-to-client ratio appears to be low in the feeding services of the Special Nutrition Program. In urban areas, one inspector supervises many centers, which serve up to 10,000 people. According to many evaluation studies, this supervisory system does not appear to be effective, and the organizer at each center generally is not trained. Monthly compensation for work at the center is low, and support for workers is limited. In the Applied Nutrition Program in Kerala, poor coordination and lack of training have been cited as two of the problems retarding program development and success.

The ratios of health workers to population vary from project to project; for many projects no figures are available. In the Maharashtra projects (Kasa, Jamkhed, Mandwa, and Miraj), voluntary health workers on average covered a population of 1,500 to 2,000, but the variation around these averages was considerable. The special nutrition programs generally had one worker and a helper to manage one feeding center that catered to 100 children and mothers, often to more. At the supervisory level, however, the ratios are much smaller, with one inspector supervising centers serving 10,000 beneficiaries. At Narangwal one health worker covered a population of 1,500, and contact was close between family health workers and village families. Early diagnosis and treatment and continuous follow-up by village workers had a major influence on the achievements there.

Population Coverage

The population covered depends on the kind of project: it probably is larger for a single intervention project. The No-Birth Bonus Scheme covers 521 persons; the experimental program of alternative strategies in family planning in five districts of Bangalore, as many as 1.7 million. But the deficit between the population targeted and the population covered often is great. The problem is in distinguishing the population at risk and the population generally covered. So, a distinction should be drawn between projects in which groups at risk are identified and given priority and projects in which wide population coverage is intended. Both kinds of project can have problems of achieving expected coverage of the target population. Project capacity, resource and administrative limitations, and the priorities assigned

to goals and objectives naturally are important factors affecting the ways target groups are selected and groups at risk are identified and treated.

Several factors affect coverage. Physical access makes a big difference in reaching the target population. One study in India has shown that for each additional half mile between the community and the health center, the percentage of the population attending the center falls 50 percent. 1/ A similar study has shown that 60 percent of the patients came from within a mile of the primary health center. 2/ In general, the population covered by the experiments and special projects is small. The cost of services and transport also affects access, as do sociocultural determinants. The efficiency and quality of services influences the use of services, an indicator of effective access: Also influencing the use of services are the relationship between the health staff and the community, the patients' perceptions about their illnesses, and the opportunity cost of obtaining care.

The projects have had mixed results in covering target populations. The experience in the large service-oriented projects has not been encouraging. Many of them provide a clinic-based, centralized system of health and nutrition care, which excludes many of the target population for whom access is difficult. The projects are trying to reach the vulnerable groups--mothers and children in low-income families--but because services are available only at clinics, the coverage excludes many people for whom the programs were intended.

-
1. World Bank (1980).
 2. Ibid.

In the Applied Nutrition Program in Kerala, 25 percent of the centers did not have the full complement of clients, and attendance rates were 30 to 40 percent below the number registered in the program. Although the study report does not provide the number of intended clients, high drop-out rates and problems of reaching the target group are evident. The incentives of the program for food production were not used as expected, either. In the Special Nutrition Program among tribal groups in Andhra Pradesh, a substantial "take-up rate" has been reported. The mean attendance rate was 86 percent, but many people from the eligible groups were not receiving the supplement. In the Mid-Day Meals Program, schools on average provided food to 16 percent more than the allocated number of children. A distribution of participants by age shows that 79 percent were between seven and eleven; other beneficiaries were below or above these ages.

Outreach efforts--believed to be important in effective coverage of health, nutrition, and family planning services--have been integral in many of the projects, including the two Narangwal projects. The outreach of the small projects seems to have increased the acceptance of family planning and the coverage of target groups. ^{1/} In the Miraj project the proportion of family planning acceptors rose from 20 percent in 1974 to 89 percent in 1977. The substantial increase may, however, be in part attributed to the extensive sterilization campaign in the state. At Jamkhed the percentage of eligible couples practicing family planning is substantially higher than in nonproject areas.

1. The National Family Welfare Program in India has, over the years, adopted a new approach for reaching prospective family planning acceptors. In 1963 the outreach system was initiated when clinic-based services failed to reduce the birth rate to targeted levels.

The smaller projects have been more effective in reaching target groups, primarily because of their extension work in the villages. Extension services in the community have reduced or eliminated problems of access and have enabled health and family planning workers to develop a relationship with villagers. Village health workers at Jamkhed make house-to-house visits and are responsible for the care and follow-up of all family planning acceptors and all prenatal and postnatal cases. Village health aides at Miraj were based in the village and undertook health and nutrition responsibilities with regular support and supervision from a visiting health team. Health workers at Kasa, by visiting households regularly, were able to identify emerging problems and take immediate action in response to needs.

But the success of these small projects masks the greater difficulties that planners face in transforming them into large-scale programs, which raises questions about replicability. Many small projects are characterized by their flexibility in problem-solving and their ability to change direction. In addition, smaller projects tend to have well-defined goals and objectives. Large-scale programs often are less flexible and adhere to rigid operational procedures, irrespective of problems identified. That is, they tend to emphasize procedures more than goals and objectives. Pyle (1979) has highlighted this problem and suggests that when small projects are expanded, there is a "misfit" between the structure of a larger bureaucracy and the newly adopted strategy. He suggests that the strategy adopted should be modified substantially and that the intervention should be tested in the bureaucratic and political setting.

MAIN ELEMENTS OF THE PROJECTS

In surveying the fourteen experiments and special projects, we examined the following main elements: the integration of services, the participation of the community, the use of auxiliary workers, the nature of supervision and training, the use of home visits, and the selection of clients (table 3 overleaf). We also checked whether costs and benefits were measured and whether the outcome was evaluated.

Integration of Services

One important lesson is the efficiency of integrating services for health, nutrition, and family planning. According to the well-documented results of the Narangwal research, the effects of integrated services on growth, morbidity, mortality, and family planning acceptance are all significant. The findings suggest that prenatal nutritional care, which included a food supplement and iron and folic acid, were strongly associated with a reduction in the perinatal mortality rate of 40 to 50 percent. Tetanus immunizations for pregnant women reduced perinatal mortality about 20 percent.

Recognizing the relation between maternal care and infant mortality, and the synergistic relation between infection and malnutrition, many projects focused integrated services on mothers and infants. The Mandwa project, for example, has combined prenatal and postnatal care with nutrition and immunization programs to achieve better birth weights, avoid neonatal tetanus, and reduce infant mortality. Eligible couples at Jamkhed are approached at an appropriate time to encourage their practice of family planning. Women who have just delivered and women who have three to four children are usually encouraged to adopt family planning when the children in the family are

receiving continued care and follow-up. The basis of this approach is the belief that eligible couples will not adopt family planning until they are confident they will have their desired number of healthy children.

Nutrition surveillance has been important in some projects. The Kasa project developed specific criteria for groups at risk. These groups were identified through regular anthropometric measurement of children and a number of risk factors for pregnant women. Previous history of stillbirth, abortion, or small-for-dates babies and other clinical signs alerted health personnel to the need for special care and surveillance. At Narangwal the growth of children was monitored from birth until they were three, alerting project staff to the greater risk of mortality. The findings there show that each 10 percentage point shortfall in weight-for-age exponentially increased the probability of death.

The Narangwal results show that although health care had a major effect on infant and child mortality--and that nutrition care alone reduced perinatal death rates--the services, when combined, had a substantially greater effect on mortality, morbidity, and growth (and were only slightly more expensive). Several findings of the Narangwal population study also point to the merits of combining services. In villages where family planning, women's services, and child care were available, the number of contacts was higher than in villages where only family planning and child care were available. But staff in the second group of villages spent more time delivering the services offered. Family planning services, when combined with other services, were more efficient both in the use of work time by family health workers and in the cost of services. The average cost for a new acceptor of modern methods in the second year of services was lowest when all three

Table 3: Main Elements of Experiments and Special Projects

Project	Integration of services	Participation of community	Use of auxiliary workers
<u>Experimental-research projects</u>			
Narangwal Nutrition Project	Yes Combined services (health, nutrition, and family planning) provided to experimental groups	Yes In organization and execution of programs	Yes Family health workers/feeding center attendants
Narangwal Population Project	Yes Combined services (family planning, women's services, and child care) provided to experimental groups	Yes In organization and execution of programs	Yes Family health workers/family planning workers/family planning educators
Alternative Strategies in Family Planning, Bangalore	Yes Maternal-and-child-health and family-planning services through PHC network	Yes Limited to some experimental areas and only partial community participation.	Yes Community welfare workers/auxiliary nurse midwives/lady health visitors
Mandwa Rural Health Research Project	Yes Health, nutrition, and family planning: preventive and curative services	Yes Fairly substantial initial involvement	Yes Village health workers/auxiliary nurse midwives
<u>Pilot projects</u>			
Kasa Integrated MCHN Project	Yes Health, nutrition, and family planning: preventive, promotional, and curative work	Yes Limited to selection of social workers and to other minor community involvement	Yes Part-time social workers (village health aids)/auxiliary nurse midwives/male multipurpose health workers
Project Poshak (Extensive Phase)	Yes Supplementary nutritional care through existing PHC network (infrequent interpersonal sessions, however)	No Reported only for use of services	Yes Lady health visitors/auxiliary nurse midwives
Miraj Integrated Health Services	Yes Nutrition, health, and family planning: preventive and curative care.	Yes But reported limited	Yes Village health aids/local village midwives (daís)
Indo-Dutch Project for Child Welfare	Yes Health, nutrition, and family planning: preventive and curative services.	Yes But poor	Yes Village health workers/auxiliary nurse midwives
No-Birth Bonus Scheme, South India	Yes Linked directly to Comprehensive Labour Welfare Scheme	No	Yes Auxiliary health staff attached to scheme
<u>Service projects</u>			
Comprehensive Rura Health Project, Jamkhed	Yes Nutrition, health, and family planning: preventive and curative services	Yes Major	Yes Village health workers/auxiliary nurse midwives.
Applied Nutrition Program, Kerala	No Periodic checks by PHC staff at feeding centers	Yes Mainly in feeding component	Yes Auxiliary health workers/village extension officers (untrained)
Special Nutrition Program, Coimbatore	No No direct links with PHC network	No	Yes Feeding center staff
Special Nutrition Program, Andhra Pradesh	No No direct links with PHC network	Yes Minor	Yes Feeding center staff
Mid-Day Meals Program, Madhya Pradesh	No No direct links with PHC network	No Children but no parents participated in distribution of food	Yes Feeding center organizer (teaching staff also engaged in preparation and distribution)

Note: PHC stands for primary health care.

Supervision and training	Extent of home visits	Selection of service clients	Whether costs and benefits were measured	Whether impact was evaluated
Yes Ongoing training and supervision	Regular	Weekly, bi-weekly, and monthly	Age, health, and nutrition level criteria.	Yes Output and outcome data collected
Yes Ongoing training and supervision	Regular	Weekly, biweekly, monthly, and quarterly, depending on age and type of care	Age, health, and nutrition level criteria.	Yes Output and outcome data collected
Yes Some key posts remained vacant	Limited	Minimal house contacts	By geographic area	Yes No cost figures available Output data available
Yes Regular training and supervision	Frequent	House visits by village health worker	Target services to children and mothers	Yes Limited Output data available
Yes Preliminary and ongoing training and supervision	Frequent	Primarily to target group members	Target group and general population coverage	Yes Limited Output and outcome data collected
Yes Preliminary and ongoing training and supervision	Limited	Home visits rarely made due to time and physical inaccessibility.	Age criteria for children; all pregnant and lactating women were included	Yes Output and outcome data collected
Yes Preliminary and ongoing training and supervision	Frequent	Mainly to target groups	Target group and general population coverage	Yes Limited Output and outcome data collected
Yes Preliminary and ongoing training and supervision	Frequent	Mainly to target groups	Target group and general population coverage	Yes Output data mainly collected
Not reported	None	No home visits reported; preliminary discussion with beneficiaries	Women of child-bearing years eligible	Yes No cost figures available Output and outcome data collected
Yes Preliminary and ongoing training and supervision	Frequent	Primarily to target groups	Target group and general population coverage.	Yes Limited Output and outcome data
Yes No details available	Irregular	To some participants	Based on geographic location; no individual criteria for participation.	Yes Retrospective output data available
Yes Supervision and training limited; some workers untrained	None		Based on age criteria for children; pregnant and nursing mothers eligible	Yes Cost figures not available Output and outcome data collected (retrospective)
Yes Supervision and training limited; some workers untrained	None		Based on age criteria for children; pregnant and nursing mothers eligible	Yes Output and outcome data collected (retrospective)
Yes Limited supervision and training; teachers food distribute generally	None		Eligibility based on school enrollment	Yes Retrospective output and outcome data available.

services were combined. The health outcome measured in the project, as a proxy for the effect of child care, was death of children from birth to age three. Cost-effectiveness calculations show that the cost of an averted death was slightly less in villages with all three services combined.

The need for integrating services is underlined by the experiences of single interventions. For example, the Special Nutrition Program--launched by the government in 1971 with the main objective of providing supplementary nutrition for preschool children, pregnant women, and nursing mothers--has had problems. Concern has been expressed about whether the feeding-only strategy of the project adequately addresses the health and nutritional needs of the target groups. The Integrated Child Development Scheme--a large pilot project currently under way in India is designed to meet the health, social, nutritional, and educational needs of children in the preschool age group as well as those of pregnant and nursing mothers. Begun in late 1975, it is a multifaceted project to deal with the many problems of health and nutrition among the vulnerable groups. Preliminary findings from a stratified random sample survey of children under six show a major decline in the percentage of malnourished children over a two-year period.

Community Participation

Communities can participate in the development of a health care system in many ways and at different stages. These include having the community take part in the planning and identification of programs to solve their health needs; having the community help in prevention, promotion, and the collection of epidemiological or other relevant data; and having the

community pay a fee for services, make salary payments to health workers, or provide materials and labor for construction.

The Jamkhed project got the community to take part by first approaching village leaders with proposals for the comprehensive health care services and implementing the desired services with community cooperation. The project became increasingly self-sufficient: in 1978 patient fees covered three-quarters of the recurrent expenses (Gwatkin and others 1980). The communities donated land, provided materials, and offered their services in setting up the community health facilities. The project also enlisted local community groups, such as Young Farmers Clubs, to help conduct mass immunization and nutrition programs.

Many of the small projects worked through gram panchayats (village committees) and made no attempt to bypass the village hierarchy or to challenge sociopolitical structures. At Mandwa the project objectives were not in line with vested interests in the villages. Local health committees were formed to oversee programs and to assist community health workers in preventive health work. The project director reports that the enthusiasm of those committees has waned substantially because the project is directed toward the poorer sections of the community and not so apparently beneficial to the most vocal members of the community, who make up the committees (Antia 1980). But the community still pays part of the health workers' salaries and pays for medicine.

At Narangwal efforts were made, before and after projects were launched, to inform communities and to encourage their participation (Taylor and others, forthcoming). Throughout the project's life, villagers assisted in organizing and executed all major vaccination projects. Villagers provided

food and equipment for a special day-care center and made payments in kind to women locally recruited to manage the program. Vital statistics were collected through a variety of sources, including village reports. The communities provided buildings for use as health subcenters and feeding centers. Village participation was reported to be in accord with the objectives of the project.

In the Kasa and Miraj projects the community was not involved to any great extent. About these two projects, Pyle (1979) has suggested that the projects are effective only as long as the voluntary agency or government supports them. Once support is withdrawn, the project cannot survive.

The problems of the Indo-Dutch project are common to many others. When it was begun as a pilot project in late 1969 in the Hyderabad District of Andhra Pradesh, planners expected that international donors could gradually withdraw as community involvement increased. Communities were slow in responding, however, and it is now expected the project will continue with the same inputs until 1985. Of several problems, one is the time at which the community was asked to participate. The first approach was to provide clinics, health care, and nutritional supplements without any community input. In 1973, four years after the start of the project, project organizers asked the local communities to contribute toward health care services and to pay membership fees for women's groups and child care services. The sluggish response has encouraged project leaders in the expanded project in Hyderabad to approach the community before providing services.

The large-scale service projects in nutrition generally have not been effective in engaging the participation of the community, but community involvement in the nutrition project at Andhra Pradesh was considerable. In

the Applied Nutrition Program, gram panchayats provide food utensils and pay a ten-rupee allowance to workers. In the mid-day feeding project in Madhya Pradesh, no direct parental or community involvement is reported, although the community has expressed positive views about the project.

If community participation is confined to the traditional power structure (such as gram panchayats), these structures may be strengthened, and the inequalities villages increased. At Mandwa the project managers worked with village committees to reach target groups. These committees, composed of the most vocal members of the community, lost interest when they saw they had little to gain from promoting the project. At Jamkhed the community participation went beyond the established power structure. Although health workers were encouraged to avoid politics, the development of broadly based health services impinged on the power structure there. The project directors were in one instance asked to urge one of their workers to withdraw from local community elections, fearing the worker would unseat the incumbent.

Use of Auxiliary Workers

Many of the projects relied largely on paraprofessional staff to deliver preventive and simple curative services and to do promotional work in the villages. In the Indo-Dutch Project community health volunteers provide basic health and nutritional services to the community and monitor changes in health and growth of children. In the Jamkhed project the village health workers, usually women the community selects, are important in delivering health services. People in villages can identify with the worker, who emphasizes promotional and preventive health work and makes it more acceptable

to the community. In the Narangwal project the family health workers treated simple conditions and provided health care and follow-up to children receiving services. Their work accounts for a large part of the project's success.

Basic to primary health care is that village health workers, indigenous to the area, should provide health, nutrition, and related services at the periphery of the health system. Many projects (Miraj, Kasa, and Jamkhed) have used the skills of traditional midwives and practitioners; others (Mandwa and Indo-Dutch) have recruited new cadres of workers and trained and assigned them to the villages they come from. Village health workers are men or women usually able to read and write, chosen by the community (or with its agreement), and trained to deal with community problems. They are paid in cash or in kind by the community for the health functions they perform full-time or part-time. They are part of the health team working at the periphery.

There is no single system of recruiting a particular kind of health worker. Some projects have engaged workers who had previous experience in the government health services; others recruited and trained workers with no experience in health care. The education of workers also varied substantially, ranging from ten years of general education and further medical training (as at Narangwal) to illiterate (as for women chosen as village health workers in Mandwa and Jamkhed). Few low-level workers in the large nutrition projects had training in nutrition intervention. There was clearly a preference for female staff, primarily because many services are more acceptable if delivered by a woman. Middle-aged women with children of their own had often been chosen by the community to provide informal health services before their recruitment into the projects.

Many projects have emphasized the role of paraprofessionals in providing health care and have developed suitable practical training plans. Short training courses of one to six weeks have been found most satisfactory in preparing health workers for their respective assignments. Training is close to the villages, and priority is given to practical skills. Ongoing training needs are also met by regular in-service teaching and discussion, a method that has been particularly successful in augmenting the worker's knowledge and skills.

- o The Jamkhed project has emphasized two-way learning: case studies are discussed weekly, based on the experience of health workers during the preceding week. This alerts the project directors and other professional staff to the problems and perceptions of the community, and reinforces the health workers' training by continuing education.
- o The Kasa project had some problems in recruiting village health workers. Although female workers were preferred, few women who met the criteria were willing to work in isolated areas. About 60 percent of the workers recruited were men, for whom drop-out rates were high because of the increased demand for labor during harvest periods.
- o The preservice training of family health workers at Narangwal initially took eighteen weeks but was later compressed to six weeks without an apparent loss in technical skills. All family health workers at Narangwal had a high school education, previous training as lady health visitors, and follow-up training in health.

- o At Jamkhed 80 percent of the many village health workers are illiterate. The experience there suggests that illiterates can provide efficient services and handle 90 percent of the cases, including diagnosis and treatment.
- o The Mandwa project, in an attempt to have an immediate effect on village health problems, initially used many health professionals, but this proved counterproductive. Highly trained personnel in the project expected rapid changes and had difficulty in adapting to the slower pace of village life. The project is now directed by one health professional; community health workers and auxiliary nurse midwives provide preventive and curative services.
- o In Madhya Pradesh the feeding program is run by the organizers of each center with the help and support of teaching staff and students. Because half the schools do not have a cook assigned to the program, students and teachers are responsible for much of the preparation and distribution of food.

Supervision and Training

The more successful projects share many characteristics in their health manpower, in their supervisory system, and in their training programs. First, they selected front-line workers from the community. This made it possible for health workers to voice the needs of the community and to play a central role in meeting the health needs of the target population. The workers could deliver simple curative and preventive services and cover dispersed village communities. Second, the more successful projects were

developed by health professionals familiar with local health problems and community needs. Third, they developed an effective supervisory and training system. Results invariably were better in smaller projects with careful supervision: we have already noted that two continuous training programs based on the day-to-day experiences of workers at Kasa and Jamkhed produced significantly better results. Fourth, the better projects had workers take part in setting priorities. Fifth, those projects collected epidemiological data, identified community needs, and assessed service packages in relation to targets for health, nutrition, and family planning.

Here are a few examples. In the Narangwal population project, family health workers offered various services to groups of villages, and the project's impact on contraceptive use was measured longitudinally. At Jamkhed and Kasa, workers were directly involved in setting priorities, identifying community problems, and delivering services to groups at risk. The results of these projects have been encouraging. But in the Special Nutrition Program, which shares few of the characteristics just listed, the nutrition organizer is neither properly trained nor supervised, and evaluation reports suggest that workers have become despondent.

Use of Home Visits

The primary health center, the subcenter, and extensive home visits are basic elements of many of the projects. At Narangwal, Kasa, Jamkhed, Miraj, Mandwa, and Chevella in the Indo-Dutch project, the health care system has been based on outreach and on integrated services. These projects have developed a system of regular house-to-house visits to collect information and epidemiological data, to follow up on cases under surveillance, and to

identify and treat particular conditions and groups in need of special care. At Narangwal this system was important in the early recognition and care of illnesses and malnutrition. Home visiting appears to be effective both in reaching target groups and in providing services to meet basic needs.

Project Poshak and the large nutrition projects had no outreach program. Mothers and children attended a central clinic, as in Poshak, or a nutrition center to collect food or attend the feeding program. The projects did not provide for an initial house-to-house recruitment campaign of eligible family members or for the follow-up of drop-outs. Project staff were thus unable to identify emerging health or nutrition problems or to obtain up-to-date information on the effect of projects on the target groups. In addition, the findings reported by these projects suggest that target group coverage was not substantial and the drop-out rates were high. The No-Birth Bonus Scheme in South India nevertheless recruited many eligible couples without home visits. But this was a single-purpose project, and the environment of the project made recruitment and follow-up simpler than in the broader programs.

Increased emphasis on outreach generally led to better use and better coverage for the percentage of the population at risk. The Narangwal experience shows that the greater the reliance on home visits, the greater the use of services by low-income groups. Home visits were weekly in villages with services for family planning and child care, and neonatal deaths were reduced most for low-caste children. The villages with combined services for family planning, women's care, and child care had only monthly outreach visits. As a result, fewer low-caste families were reached, and reductions in neonatal mortality were moderate, most of which were in the high-caste group.

Selection of Clients

Many of the health and nutrition projects, particularly in the large nutrition programs, had no criteria based on the health and nutritional status of mothers and children. Without such criteria the problem, as in the Applied Nutrition Program, is the failure to reach the neediest members of the community--low-income families. It may be unacceptable to limit participation by nutrition level. There is, in addition, the practical difficulty of screening all participants. At Kasa, criteria were set to determine eligibility for the special nutrition supplement; political repercussions were reduced by a community education program given by part-time social workers based in the villages. Analysis of Project Poshak shows that the main target group--the hutbound toddler of low-income families--did not participate to the extent expected primarily because of time and social constraints. A selection process would to a large extent overcome these problems.

The main screening procedure in many smaller projects is the charting of weight on the "Under 5" card (Morley weight chart). Children are also screened for simple ailments, such as fever, diarrhea, and skin and eye conditions. Because findings, treatments, and immunizations are recorded on the cards, projects can track changes in morbidity and growth over time. The Kasa project was able to hold the proportion of members receiving supplementary nutritional care to 23 percent of the population under five by using the following criteria: low birth weight, weights below 65 percent of Harvard standards, no weight gain in three consecutive months, loss of weight in two successive months, or such illnesses as measles or gastroenteritis. At Jamkhed and Miraj the screening is similar to that at Kasa, and participation in special project activities is restricted mainly to the vulnerable groups.

In many of the large service programs, project planners usually set age criteria. In several special nutrition programs, however, many children outside the age group were admitted. Another important factor was the need, identified in Poshak, to make "pre-implementation visits to the target population to establish rapport" (Gopaldas 1975). If selection and participation are based on age and not on morbidity and nutrition, projects often fail to reach the most vulnerable groups. At Narangwal, nutrition and medical care services relied on surveillance. Problems were identified by family health workers. Treatment was prompt, and growth was monitored consistently. If children missed more than seven consecutive days of feeding, homes were visited to find out why. This method of selection and continued follow-up of cases had a major influence on the growth of children in the nutrition care villages.

PRINCIPAL FINDINGS ABOUT COST AND BENEFIT

An evaluation of cost and benefit is needed to judge the usefulness and replicability of the projects. Table 4 (overleaf) provides a brief summary of the reported impact of the various projects--and if available, the per capita cost and annual cost of services. The Poshak, Narangwal, and Andhra Pradesh figures are probably the most reliable. For several projects, only rough approximation of expenditure is possible. In many of the small projects--Kasa, Jamkhed, Miraj, and Mandwa--such inputs as donated food and labor are not included in the cost. Analysis of cost differences across projects has little meaning because of differences in services, in the time span of projects, in the size and type of target group, and above all in cost accounting, which usually is inadequate or incomplete. It also is impossible to compare costs and benefits of projects because of fundamental problems in measuring

benefits (see the later discussion). Some cost comparisons nevertheless are possible.

At Narangwal the annual per capita cost of services was Rs 6.00 to Rs 15.00 (\$0.80 to \$2.00) for the nutrition project and slightly higher for the parallel population project. ^{1/} Average annual per capita cost for each service ranged from Rs 8.70 to Rs 21.30 (\$1.16 to \$2.84) in the population project. The estimated per capita expenditure for services at government primary health centers in Punjab was Rs 2.00 to Rs 3.00 (\$0.27 to \$0.40) in 1968 and 1969. The Narangwal study group estimated that the project costs for combined services could be reduced by half (that is, to \$1.07) if the project used government medical stores, if personnel received the lower fringe benefits typical of government personnel, and if food were free. Even though the cost would still be high (about four times that of government services), the researchers suggested that the per capita cost, expressed in relation to the population served by the two types of programs, would be similar. It might be too much, however, to expect that program efficiency could be maintained using fewer resources.

The Poshak annual cost figures, Rs 110 to Rs 114 per beneficiary (\$14.67 to \$15.26), are high, even higher than those for the government nutrition programs; the main expenditure was on food. The findings about costs and coverage of target groups are not encouraging.

In general the per capita expenditure in smaller projects that combine health, nutrition, and population are fairly low--Rs 3.70 to Rs 21.30 (\$0.49-\$2.84)--and compares favorably with those by government. Measurement in these projects is complicated, however, by the problem of valuing financial

1. The exchange rate used throughout the paper is Rs. 7.5 to the U.S. dollar, even though there were fluctuations.

Table 4: Reported Costs and Benefits of Projects

Project	Annual cost per capita (rupees)	Annual total cost (thousands of rupees)	Cost of statewide replication (millions of rupees)	Reported impact	Average child mortality rate, 1973	
					Infant mortality rate, 1970	Average child mortality rate, 1973
Narangwal Nutrition Project	6-15	157.5	155.0 <u>a/</u>	Treated children 0.5-0.6 kg. heavier and 0.2-1.3 cm. taller than others at 36 months.		
					Nut Area	11
					Medical Care Area	11
					Nut/Med Care Area	13
					Control Area	19
Narangwal Population Project	9-21	462.2	220.1 <u>a/</u>	Current users of contraception after 1-3/4 and 4-1/2 years of service.		
					FPWSCC area	34%
					FPWS area	41%
					FPCC area	-
					PPED area	-
					Control area	-
Alternative Strategies in Family Planning, Karnataka	n.a.	n.a.	n.a.	Family planning performance improved under three of the strategies adopted - (a) responsibility entrusted to a voluntary organization (b) improved technical competence of the health staff (c) payment of incentives in kind.		
Handwa Rural Health Research Project	5	135.0	156.2 <u>b/</u>	<u>Project coverage</u> Registration of ante natal cases 81% Antenatal cases receiving a nutrition supplement 90% <u>Immunization coverage</u> Tetanus toxoid (2nd dose) 60% Triple antigen (DPT) 70% B.C.G. 47%		
Kasa Integrated MCHN Project	7	400.2	246.4 <u>b/</u>	<u>Immunization Status</u> B.C.G. 0.2% Smallpox 52.3% DPT (2nd dose) 1.4% Sterilizations 45 (1975) 1,668 (1977) 62.9% of severely malnourished children improved weight by 10% above expected growth for age.	June 1975	May 1976
						54.0%
						94.2%
						57.0%
Project Poshak (extensive phase)	112 <u>d/</u>	1,716.9	755.7 <u>c/</u>	Differences in final weight of 688 experimental children and 73 age-matched controls were not significant. Weight differences were significant in the toddler age group (above 12 months), which collected at least 50 percent of targeted food when compared with control group.		
Miraj Integrated Health Service Project	4	852.2	128.4 <u>b/</u>		1974	1977
					Infant mortality rate (per 1,000 live births)	23.1
					Crude birth rate (per 1,000)	21.4
					Antenatal cases covered	97%
					Eligible couples practicing family planning	89.1%
Indo-Dutch Project for Child Welfare	n.a.	n.a.	n.a.	<u>Sterilizations performed</u> 1970-71 229 1972-73 918 1974-75 205 <u>Antenatal cases treated</u> 1974 3,826 1975 4,801 1976 (to June) 2,946		

Project	Annual cost per capita (rupees)	Annual cost (thousands of rupees)	Cost of statewide replication (millions of rupees)	Reported impact			
				Crude birth rate		Treatment area	
				Experimental	Control	1971	1976
No-Birth Bonus Scheme, South India	n.a.	n.a.	n.a.	1969-70	40.5	39.2	
				1973-74	25.4	33.0	
				1976-77	21.9	34.1	
Comprehensive Rural Health Project, Jamkhed	9-11	1,125.0	390.4 b/				
				Infant mortality rate	97	39	-
				Child mortality rate	97	39	-
				Eligible couples practicing family planning (%)	2.5	50.5	-
				Under 5's immunized (%)	<1	98	-
Applied Nutrition Program, Kerala	n.a.	n.a.	n.a.	Coverage. Number of pregnant and lactating mothers in more than 50% of centers less than stipulated. In more than 25% of the centers, number of persons seeking admission less than stipulated; 40% of the centers do not have sufficient facilities for nutrition program.			
Special Nutrition Program, Tamil Nadu	n.a.	n.a.	n.a.	Mean weights of boys by months (kilograms)			
					6-12	13-24	25-36
							37-48
				Present Study	6.4	8.9	10.2
				All India	6.4	10.1	11.8
				Tamil Nadu	-	9.9	11.6
							13.1
Special Nutrition Program, Andhra Pradesh	71 d/	9,870.0	--	Clinical assessment showed that symptoms related to eyes, mouth, tongue and gums at the beginning of the study disappeared to a great extent after six months.			
				Weight as % of ICMR standards in supplemented (S) and unsupplemented (US) preschool children of different tribal groups			
				Weight as % of ICMR Standards	Gonds S	Gonds US	Jatapus S
							Jatapus US
							Savaras S
							Savaras US
				>90	49.7	30.4	86.1
				75-90 (Grade 1)	42.3	56.3	13.5
				60-75 (Grade 11)	8.0	12.6	0.4
				<60 (Grade 111)	-	0.7	-
Mid-Day Meals Program, Madhya Pradesh	55 d/	31,488.3 e/	--	Percentile of Classification of nutrition status of children by program efficiency			
				weight-for height standard	0-60	61-85	86-95
							96 and over
					Low	Medium	High
							Very High
				< 69	1.5	1.0	1.1
				70 - 79	22.1	20.6	16.9
				80 - 84	25.2	26.6	24.9
				85 - 89	27.8	26.8	28.3
				≥ 90	23.4	25.1	28.1
							28.8

n.a. Not available.
 -- Not applicable.

a/ Per capita cost x rural population (10,334,881) of Punjab in 1971.
 b/ Per capita cost x rural population (34,701,024) of Maharashtra in 1971.
 c/ Per beneficiary cost at subhealth center x 6.87 million rural children aged 0-6 in Madhya Pradesh in 1971.
 d/ Per beneficiary.
 e/ Based on 1977-78 expenditure.

and social costs. Many of the projects used highly skilled personnel to collect data, undertake various service functions, and manage the project's activities. In India the cost of goods and services on local markets does not reflect their real costs because of distortions in the economy. So it is difficult to evaluate the extent to which projects could assign costs to services in a way that reflects the social opportunity cost of labor. For example, in one of the smaller projects the director, a medical doctor, worked part-time and on weekends to develop the project. He was unwilling to include his own time and effort in the cost estimates because he believed that his time and skills were not at a premium.

Measuring benefits is much more difficult than measuring costs. First, the output (the immediate result) and outcome (the final result) cannot always be clearly defined. Second, even when outcome measures can be defined, they cannot always be clearly ascribed to the use of services. Third, giving dollar values to outcomes, which is necessary to measure benefits in comparison with costs or with benefits of other projects, is even more difficult. Thus cost-benefit analysis is inappropriate for evaluating these projects. But the effectiveness of the projects can be discussed by considering outputs and outcomes. Cost-effectiveness can also be analyzed by looking at cost-to-output and cost-to-outcome ratios.

Few of the studies provide comprehensive data on outcomes, but many have data on outputs. These data relate to coverage of the target populations and the use of services. But even if formal controls were established, it was difficult to demonstrate that project inputs were responsible for changes in growth, morbidity, or infant and child mortality. The Narangwal studies--two of the few well-controlled field research projects--are exceptions, for they showed the strong relation between health-related changes and project inputs. For example, the perinatal mortality rate was reduced 40 to 50 percent in villages with nutrition services; this major decline is strongly associated with prenatal care and nutrition supplements for mothers.

At Jamkhed, findings from the treatment and control areas show a marked difference in infant and child mortality rates and in the percentage of eligible couples practicing family planning. The change in the trend of these rates is large for a five-year period, but the comparability of the groups is not known. Still, it is unlikely that the downward trends would have been as rapid without project services.

Five projects--Kasa, Jamkhed, Narangwal, Miraj, and the No-Birth Bonus Scheme--have an upward trend in rates of family planning acceptance and, where recorded, a downward trend in infant mortality. In the Kasa project the weight of severely malnourished children substantially improved after one year of supplementary feeding for groups at risk. The number of sterilizations also went up substantially over a three-year period. The No-Birth Bonus Scheme shows the downward trend in the crude birth rate to be fairly substantial in project areas. Such intervening factors as the nationwide family planning campaign may have affected the response, but the

decline in the birth rate of controls was much slower. At Narangwal the proportion of new family planning acceptors was highest in areas offering combined services--it was 44 percent for the group receiving family planning, child care, and women's services; 42 percent for the group receiving only family planning and women's services; 38 percent for the group receiving family planning and child care; and 20 percent for the group receiving only family planning and education.

The large nutrition projects have been evaluated using cross-sectional studies some years after the programs began. In the feeding program in Madhya Pradesh schools, CARE undertook a study to determine the effect of the school meal on nutrition and school attendance. The study was also to determine the extent to which the school meal replaces food normally consumed at home. Anthropometric data were collected; home dietary information was collected through 24-hour recall; attendance rates were collected from school records. No control groups were available, and the measurement was based on a study comparing children with "more exposure" to the feeding program and those with "less exposure." Children in higher-program-efficiency schools with greater exposure to the program were compared with children from lower-program-efficiency schools with less exposure to the program. The findings show that the program had a positive impact on the growth of children and on malnutrition in the schools with efficient programs. Schools with inefficient programs had proportionately more upper class children with better educated parents, and it can be concluded that socioeconomic factors were responsible for the higher attendance rates recorded in low efficiency schools.

Some of the nutrition studies compared national, state, and project figures. General findings indicate lower weights for project children in some of the studies. A comparison of tribal children in Andhra Pradesh in the Special Nutrition Program (SNP) shows that supplemented children were taller and heavier than unsupplemented children of the same tribal group. The percentage of children classified as normal, according to Indian averages, was higher in the supplemented group in the same tribe. Other findings are inconclusive.

In the experiment on alternative strategies in family planning in Bangalore, evaluation of primary health care suggests that the involvement of a voluntary agency and the technical competence of staff had significant effects on family planning. The use of incentives in kind had mixed results. The use of services for family planning and maternal and child health improved during the study period for three of the strategies adopted, but administrative difficulties in procurement and handling were encountered throughout the project. There are no comprehensive data on outcome for the project.

The output data for many of the better-documented projects show that a comprehensive program of integrated services for health, nutrition, and family planning appears to be more cost-effective than many of the large single interventions.

Project researchers at Narangwal calculated the cost of service inputs in relation to outcome measures to obtain cost-effectiveness ratios for the different packages of services: cost per death averted, per day of illness averted, per additional centimeter of growth at thirty-six months, and per additional percentage-point increase in psychomotor development

score to age three. The lowest cost for a death averted (in 1970 prices) was \$7.75--for the cost of prenatal child care per perinatal death averted in villages with nutrition care. The costs per infant death averted and per child death averted were lowest in the villages with health care: \$25 and \$31. Nutrition services and combined health and nutrition services were much more costly per child death averted.

Combined health and nutrition services were most cost-effective for growth. According to the morbidity indicators, health care is the most cost-effective program at Narangwal. The findings suggest that combined programs, although slightly more expensive than single interventions such as health or nutrition have made a formidable impact on growth, mortality, and morbidity. For the population project at Narangwal, estimates of the average number of couples practicing family planning during the second year of services show the cost of services per practicing couple to have been lowest (\$10.27) in villages with integrated services for family planning, women's care, and child care. The average cost of family planning services per new acceptor of a modern family planning method during the second year of services also was lowest (\$12.27) in those villages. The data on other projects are limited. Costs were not related to outcome measures, although one or two projects were able to determine cost of services, such as the cost per child vaccinated.

Advocates of an integrated package of services assert that separate (conventional) services for health, nutrition, and family planning could be replaced by an integrated package of services with wide coverage of the population at a cost comparable to present health expenditure in India.

METHODS OF MONITORING PROJECTS AND ANALYZING THEIR EFFECT

The experiments and special projects offer some methodological guidelines for measuring project performance. Few projects used formal controls to test the effect of interventions on the experimental or service group. In many cases, output indicators were used to measure performance. 1/ Most studies had weak or invalid controls, or measured project findings over time. Without a control group, it is difficult to show definitively that project inputs have been responsible for changes in health, nutrition, or family planning. Changes ascribed to project interventions may be caused by self-selection, time of year, aging of the study population, and other socioeconomic variables.

In the Narangwal population project, socioeconomic differences between control and experimental groups emerged after the project started: for example, differences in literacy rates, sex ratios, caste distribution, village infrastructure, and socioeconomic levels. Control children were also heavier and taller than experimental group children. In essence, the control group was better off than the experimental groups, but multivariate analyses of individuals were able to correct these differences. In Project Poshak the control phase of the project lasted only a year. A decreased mortality rate was reported among treatment children, but compared with age-matched controls the difference was not statistically significant, and there was no follow-up of families that migrated from the area.

1. These included coverage and use rates: for example, the number of antenatal cases attended, immunizations performed, and family planning acceptors recruited.

Self-selection poses difficulties for project design and evaluation. In some villages the people are receptive to innovations, such as a proposed health center or nutrition project, and these villages may differ substantially from villages selected as controls. At Jamkhed the project directors agreed to work only in villages where community participation in the project was acceptable to the people and where the people were involved in planning and implementation. The comparative analysis of findings for the control group and for the project area is thus weakened.

In many studies the sample groups were not large enough for findings to be significant. In the Narangwal nutrition study, mortality rates declined but may have been affected by migration to and from the project area. Although project staff were vigilant in tracing cases, one missed death could substantially change the rates. For many of the groups, the number of deaths was too small to be significant. At Jamkhed the declines in infant mortality rates were shown to be substantial over a five-year period, but the sample was too small for the findings to be significant.

The Kasa, Mandwa, and Miraj projects used no controls but measured project activities and results over time. In the Kasa project, infants and children were regularly surveyed by the use of a weight chart. At any time during the project, workers could easily determine what children in the project area needed special care, how many immunizations had been carried out, and what the number of antenatal cases was in the area. There was a before-and-after evaluation of the alternative strategies project in Bangalore in family planning to determine its effects on family planning practice.

But the experimental and control groups were not matched, and several implementation problems made the evaluation of inputs difficult. In the Special Nutrition Project in Tamil Nadu, findings of a cross-sectional survey were compared with state and national figures to evaluate the effect of the intervention on the study group. Analysis of this kind is unsatisfactory because of the many differences in nutrition and in infant and child mortality between states and areas. For example, project workers at Jamkhed found large differences between the infant mortality rate in the town of Jamkhed and that in the surrounding rural areas.

Retrospective studies are common in India, and many service-oriented programs collect no baseline data. This appears to be so in many of the large-scale interventions of the government. In the Special Nutrition Program, for example, five representative centers were compared in Coimbatore, Tamil Nadu -- measuring weight, height, and dietary intake. The problem of such a comparative analysis is that it can be misleading for project planners. The dietary information was collected by recall, which often is inaccurate. Anthropometric data were compared with that for all India and for Tamil Nadu. A second study in Tamil Nadu recorded anthropometric data over six months. The findings reveal fairly substantial growth for the study group during that period, but whether the intervention brought about these changes cannot be determined with this kind of analysis.

Constraints of time, finance, and personnel apparently induced many project leaders to evaluate outputs rather than outcomes. Such evaluation has recognized shortcomings, but given the constraints and objectives of many projects, sophisticated techniques of data collection and analysis would be inappropriate.

Output measures were adopted in most of the projects, but a few projects--Kasa, Jamkhed, and Narangwal, for example--measured such outcome indicators as infant and child mortality rates, nutritional levels, and family planning acceptors, and fertility levels. Even so, it is difficult to establish a definite relation between project interventions and changes observed in mortality, morbidity, growth, or fertility. In the Narangwal study, recall by mothers in measuring morbidity changes was so detailed that results are inconclusive. Two-thirds of the variance in weight of children could not be explained, even after the large number of variables and project inputs were taken into account.

Output measures reflect changes in the use of services and in the type of service coverage: for example, the proportion of children immunized, the number of tuberculosis cases under treatment, or the number of deliveries attended by health workers. The Kasa, Indo-Dutch, and Mandwa projects are among those that use output measures to evaluate project performance.

CONCLUSIONS

The findings from the survey of experiments and special projects are not conclusive. There still are many gaps in knowledge about these projects and about the potential contribution of project services, particularly that of primary health care. The contributions of various factors to project accomplishments, the service packages adopted, and the final effects of different interventions are still not fully understood. The potential for replicating services on a large scale also needs to be assessed with a focus on cost, institutional requirements, and implementation problems. The favorable results of some of the small projects are relevant for policy.

- o First, the integration of services for health, nutrition, and family planning is important.
- o Second, auxiliary health workers, and the outreach services they deliver, greatly increase physical access. The home visits in various projects overcame many problems of reaching the most vulnerable groups. In addition, community participation seems to be important in planning and implementation.

But scaling up small experiments and special projects to large, effective service programs is complex. The population covered by such experiments and projects is small in comparison with the statewide need for services in health, nutrition, and population--and minute in comparison with the needs of all India. For example, the Maharashtra projects covered about 400,000 persons, less than 0.8 percent of the population of the state.

One major problem is the inflexibility of large programs and of the bureaucracy. Small projects can be flexible--in their system of management, in the way they deliver services, and in the ability to change

course on the basis of new findings. What is needed? Experimentation and research on operations to modify institutional arrangements in a way that accommodates much of the flexibility that is so important to the success of smaller projects. For example, innovative measures could be tried out in statewide or districtwide services to demonstrate their efficacy. The measures that work best (and fit best) could then be incorporated in the new program. What has complicated this so far is that among the successful projects no single kind of project stands out. Different kinds of projects work well in different conditions. That means that a nationwide blanket program would be inappropriate in many parts of the country and that programs should be sufficiently flexible to be modified to local conditions--a problem which is likely to be exacerbated by the inflexibility of the national level bureaucracy.

A further difficulty in considering replication of the experiments and special projects is that there is not enough information on them--because of the problems inherent in measuring outcome and the inadequacy of the systems for collecting data and for monitoring and evaluating progress. These problems preclude systematic analysis of what projects have achieved and what interventions have meant for the population covered by services. Part of the difficulty is that the most reliable indicators of project achievements--outcome indicators of growth, morbidity, and mortality--are the most difficult to measure and collect. So output indicators (of coverage and use) are often used instead. Less reliable than outcome indicators, they are less convincing (and possibly less correct) in demonstrating how, what, where, and for whom services should be provided. The complexities inherent in monitoring and

evaluating projects must be surmounted so that it is possible to get early warnings about what is going wrong and to get the information needed to make decisions about program development and policy. The first step is to collect good baseline data. Also needed is better financial and economic analysis. Poor in most of the projects surveyed, the costing of services and benefits is precisely what is needed to compare the benefits and efficiency of different packages of services--and to estimate what replication on a large scale will cost. Simply multiplying per capita costs by population is not good enough, for there may be economies (and diseconomies) of scale. In addition, when considering the broad replication of an experiment or special project, and intangible but very important factor in their success must be kept in mind: Most of the experiments and special projects are the results of the drive and initiative of individuals. This factor usually makes exact replication impossible. The experiments and special projects nevertheless offer, as this review shows, many important lessons that have general applicability.

APPENDIX A. PROFILES OF FOURTEEN STUDIES

Experimental-research projects

Narangwal Nutrition Project	47
Narangwal Population Project	51
Alternative Strategies in Family Planning, Bangalore	54
Mandwa Rural Health Research Project, Maharashtra	57

Pilot projects

Integrated Health and Nutrition Project, Kasa	58
Project Poshak	63
Integrated Health Service Project, Miraj	65
Indo-Dutch Project for Child Welfare	68
No-Birth Bonus Scheme, South India	70

Service projects

Comprehensive Rural Health Project, Jamkhed	74
Applied Nutrition Program, Kerala	77
Special Nutrition Program, Coimbatore, Tamil Nadu	80
Special Nutrition Program, Andhra Pradesh	84
Mid-Day Meals Program, Madhya Pradesh	86

NARANGWAL NUTRITION PROJECT

The Narangwal nutrition study (1968-74) was a major field research project designed to examine the relations between infection and nutrition and to analyze the impact of several service packages on the cycle of infection and malnutrition. The study was conducted at the Narangwal Rural Health Research Center in Punjab. A parallel study--the Narangwal population project--was also conducted by the research team.

The nutrition study was done in ten villages with a total population of about 10,500 located around two community development blocks in the Ludhiana District of Punjab. The Indian Council of Medical Research, the World Health Organization, the National Institute of Health, and the Agency for International Development provided funding. The Indian Council of Medical Research and the Johns Hopkins University School of Hygiene and Public Health ran the project.

Design and Objectives

The main objectives of the study were to determine the effect of nutrition and medical care--alone and in combination--on the growth, morbidity, and mortality of children under three. The cost-effectiveness of the service packages was analyzed and the project incorporated health care and services that auxiliary health workers could provide.

The 1,000 infants and children in the target population and women of reproductive age were divided into four groups: a control group, which was provided no services beyond emergency and minimal symptomatic treatment, and

three experimental groups, which were provided different packages of medical and nutrition services. Data on weight; height, and morbidity were collected in a weekly recall by mothers of the occurrence, onset, and duration of forty-four signs and symptoms. Data on fertility and mortality were collected by specially appointed data collectors. Baseline data on morbidity and body measurements were collected for one year before services were provided; service components were introduced sequentially.

Services

Two villages constituted a control group with no special services. Each of the three experimental groups of villages received different services. The first group received only nutrition care, including regular nutrition monitoring, selected food supplementation for children and pregnant women, and nutrition education with particular emphasis on the importance of late weaning and of introducing supplementary foods early in the infant's life. The two villages in the second group received medical care. Health workers visited homes, treated minor ailments, provided routine immunization, and provided curative services at village clinics. A physician visited the village clinics weekly, and infants and children were examined weekly. The third group of villages received combined medical and nutrition care and family planning services.

The services were provided by family health workers who had six weeks of training and follow-up training in the field. Physicians, nutritionists, and public health nurses trained and supervised the health workers.

Findings

Growth. Nutrition care alone or in combination with health care increased significantly the weight and height of children older than seventeen months. Mean weights and heights in villages with health care were between those in villages with nutrition care and control villages. Treatment children were 500-600 grams heavier and 2-13 millimeters taller than others at thirty-six months. Sex and caste were shown to have a pronounced independent and additive effect on growth. Nutrition care had a major effect on perinatal mortality, reducing it 40 to 50 percent, apparently because of the provision of supplementary food, iron, and folic acid to pregnant women.

Morbidity and Mortality. Children in villages with health care had shorter episodes of illness for conditions such as cough, fever, diarrhea and eye infection. Combined health and nutrition services produced a significant reduction in the duration of eye infections (further reduction of one day). Medical care villages had a perinatal mortality rate (stillbirth and 1-7 days) that was about 20 percent lower.

Other findings include the following:

- o Neonatal mortality (0 to 30 days) was reduced 40 percent in groups provided with health or nutrition care.
- o Postneonatal mortality (1 to 12 months) was reduced 50 percent in health care villages but only 7 percent in nutrition care villages.
- o Mortality of children aged 1-3 was reduced about 40 percent in all villages receiving services.

Cost. Nutrition care was the most expensive service (\$2.00 a year); medical care cost less than half that. The cost of deaths averted varied with the age of the child. Cost-effectiveness analysis revealed that the cost of prenatal child care per perinatal death averted was lowest in nutrition vil- lages; the cost per infant death averted was lowest in health care villages, as was the cost per child death averted. The findings show that nutrition care was more efficient in promoting physical growth, health care in reducing morbidity.

Table A.1. Mortality Rates by Experimental Group and Age Group at Narangwal, 1970-73

Experimental group	Stillbirth rate <u>a/</u>	Perinatal mortality rate <u>a/</u>	Neonatal mortality rate <u>b/</u> (0-30 days)	Postneonatal mortality rate <u>b/</u> (1-12 mos.)	Infant mortality rate <u>b/</u> (0-1 yr.)	Child mortality rate <u>c/</u> (1- 3 yr.)
Control	57.4	104.2	77.8	52.2	128.0	18.6
Medical care	44.6	80.8	46.7	23.3	70.0	11.0
Nutrition care	24.9	60.9	48.3	48.3	96.6	11.0
Nutrition and health care	36.8	63.3	47.4	35.2	81.0	13.3

Source: Kielman and others (1980).

- a. Per 1,000 live and still births.
- b. Per 1,000 live births.
- c. Per 1,000 population at a given age.

NARANGWAL POPULATION PROJECT

The population project in Narangwal (1968-74) was a major research project conducted in conjunction with the Nutrition Study in Punjab. It was, we believe, the first controlled field experiment prospectively to measure combinations of health and family planning services against family planning acceptance. The combined nutrition and health care villages in the nutrition study were also the child care and family planning group of villages for this study. The Indian Council of Medical Research, working with the Johns Hopkins University School of Hygiene and Public Health, was responsible for the project. The U.S. Department of Health, Education, and Welfare, U.S. Agency for International Development, the Indian Council of Medical Research, and the World Health Organization provided funding.

Design and Objectives

The main objectives of the study were to measure the effects of different packages of services on attitudes toward family planning and on its practice--to show what measurable effect each service has on practice. The nineteen experimental villages had a population of about 27,100; one group of villages served as a control for the experiment. Each group of experimental villages was provided with a different service package. Information was collected by cross-sectional and longitudinal studies. Longitudinal data included vital statistics, morbidity, anthropometric data, family planning practice, and fertility. Socioeconomic studies were conducted and cross-sectional data were collected on the knowledge and practice of family planning and on attitudes and beliefs about child survival and family planning. The use and cost of health services were also measured.

Services

The different packages of services were as follows:

- o FPED -- family planning and family planning education only.
- o FPWS -- family planning and women's services.
- o FPCC -- family planning and child care services.
- o FPWSCC -- family planning, women's services, and child care.
- o CONTROL -- no services.

Women's services included prenatal and postnatal care, early identification of pregnancy, and treatment or referral for illness. Child care services included nutrition and infectious disease control. Family planning services included education, motivation, and contraceptive services with follow-up. The group of villages receiving family planning and child care services (FPCC) was also part of the parallel nutrition project.

Findings

Because the project ended earlier than expected, changes in fertility could not be shown in the experimental groups. Originally the project was to continue until the curves for family planning practice had plateaued in the experimental groups. But services were ended in one group after two years and in another after three years. In addition, the service packages were not introduced at the same time. Although the project was designed to show both an increase in contraceptive practices and a significant decline in fertility, the short duration of the project limited evaluation to output measures. At the end of the project, the curves for family planning practice were still

rising. Significant differences in fertility in the experimental groups could not be shown. The main indicator of program performance was the number of people who accepted family planning during the program's life, excluding previous family planning acceptors using modern methods of contraception.

Table A.2. Practice of Family Planning at Narangwal,
by Experimental Group
(percentage of eligible couples)

Experimental group	New acceptors	Current users	
		After 1 3/4 years of service	After 4 1/2 years of service
FPWSCC	44	22	34
FPWS	42	25	41
FPCC	38	27	-
FPED	20	30	-
CONTROL	-	9	-

Source: Taylor and others, forthcoming.

Several variables--such as caste, income, and land ownership--also influenced family planning practice, but their influence was shown to be less important than previous use of family planning or of health services. One significant variable was the number of children a couple had lost: child deaths had a strong influence on family planning acceptance. Integrated services for health, nutrition, and family planning were the most cost-effective.

ALTERNATIVE STRATEGIES IN FAMILY PLANNING, BANGALORE

The Population Center in Bangalore did an experimental study (1974-79) of five "alternative" strategies in an area covered by the ongoing India Population Project.

Design and Objectives

The experiment was to test the appropriateness of changes in the family planning program and to find ways of improving the program's efficiency and effectiveness. The implementation for each strategy was also studied to provide better ideas about that for the entire program. Each of five strategies was introduced at selected groups of primary health centers in Bangalore in 1976. The five strategies were:

- o Involving a voluntary agency in family welfare programs at primary health centers.
- o Applying management principles at primary health centers, including those for planning, supervision, training, and coordination.

- o Improving the technical competence of health service personnel.
- o Entrusting responsibility for family welfare targets to nonhealth departments: that is, to Panchayat chairmen, village accountants, and other village level workers.
- o Using incentives in kind at the primary health centers.

The strategies were adopted in ten primary health centers in five districts; five other centers, one from each district, were controls. Performance was estimated from survey data for 1968-69 to 1973-74, and centers were ranked as high, medium, and low in performance. As far as possible, each strategy was tested in a high and low performance center.

The performance of each primary health center was evaluated on the basis of six criteria:

- o Number of sterilizations and sterilization equivalents during the financial year.
- o Registered prenatal and postnatal cases and number of deliveries by qualified personnel.
- o Input-output analysis.
- o Changes in average open birth interval.
- o Opinions of personnel involved directly or indirectly in the program.
- o Changes in fertility and attitudes measured by a longitudinal sample survey.

The Population Center collected data each month and conducted surveys between 1975 and 1978 to provide information on sterilization and MCH activities, on the knowledge, attitude, and practice of family planning (KAP), and on fertility indexes. Used in evaluating the alternative strategies were the

sterilization equivalent rate, the maternal-and-child health equivalent rate, the staff efficiency index, and the KAP measurement. There were two evaluations: one in 1974-75, before implementation of the alternative strategies, and one from 1977-79, after implementation of the strategies.

Findings

Although recognizing the difficulties in developing a true experiment in family planning, the authors suggest that the study, in addition to providing some answers to questions raised in the experiment, has brought to light many new issues and field problems. The findings suggest that involvement of a voluntary agency in the administration of a primary health center, produces substantial results in achieving targets for family planning and maternal and child health. Conversely, a partnership with the government in undertaking a joint effort to achieve targets was not successful. Primary reasons for this included lack of coordination, poor demarcation of roles and responsibility and a feeling of alienation. Management principles did not have a significant effect on family planning, but the improved technical abilities of staff members yielded significant results. The project emphasized family planning services more than maternal-and-child health (MCH) services, and that affected MCH performance.

Having village-level functionaries responsible for the motivational aspects of the program and health staff responsible for provision of services did not make a difference in performance of family planning or MCH activities. Misunderstandings about the role of these functionaries vis-a-vis health personnel and a conflict between their normal role in the village were the most important problems encountered. The role for such groups would be to create awareness of and demand for family planning services. The use of incentives in kind at primary health centers had mixed results. The use of family

planning and MCH services improved under this strategy, but there were many problems with the incentives, including an adverse effect on the credibility of workers.

There was no economic analysis of the various strategies.

MANDWA RURAL HEALTH RESEARCH PROJECT, MAHARASHTRA

The Mandwa Rural Health Research Project (1973-) was started when the Department of Health agreed to give control of a primary health unit to the Foundation for Research in Community Health, which is part of Grant Medical College in Bombay. An ongoing experimental project, Mandwa covers 30,000 people in twenty-nine villages in a rural area of the Konkan coast in Maharashtra. OXFAM provides financing for the project along with other international donors and the state government.

Design and Services

From the outset the project has been strongly committed to local community involvement by forming local health committees to assist health workers in preventive and promotive health work. Partial payment of the health workers' salaries and of charges for medicines has also been part of the scheme. Mandwa provides integrated health services to the community and is involved in leprosy and tuberculosis control. The Foundation, which acts as the administrative agency, provided staff to run the project and trained twenty-six women, chosen by the communities, to undertake simple curative procedures and preventive work. An auxiliary nurse-midwife provides support for five village health workers and covers a population of 5,000. A doctor visits each of the six subcenters once a week to advise on more difficult cases and provide staff support and training. In the first stages of the project, hospital facilities were provided in response to the need communities expressed.

Results

The experience of the Mandwa project has been mixed, and several changes have been implemented. Although the project encouraged the participation of communities, local health committees have lost interest and stopped functioning. These committees were mainly constituted by the vocal village members who control the village and its activities. The project's main emphasis has been on providing simple curative and preventive services, not the more sophisticated services these committees expected. The project director has highlighted two other problems. First, the involvement of highly trained professionals in the early period was counterproductive because rapid change was not in keeping with the pace of life in villages. Second, coordination between government health staff and the project's staff has been limited--and it is believed that this has adversely affected the project.

Even so, the results reported by the project are noteworthy (see table A.3). Project costs per capita are estimated at \$0.60 (Rs 4.50) a year.

INTEGRATED HEALTH AND NUTRITION PROJECT, KASA

The Kasa project (1974-77) was a pilot study in an area served by a primary health center. About 125 miles north of Bombay in Maharashtra, the project area covered about 56,000 people, of whom 88 percent were tribal. In 1974 the government handed over the control of personnel, financial resources, and local health facilities to the Institute of Child Health in Bombay. On completion of the project in 1977, the primary health center functions

Table A.3. Activities of Community Health Workers at Mandwa

<u>Immunization coverage</u> ^a	
Smallpox	90%
Triple antigen (DPT)	70%
B.C.G.	47%
Tetanus toxoid (second dose for pregnant women)	60%
 <u>Antenatal care</u>	
Registration of cases	81%
Coverage with nutrition supplement	90%
 <u>Control of tuberculosis</u>	
Cases detected by CHW in 1978-79	41
Tuberculosis cases	81
Proportion under regular treatment	75%
 <u>Control of leprosy</u>	
Leprosy cases	150
Cases detected by CHW in 1978-79	45
Proportion under regular treatment	70%

Source: Antia (1980).

- a. Vaccinations are by auxiliary nurse midwives, but cases are identified by community health workers.

reverted to the Department of Health. The project was paid for by the government of India, the government of Maharashtra, and CARE; it was administered by the Institute of Child Health at Grant Medical College in Bombay.

Objectives and Design

The goal was to develop effective and efficient integrated health and nutrition services for replication in rural Maharashtra. The objectives included providing integrated maternal-and-child care to all preschoolers and pregnant and nursing mothers in each village; providing care through part-time social workers and medical and paramedical staff; encouraging community participation; and evaluating the cost and effectiveness of the project. Targets were set and groups "at risk" were identified by such criteria as birth weight of less than 1.5 kilograms, and no weight gain in three consecutive months. Similarly criteria were set for selecting pregnant women at risk.

The under-five (Morley) weight chart and an observation chart for mothers were used to monitor changes. No control groups were used; evaluation was based on before-and-after assessments of conditions among the target groups. Surveillance was done by maintaining a longitudinal record for each child, and the built-in evaluation system provided up-to-date information on project activities.

Services

The phased introduction of services avoided overloading the health workers and was believed to be more acceptable to the community. For example, to avoid suspicion and resistance, the project initiated its immunization program several months after the project started. Birth control practices were introduced in a similar way and at an appropriate time for the woman: after a birth, for women with many children and for women more susceptible to pregnancy, that is, one year after the last birth. The project provided clinic-based services.

The project had many part-time social workers who visited homes, maintained records, registered target group members, provided supplementary food, and conducted educational classes. Doctors and multipurpose workers provided support and supervision. One voluntary worker covered about 2,000 people.

Findings

Data for the Kasa project are limited, and costs of project inputs were not estimated accurately. Such items as donated food and labor were not included in the financial analysis, but rough estimates show a cost per capita of about (\$0.93) (Rs 7) a year for the services. There were 45 sterilizations in 1974-75, 1,668 in 1976-77. Reports also show, after eighteen months of supplementary feeding, that 62.9 percent of severely malnourished children improved their weight by 10 percent more than the expected growth. Table A.4 shows the better coverage by immunizations between June 1975 and May 1976. The success recorded by the project may be related to factors independent of the project, because there are no figures for a control group.

Table A.4. Immunization Status at Kasa

Immunization	<u>Percentage of population immunized</u>	
	June 1975	May 1976
BCG	0.2	54.0
Smallpox	52.3	94.2
Triple Antigen (second dose)	1.4	57.0

Source: Shah (1977).

PROJECT POSHAK

In the early 1970s supplementary feeding programs in India were attracting older preschool children but were not reaching the most vulnerable groups. Project Poshak (1971-75) was a pilot project in Madhya Pradesh to meet the nutritional needs of hutbound infants and toddlers aged six months to thirty-six months. The project was designed to reach preschoolers not benefiting from the on-site feeding. The nutrition program was linked to the health care structure so that target groups would also benefit from preventive and promotive health services.

Many agencies were involved in the funding and management of Project Poshak, but CARE played the major role in administering and evaluating it. If the project were successful and if the take-home supplement proved effective and efficient, the model was to become a permanent part of the state's nutrition program.

Design and Objectives

The pilot project, an integrated health and nutrition plan, was designed to test and evaluate the feasibility, efficiency, and impact of a large supplementary feeding program covering a widely dispersed population. Because it was conducted in backward tribal areas, it was believed that the project, if successful in meeting its objectives, could be easily replicated in better-off states. The project was to work through the health care system, not through new services, so that replication would also be feasible in view of the manpower and financial constraints. There were three phases: exploratory, extensive, and intensive. The main objective of the study was to

test the feasibility of providing a "take-home" ration rather than an on-site feeding ration to improve nutrition among preschool children. The effect of services on the experimental group was measured longitudinally against a small control group; population coverage and the effectiveness and efficiency of services were also measured.

Services

The project provided, through the primary health centers and sub-centers, medical and health care services with village immunization and deworming services. Pregnant and lactating mothers received education and demonstrations on child care. A take-home supplementary food ration was distributed at the health care center, usually weekly. This allowed mothers to provide regular amounts of the supplement to their children and avoided daily trips to the feeding center. The project reached 15,000 beneficiaries during its four years of operation.

Findings

In the extensive phase of the project, the cost per child was \$15.26 (Rs 114.46) a year at subcenters and \$14.67 (Rs 110.06) a year at primary health centers. The annual cost per child in the exploratory and intensive phases was much higher. The figures show that the take-home rations were less expensive than on-site feeding. Pyle (1976) has suggested that "the two most important factors in determining the value of the Poshak concept--cost and effectiveness--were neither strongly positive nor negative."

Records of health-related inputs were scanty for some areas, and it was impossible to trace inputs and their use by target groups. Mortality rates for treatment children, when matched against controls, were not

significantly different. The effect of combined services was assessed in a final weight measurement of a subsample of 688 experimental children compared with age-matched controls. Differences were not significant. Improvements in 'weight status' among children with second-degree and third-degree malnutrition were substantial during the intensive phase of the project but poor during the extensive and exploratory stages.

A substudy comparing take-home and on-site feeding was conducted during the intensive phase of the project. Findings from that study showed participation rates to be much higher in the on-site scheme: they were 43 percent to 53 percent for the take-home ration, compared with 60 percent or more for on-site feeding. The main target group, toddlers and preschool children (six to thirty-six months) of landless laboring families, did not participate to the extent expected. The small landowner class benefited most. The effect of services in the extensive phase on the control and experimental groups, was not substantially different. Several spillover effects were identified among the experimental groups, however, including more use of services at the primary health center, more acceptance of family planning measures, and better attitudes of mothers toward health and nutrition.

INTEGRATED HEALTH SERVICE PROJECT, MIRAJ

The Miraj Integrated Health Service Project (1973-77) was jointly run by the Government of Maharashtra and the Miraj Medical Center. The Department of Health gave the voluntary agency full responsibility for administration based at a primary health center. After the completion of the project in 1977, responsibility for service activities reverted to the previous administration. The World Council of Churches, the government of Maharashtra, and Miraj Medical Centre provided funding for the project.

Design and Objectives

The objectives included the provision of primary health care services, family planning, and special programs of leprosy and tuberculosis control. Training was emphasized: the project trained 173 of the 186 traditional midwives in the project area; a short orientation course with emphasis on practical skills was held for (voluntary) village health aides, close to their village. Community participation was encouraged: the community was expected to pay a flat fee of \$0.03 (Rs 0.25) for any medication received for three-day treatments. Involvement of local village organizations was not stressed, though project leaders worked with the gram panchayats. Health services were introduced sequentially. As these became more acceptable, and as the health workers established a relationship with the community, family planning services were introduced. Population coverage was about 230,000. The project employed a demographer, who processed and analyzed data on vital statistics and on the coverage of services.

Services

The health workers made house-to-house calls in the villages and carried a basic medicine kit containing vaccines, medicines, contraceptive devices, some audio-visual aids, and a delivery kit. They also collected vital statistics and taught mothers how to prepare oral rehydration fluids for the treatment of childhood diarrhea. They were supervised and given guidance by the health team, and intermediate workers usually visited the village once a week.

Findings

Data on the effect of services, particularly in relation to project costs, are approximations. The per capita cost of the Miraj project was estimated to be \$0.49 (3.70) a year. Because the project charged for medicines, \$2,650 (Rs 20,000) were recovered, and the project set up a revolving fund to buy medicines. This more than doubled the allocation for medicines at the primary health centers.

One indication of effectiveness of the project is the infant mortality rate, which was reduced 66 percent in three years. The project did not have a control group, but infant mortality rates and output data are available for coverage of services during the three years. Table A.5 provides project results and achievements.

Table A.5. Improvements under the Integrated Health Service Project at Miraj

Measure	January 1974	January 1977
Crude birth rate (per 1,000 population)	26.3	21.4
Infant mortality rate (per 1,000 live births)	67.6	23.1
Percentage of children under five immunized		
Smallpox	85.0	99.7
Triple antigen	2.0	85.0
Polio	1.5	83.0
BCG	6.0	55.0
Percentage of eligible couples practicing family planning	30.6	89.1
Crude birth rate	26.3	21.4
Percentage of antenatal cases covered	n.a.	97.0

n.a. not available

Source: Pyle (1979).

INDO-DUTCH PROJECT FOR CHILD WELFARE

The Indo-Dutch Project for Child Welfare (1969-) started as a pilot project in Andhra Pradesh. It was designed to test and develop better methods of care for children under sixteen, and to combine these services with a research and training component. The project was to be a model for replication elsewhere in the state. The project donors expected to complete the pilot project in eight years and then to withdraw. It was intended that the project would become self-sustaining with increased community participation and eventually become a community project. It is now expected that donors will continue with the project until 1985. Fourteen villages in Chevella Block in the Ranga Reddy district of Andhra Pradesh are covered by the project. It was developed through the collaboration of the Indian government and the Netherlands Foundation.

Design and Objectives

The main objectives are to provide health, nutrition, and educational facilities for children up to sixteen. In addition, the nutrition component is linked with income-generating activities. The health component has changed over the years to develop the most appropriate type of service for communities. Auxiliary nurse midwives, each covering a population of 5,000 in the project area, supervise and support community health volunteers (gram swastikas). A mobile health team visits villages twice a week to monitor and supervise the work of auxiliary nurse midwives and to immunize eligible children.

Services

The community health volunteer covers about 200 families and provides basic health care to mothers and children in the population. Scabies, worms, and diarrheas are treated; surveillance is maintained for children under five; prenatal and postnatal cases are supervised and pregnant women are referred for special care to the auxiliary nurse midwife. The community health volunteer has a monthly stipend of \$6.70 (Rs 50) and families are expected to pay \$0.06 (50 paise) a month toward her salary. In effect, many families do not pay this sum, and community involvement is not apparent. Creches and income-generating schemes, such as preparing ground spices and making up packets of protein foods for the nutrition project, were also started. Family planning services are available for interested couples.

Findings

In 1977 the National Institute of Rural Development in Hyderabad completed a study of the project's impact in the Chevella block. The survey, conducted primarily among female beneficiaries of the program, produced mixed results. The immunization program had widespread acceptance in an area where immunizations had not previously been undertaken. It was also found that infant mortality rates dropped and that health services were more accessible to the population. But the study did not find any major change in community attitudes and practices or in the adoption of income-generating activities beneficial to the families. The local women's groups (mahila mandals) were not as effective as expected in involving and reaching local women, despite an expenditure of \$12,800 (Rs 96,000) to strengthen these women's groups. Loans to encourage income-generating activities have not

been recovered. One of the major omissions was the absence of community involvement in determining needs and appropriate responses. Only in 1973, five years after the project's initiation, were the communities asked to contribute to the various activities of the project. Detailed survey findings are not available to assess the effect of the project, but figures on service coverage are shown in table A.6.

Table A.6. Service Coverage by the Indo-Dutch Project

<u>Sterilizations performed</u>	
1970-71	229
1972-73	918
1974-75	205
<u>Antenatal cases treated</u>	
1974	3,826
1975	4,801
1976 (first half)	2,946

NO-BIRTH BONUS SCHEME, SOUTH INDIA

The United Planters Association of Southern India (UPASI), with the support of USAID, introduced monetary incentives to encourage couples to adopt family planning. The incentive was a deferred payment to couples who limited their family size. Called the No-Birth Bonus Scheme (1971-), it was started on three tea estates in South India and of first was open to all permanent female employees between seventeen and forty. On the tea estates, legislation

requires that all permanent employees be provided with housing, health services, and such benefits as pensions and maternity and child care benefits.

Design and Objectives

The No-Birth Bonus Scheme -- part of the larger Comprehensive Labor Welfare Scheme -- was intended to test nontraditional incentives to limiting family size. It was designed to overcome some of the problems with more immediate incentives in family planning and to encourage couples to adopt family planning by giving them the freedom to choose between different contraceptive methods.

Each female estate worker of childbearing age who accepted the plan was provided with a joint savings account in her name and the company name. For each month that she did not become pregnant, \$0.67 (Rs 5) would be deposited in the account, which would be frozen until she passed the childbearing period, when she could withdraw the savings. In the interim, she would earn interest on the deposit. If she became pregnant, however, a certain amount would be forfeited or payments stopped for a year.

Services

Under the larger welfare scheme operating on all three tea estates, a maternity and child welfare program provide immunizations, supplementary nutrition care, prenatal and postnatal services, and recreational and educational facilities. Family planning services are free. If a couple decided to be sterilized, the large cash incentive provided by the government would accrue in addition to the deferred incentive offered by the bonus scheme.

In the first year of the plan, 480 of 792 eligible women joined. In the second year, 116 eligible women enrolled; but since then the rolls for membership have remained closed, and the numbers are gradually reducing. A few women have migrated or died, and a few have forfeited membership. In 1977 there were 521 members.

Findings

In 1975 a sample survey was conducted on eighteen tea estates. More information, obtained from official records of births and from personal observations, has helped in assessing the effect and shortcomings of the scheme. There were three groups of estates: the first comprised the three tea estates that had the No-Birth Bonus Scheme (Type I); the second, nine estates that had only the Comprehensive Labor Welfare Scheme (Type II); the third, six estates that had neither scheme and were used as controls (Type III). Crude birth rates, available from company records up to 1977, were selected to ensure more accuracy in the data analysis. Table A.7 presents the crude birth rates for the three types of tea estate and for other areas.

The measurements suggest that the biggest effect was on women in their thirties and on couples who had three or four children. Of the eligible women in the three estates chosen for the bonus scheme, 82 percent joined during the two years that enrollment was open. Although birth and fertility rates appeared to be falling faster on those estates than on the other two groups, further data and analysis would be necessary to test the size and significance of the decline. Furthermore, several administrative shortcomings were identified in the plan, which may have contributed to a slower decline in birth and fertility rates. The evaluation study does not provide a financial analysis of the project.

Table A.7. Crude Birth Rates, South India, 1969-70 to 1976-77

Year <u>a/</u>	All India	Tamil Nadu	Nilgiris district	Type of estate		
				I	II	III
1969-70	39.0	--	--	40.5	39.5	39.2
1970-71	38.1	33.9	33.3	39.0	38.9	--
1971-72	37.3	32.7	31.4	35.5	37.5	--
1972-73	36.4	32.0	29.0	27.2	34.5	33.0
1973-74	37.0	32.0	27.0	25.4	32.0	33.0
1974-75	36.0	--	--	24.3	27.7	35.7
1975-76	35.0	--	--	24.7	27.9	38.5
1976-77	34.5	--	--	21.9	28.1	34.1

a/ July 31 - June 30.

Source: Ridker (1980).

COMPREHENSIVE RURAL HEALTH PROJECT, JAMKHED

Jamkhed, in Ahmednagar District, is one of the poorest areas of Maharashtra. When the service-oriented health project started there (1971-), it covered an area around the town and used Jamkhed as a base for its activities. Population coverage after the first year was about 40,000; by 1978 it was 100,000. The project leaders, recognizing the need for comprehensive health services with fullest community participation, approached village leaders and received an enthusiastic response to their suggestions for a comprehensive set of health and nutrition services for the area. Funding is provided by the Christian Medical Commission and various secular and religious agencies, but the project has become increasingly self-sufficient. Studies before the start of the project showed a high rate of infant mortality in the area--from 80 per 1,000 live births in Jamkhed town to 150 in the more rural areas.

Objectives and Design

The main project goals include reducing mortality and morbidity rates, reducing population growth rates by gradually introducing family planning services, and caring for the chronically ill and controlling leprosy and tuberculosis. The project is designed to ensure full participation by the community: the project directors must be assured of local support before the village health team starts to work in a village. The village health team also collects data and identifies target groups.

Services

Project services include immunizations, supplementary nutritional care, care for children under five, family planning and maternal care, and a program to control leprosy and tuberculosis. A central clinic provides more sophisticated medical care, with an outpatient clinic, operating room, and facilities for thirty patients. Curative services are provided to respond to the expressed need of the community and to make the preventive and promotional aspects of the program more acceptable. Fee-for-service payments are made for curative services, but not for preventive measures. Mobile teams visit the villages and, with village health workers, are responsible for identifying and following up pregnant women and family planning acceptors. The teams and village health workers also supervise home births, run a supplementary feeding program, do surveillance of children under five, collect vital statistics, and provide basic health care and education. They refer serious cases to the center at Jamkhed or the hospital at Ahmednagar.

Findings

The Jamkhed project has emphasized community participation and responsibility. As a result, 75 percent of the recurrent expenses for the project are met by patient fees. The government provides 4 percent of the budget, foreign donations the rest. Curative services account for 30 percent of the budget, preventive services for 60 percent, and administration for the remaining 10 percent. The communities have donated land, contributed building materials, and provided labor. In 1979 the per capita cost for care was estimated at \$1.17 (Rs 8.75) a year.

Table A.8 presents the findings of surveys of the target population in 1971 and in 1976. Note the marked differences in mortality rates and service coverage between project and nonproject areas. Further analysis of the data is needed, however, because there were no strict controls to assess the effect of project measures.

Table A.8. Comparison of Project and Nonproject Areas, Jamkhed

Measure	Project area		Nonproject area 1976
	1971	1976	
Population surveyed	1,490	1,491	1,405
Percentage of children under five immunized	< 1	84 <u>a/</u>	15
Infant mortality rate (per 1,000 live births)	97	39	90
Percentage of pregnant women receiving ante-natal care	< 0.5 <u>b/</u>	78 <u>c/</u>	2
Crude birth rate (per 1,000 population)	40	23	37
Percentage of eligible couples practicing family planning	2.5	50.5	10

Source: Pyle (1979).

- a. In 1978 it was 98 percent.
- b. Percentage for all women.
- c. In 1978 it was 96 percent.

APPLIED NUTRITION PROGRAM, KERALA

Kerala is one of the poorest states in India, and with Bihar, Gujarat, and Tamil Nadu it has a high incidence of calorie-deficient diets. These deficiencies particularly affect the vulnerable groups--the young, pregnant women, and lactating mothers. In 1950 the FAO, UNICEF, other international organizations, and the government of India started a program of supplementary feeding for children, pregnant women, and nursing mothers. This program was later expanded to encourage village food production and to educate families about nutritional needs and ways of meeting those needs. In 1963 the government of India signed an agreement with the international agencies to extend the program to the whole country.

In 1963-64 the program started in Kerala, and in 1978 it was operating in eighty-one of the state's 144 community development blocks. Several agencies and government departments have been involved in the project. The government of India, UNICEF, and CARE provide support and assistance for the successful implementation of the program; the central government's Department of Community Development has been responsible for coordination.

Objectives and Design

The program is mainly educational and its major objective is to improve the nutritional status of preschool children, pregnant women, and nursing mothers. The program has four main components:

- o Nutrition, health education, and training.
- o Production of protective and protein foods in school, home, and community gardens.

- o Demonstration feeding.
- o Scheduled health check-ups and immunizations.

Each component is designed to encourage greater participation by the communities in obtaining nutritious diets. Education and training are emphasized to create more awareness of nutritional needs and to encourage dietary changes beneficial to the vulnerable groups.

Program Services

Nutrition education has been provided at day-long women's camps: during 1976-77 about 75,000 women attended in these camps. Teaching sessions emphasized hygiene, food preservation, cooking without losing nutrients, and the general importance of nutrition. In addition, discussions of similar topics were held in 30,000 informal groups during that year.

The production component encourages activities in horticulture, poultry keeping, and fisheries, as well as the development of vegetable gardens for demonstration purposes. The feeding program of the state's 3,000 feeding centers for preschoolers and for pregnant and lactating women benefits 300,000 people.

During the first stages of the program, services were provided only in blocks where they could be tied to a training institution. Such blocks would serve both as a field-training area for trainees and as a demonstration area with ongoing field extension programs. Later, as personnel were trained, the program was extended to blocks not served by training institutions. Primary health centers work with the program by providing immunizations, selecting beneficiaries for the feeding centers, and performing medical checks of malnourished children.

Findings

In 1975 the State Planning Board, at the government's request, evaluated the impact and achievements of the program. It conducted a survey in a random sample of eleven of the seventy-four community development blocks then in existence. Only blocks that had the program for three or more years were included. A control group was selected with characteristics similar to the blocks in the sample. Schedules of information about the program were collected by observation and in household questionnaires, and these were supplemented by official data from state records.

More than a quarter of the centers did not have the intended number of beneficiaries. Furthermore, in half the centers the number of pregnant and lactating women was far lower than intended. Many believe that low-income families in the community are not aware of the program and therefore are not selected as beneficiaries. In three-quarters of the centers studied, the medical officer was not involved in the selection of beneficiaries. Field investigations revealed a deficit between registration and attendance of 30 to 40 percent. The picture for home, school, and community garden projects and production programs was similar. It was apparent that facilities were underused and that materials essential for implementation of the plan were lacking.

There was not a full complement of staff, and many extension officers involved did not have formal training in the program. According to the evaluation, implementation was poor and results were unsatisfactory because of the limited involvement of government departments and because of the lack of interest of panchayats, local bodies, and the community. The nutritional impact of services on beneficiaries in the feeding program was not reported.

SPECIAL NUTRITION PROGRAM, COIMBATORE, TAMIL NADU

The government of India launched the Special Nutrition Program (1970-) with the objective of providing supplementary nutrition to preschool children, pregnant women, and nursing mothers of low-income groups in urban slums and in tribal and backward rural areas. The national program is under the Department of Social Welfare; the state program under the Director of Social Welfare, of Tribal Development, or of Rural Development. The block development officer and his staff are responsible for the day-to-day working of the block program. Food is provided by CARE, the World Food Program, and the states. The scheme has more than 6 million beneficiaries in the country.

During 1970-75, the Special Nutrition Program in Tamil Nadu reached 80,000 children in 280 feeding centers. The program was started in Coimbatore in 1971, and by the end of that year 7,000 children were receiving supplementary nutrition care at eighteen centers in the city.

Objectives and Services

The program combats the urgent nutritional problem, especially among children. Low-income urban communities and rural and tribal families are the main target groups. Countrywide surveys had shown that up to 80 percent of preschool children are suffering from varying degrees of malnutrition in India. The program, a feeding-only program that daily supplies children with three slices of fortified sweetened milk bread weighing 75 grams, reaches the most vulnerable groups--mostly children aged six months to thirty-six months.

Evaluation Studies

At the request of the state government, an evaluation team has done several studies of the program's impact. Five feeding centers catering to about 2,500 children in Coimbatore city were chosen for the studies. A dietary study using questionnaires and interviews was carried out among the 240 families of the 308 children selected as a sample. Clinical and anthropometric data were collected, as was background information on income, family size, and the number of dependents in the household. Of the families surveyed, 85 percent had incomes below \$27 (Rs 200) a month. Only 30 percent of the members of those families had some education; only 1 percent had more than secondary education. More than 80 percent of the families spent more than 60 percent of their income on food. Dietary intake, based on the Indian Council of Medical Research allowances, was below recommended intake. There were clinical signs of corneal vascularization and Bitot's spots for 36 percent of the study children. The anthropometric data collected was compared to values for all India and for Tamil Nadu. The study data show the weights and heights of beneficiaries to be below those values at all ages (table A.9).

Table A.9. Mean Heights and Weights of Children, by Age, Coimbatore

Group	6-12 months	13-24 months	25-36 months	37-48 months
Height (centimeters)				
<u>Boys</u>				
Present study	69.4	78.1	86.7	92.7
All India	73.9	81.6	89.8	96.0
Tamil Nadu	n.a.	88.9	89.8	93.0
<u>Girls</u>				
Present study	68.4	77.3	81.3	86.3
All India	72.5	80.1	87.2	94.5
Tamil Nadu	n.a.	81.8	82.8	82.5
Weight (kilograms)				
<u>Boys</u>				
Present study	6.2	8.9	10.9	11.8
All India	6.4	10.1	11.8	13.5
Tamil Nadu	n.a.	9.9	11.6	13.1
<u>Girls</u>				
Present study	6.8	8.6	10.4	11.9
All India	7.8	9.6	11.2	12.9
Tamil Nadu	n.a.	9.9	12.1	12.2

Source: Devadas and others (1977a).

Study 2. Five centers representative of the eighteen in Coimbatore City were selected for study. Two were primary schools, two were maternal-and-child-health centers, and one was a nursery school. Measurements of weight and height were recorded monthly for six months, and a physician conducted a clinical survey before and after the study. Figures were compared for India, for Tamil Nadu, and for Coimbatore.

Weights of children in Coimbatore were below those of the other groups (table A.10). An improvement was observed in the clinical signs at the end of the study. Growth trends among present beneficiaries was close to the values for Tamil Nadu and all India, even though the study group was of lower socioeconomic status.

Table A.10. Weight of Children, by Age in Months, Coimbatore (kilograms)

Group	1-12 months	13-24 months	25-36 months	37-48 months	49-60 months	61-72 months
<u>Boys</u>						
Present study	6.4	8.9	10.2	12.5	14.5	15.6
All India	6.4	10.1	11.8	13.5	14.8	16.3
Tamil Nadu	-	9.9	11.6	13.1	15.4	16.5
Mean increase over six months	1.2	1.1	0.9	1.0	1.5	1.2
<u>Girls</u>						
Present study	6.2	8.4	10.1	11.8	14.2	15.2
All India	7.8	9.6	11.2	12.9	14.5	16.0
Tamil Nadu	-	9.9	12.1	12.2	14.1	15.6
Mean increase over six months	1.1	1.0	0.8	1.2	1.4	1.3

Source: Devadas and others (1977a).

Further findings in Coimbatore City. The same study team evaluated the effectiveness of "take-home feeding" and "spot feeding" in two further studies in Tamil Nadu. 1/ A control group was selected with the same socio-economic background as children in the program. The findings show that the mean increment in weight and height across the three groups was different: the biggest weight increases were for spot-fed children. The difference in hemoglobin levels of experimental groups and control group was also significant. Clinical assessment indicated that the nutritional status of children receiving supplements was better. The findings related to growth measurements suggest substitution and leakage to nontarget family members among the take-home group.

The second of these additional studies tested the effect of nutrition education combined with supplementary feeding at a selected feeding center; another center provided supplements only; a control group had neither services provided. The knowledge mothers and children had about nutrition markedly increased after nutrition education, and the choice of nutritious foods improved.

SPECIAL NUTRITION PROGRAM, ANDHRA PRADESH

The Director of Tribal Welfare is responsible for the Special Nutrition Program (1973-) in Andhra Pradesh; the Block Development Officers and their extension officers are responsible for its day-to-day supervision. Since 1973 the program has reached 140,000 beneficiaries. Food is provided by CARE, the World Food Program, and the state government. Recipes based on local foods are suggested by the National Institute of Nutrition and are

1/ Devadas and others (1977b).

used as much as possible in feeding children. The objectives and main components of the program in Andhra Pradesh are similar to those of the program in Tamil Nadu.

Design and Objectives

The National Institute of Nutrition has evaluated the impact of the supplementary feeding program on the nutritional status of participants to determine what effect the supplement had on intake levels--and whether it replaced home foods--and to evaluate operational and administrative bottlenecks. A comparative study of supplemented and unsupplemented groups was undertaken, after matching the control group with the program group on the basis of socioeconomic status, communication facilities, educational and medical facilities, and other characteristics. Fifty control villages and fifty-one project villages were chosen in nine community development blocks in six districts of the state. A dietary study was conducted by administering questionnaires, and data were collected on the food consumed the previous day. Weight and height measures were gathered for both groups classified into four grades.

Findings

The cost of the supplement per child is about \$0.02 (Rs 0.15) a day, and the program, unlike those in other areas, is functioning all year, not the 300 days suggested. Mean attendance is 86 percent. The supplemented group has a lower prevalence of deficiencies identified according to signs of protein-calorie malnutrition, but vitamin-B deficiency generally is more prevalent among supplemented children. The supplementary diet does not

contain extra amounts of these vitamins, and the home diet also lacks them. The extra calories the supplement provides may in some way aggravate the existing deficiency.

Supplemented children are taller and heavier than unsupplemented children of the same tribal group (table A.11). The percentage of children classified as normal--that is, children whose body weights are equal to or greater than 90 percent of the Indian averages--is greater for supplemented children than for unsupplemented children of the same tribal group (table A.12). More children in the unsupplemented groups are suffering from severe and moderate malnutrition. Differences in the nutritional status of various tribes are attributable to differences in dietary habits at home.

The researchers suggest that the observed improvement in supplemented children, an indication of the project's success, can be traced to the small number of operational and administrative problems. Important to the project's success are the compactness of villages, the involvement of local people as helpers, and the regular supply of materials given directly to the organizers of the program.

MID-DAY MEALS PROGRAM, MADHYA PRADESH

The Mid-Day Meals Program (1965-) was launched in Madhya Pradesh as an emergency relief measure in response to a drought. Having later become a regular feature of the tribal school system in the state, it has two main objectives: improving the nutritional status of school children, and encouraging regular school attendance rates. The Tribal and Harijan Welfare Department has responsibility for organizing and implementing the program and for paying port

Table A.11. Mean Heights and Weights of Supplemented and Unsupplemented Children Aged One to Five, by Tribal Group, Andhra Pradesh

Tribal group	Mean height		Mean weight	
	Supplemented	Unsupplemented	Supplemented	Unsupplemented
Gond	81.43	79.05	9.62	9.09
Kaya dora <u>a/</u>	91.77	89.13	11.48	10.88
Kondo Reddi	86.40	84.75	10.78	10.34
Jatapu	87.58	84.30	11.01	10.10
Savara	88.49	83.45	11.11	9.56
Yanadi	84.35	83.16	10.02	9.73
Chenchu	84.96	82.07	10.40	9.68

a/ Average for children aged two to five.

Source: Rao and others, 1975.

Table A.12. Weight as Percentage of ICMR Standards of Supplemented and Unsupplemented Preschool Children by Selected Tribal Group, Andhra Pradesh

Weight as percentage of ICMR standards	Gond		Jatapu		Savara	
	Supple-mented	Unsupple-mented	Supple-mented	Unsupple-mented	Supple-mented	Unsupple-mented
More than 90 percent	49.7	30.4	86.1	71.1	90.1	54.9
75-90 percent (Grade I)	42.3	56.3	13.5	21.9	8.1	34.3
60-75 percent (Grade II)	8.0	12.6	0.4	5.5	1.3	7.8
Less than 60 percent (Grade III)	0.0	0.7	0.0	1.5	0.5	3.0

Source: Rao and others, 1975.

charges and costs of transportation, storage, distribution, and overhead. CARE monitors and evaluates the program, which gets some of its food through U.S. food aid to India under Public Law 480. CARE provides 85 percent of the raw materials, the government of India 15 percent, in local groundnuts, grain flour, vitamins, and minerals.

Objectives and Services

The program is intended to reach older children, who still are subject to high rates of malnutrition even though they have passed the most vulnerable years. The effects of malnutrition on learning and on the development of children are well understood. The program also has the objective of increasing the enrollment and participation rates of children from disadvantaged homes. The provision of a free school meal is an incentive to parents to send their child to school, a deterrent to high drop-out rates.

The program is administered at the local level by a nutrition organizer and the school teachers. A daily ration of food providing more than 300 calories and 14 grams of protein is distributed to all school children on all school days--and if possible on nonworking days as well, but this depends on the local organization. The targeted number of feeding days in the year is 180. Health and nutrition education and preventive health care are part of this program, but it has not been possible to implement them or to provide the inputs needed.

Evaluation

At the request of the Tribal and Harijan Welfare Department, CARE did a retrospective study of the effect of the program on the intended beneficiaries. The objective of the study was to determine the effects of the

free school meal on nutritional levels of program participants, to measure the program's effect on school attendance rates, and to determine food displacement at home and the extent to which school meals supplement the home diet.

The study is of primary day schools in twenty-one districts of Madhya Pradesh, though meals are also provided in boarding schools (ashrams) and hostels for students. No baseline data were available, and measurement is based on a comparative study of children who have "more exposure" to the feeding program and those children who have "less exposure." (A strict control group was not available because the program extends to all accessible tribal schools in the state.) The efficiency of feeding programs was measured by examining feeding days in relation to school working days. Children who attend schools with high program efficiency and who have greater exposure to the program were compared with children who attend schools with low program efficiency and who have less exposure to the program. The random sampling was done in three stages: the "pay center" (storage point at block level) formed the unit of sampling at the first stage; the schools and school children formed the second and third stages respectively. Data were obtained from several sources:

- (1) A dietary survey, using twenty-four-hour recall, was conducted among the mothers of a subsample of the children.
- (2) School records provided data on attendance, enrollment, and feeding operations. Wastage and drop-out rates were estimated from the records maintained at schools.

- (3) Anthropometric data were collected. Weight and height were expressed as weight-for-age, height-for-age, weight-for-height, and weight-for-height combined with height-for-age.
- (4) Interviews of the program organizer, school children, and their mothers also provided data.

Findings

Effect on Nutritional Status. The Mid-Day Meals Program increases the growth of school children. Children from high efficiency schools on average are taller and heavier than children from low efficiency schools. In addition, there is less second- and third-degree malnutrition in the high efficiency schools, and the rates of wasting and stunting are lower. Shortlidge (1980) suggests in his evaluation of the impact of the program on nutritional status that the differences between high and low efficiency schools in weight and height are not dramatic:

"The most persuasive evidence of a link between the Mid-Day Meals program and health status was the regression analysis explaining percent weight-for-height as a function of sex, family type, land holding, education of mother, education of father, home caloric intake, months of participation in the Mid-Day Meals Program and program efficiency. In this equation, four variables were found to significantly affect weight for height--family, land holding, months of participation and program efficiency. Of these four the two most important were months of participation in the Mid-Day Meals Program and program efficiency" (p. 9).

Although the impact of these two variables is positive, it is not striking. The figures in table A.13 show one index of nutritional status of children from schools of different program efficiency.

Table A.13. Classification of Nutrition Status of Children by Program Efficiency, Madhya Pradesh

Weight for height (percentage of standard)	Program efficiency			
	0-60 (Low)	61-85 (Medium)	86-95 (High)	96 and above (Very high)
≤ 69	1.5	1.0	1.1	1.3
70-79	22.1	20.6	16.9	15.1
80-84	25.2	26.6	24.9	26.7
85-89	27.8	26.8	28.3	28.1
≥ 90	23.4	25.1	28.1	28.8

Source: Care-India (1979).

Effect on School Attendance. The findings about school attendance are inconclusive. Because no matching control group is in the study, it was impossible to measure differences. Low-efficiency schools have proportionately more upper-class children with better educated parents than the high efficiency schools. Because socioeconomic levels often affect school attendance rates, it can be concluded that the higher attendance rates of children in the low efficiency schools is related to socioeconomic background, not to the mid-day meal. The days present at school is positively related to the months present in the school-feeding program.

Effects on Dietary Intake. The findings show that 20 percent of the children in the program have their first meal of the day at school. The differences in food intake are not significant between those who take a school meal and those who do not. Children who take no school meal have some

"additional" food in the home. Findings from the study suggest that, in schools of high program efficiency, the mid-day meal is a supplement to the home diet. In schools with medium or low efficiency, a third of the calories of the mid-day meal substitute for the home diet.

APPENDIX B. ADDITIONAL STUDIES AND SPECIAL PROJECTS IN INDIA

Project	Type	Implementing Agency	Dates	Main Services	Coverage
Primary health care through health guides, Kot Bhalwal Block, Jammu and Kashmir	Pilot	State government	1976-	Health education/school health programs/first aid/assistance in national health programs/curative services	I.C.D. Block
Supplementary nutrition program for school children, Kot Bhalwal Block, Jammu and Kashmir	Pilot	State government	1978-	Feeding program	I.C.D. Block
Maternal and child health care, Udupi Faluk, Karnataka	Service	Kasturba Medical College, Manipal	-	Care of children under five prenatal and postnatal care/preventive and curative services	57,246
Mini health center project, St. Thomas Mount Community Development Block, Tamil Nadu	Pilot	Voluntary Health Services/Chidambaram Institute of Community Health	1977-	Prenatal and postnatal care/child welfare/curative care/first aid	-
Institutional community welfare services under "Medicare," Kasturba Medical College Hospital, Manipal	Service	Kasturba Medical College Hospital	1972-	Comprehensive medical/dental care	6,000 families
Domiciliary management of protein calorie malnutrition, Hayathnagar Primary Health Center, Hyderabad City	Research/ Pilot	National Institute of Nutrition/state government	-	Supplementary nutrition care/nutrition education/health care	-
An integrated approach to primary health care, Althoor Community Development Block, Madurai District, Tamil Nadu	Pilot	IAPHC study group	1979-	Comprehensive health services	10 villages
Primary health care through community health volunteers, Gujarat	Service	State government	-	Simple treatments/first aid/referral to health workers/participation in health activities.	Statewide
Oral rehydration therapy study, National Institute of Cholera and Enteric Disease, Calcutta	Research	National Institute of Cholera and Enteric Disease	-	Oral rehydration therapy/hospital referral	383 children

References

- Antia, N.H. "Dilemma of Health Care." Voluntary Action, vol. 23, no. 1, July-August 1980, pp. 13-19 (Monthly Journal of the Association of Voluntary Agencies for Rural Development).
- Antia, N.H. "Alternatives to Health Care System." Alternative Approaches to Health Care. Report of a Symposium Organized jointly by the ICMR and the ICSSR. New Delhi, 1977, pp. 102-13.
- Arole, M. and R. Arole. "A Comprehensive Rural Health Project in Jamkhed (India)." In Alternative Approaches to Meeting Basic Health Care in Developing Countries. Eds. V. Djukanomic and E. Mach. WHO, Geneva, 1975, pp. 70-90.
- Butt, H.W. "Indo-Dutch Project for Child Welfare." Alternative Approaches to Health Care. Report of a Symposium Organized jointly by the ICMR and the ICSSR. New Delhi, 1977, pp. 33-44.
- Care-India. "The Kasa Model Integrated Mother-Child, Health-Nutrition Project." Nutrition Planning in the Developing World. Proceedings of a Regional Workshop held by Care in India, Kenya, and Colombia. New Delhi, 1976, pp. 93-95.
- Care-India. Mid-Day Meals Program in Madhya Pradesh: A Study of Impact on Tribal School Children. New Delhi: Care-India, 1979.
- Devadas, R.P., G. Kamalanathan, and M. Kupputhail. "Studies on the Special Nutrition Program (SNP): Background Information of the Beneficiaries Under SNP." Indian Journal of Nutrition and Dietetics, vol. 14 (1977), pp. 61-64.
- Devadas, R.P., G. Kamalanathan, M. Kandiah, and M. Kupputhail. "Studies on Special Nutrition Program (SNP) II. Growth Study on 1,121 Children Receiving the Supplementation in Coimbatore City." Indian Journal of Nutrition and Dietetics, vol. 14 (1977), pp. 193-97.
- Devadas, R. P., G. Kamalanathan, P. Seelavathy, M. Kupputhail. "Studies on Special Nutrition Program (SNP) IV: Effectiveness of a Nutrition Education Program Among the Beneficiaries of SNP." Indian Journal of Nutrition and Dietetics, vol. 14 (1977), pp. 227-30.
- Gopaldas, T. Project Poshak, 2 vols., New Delhi: Care-India, 1975.
- Gopaldas, T. "Project Poshak--Evaluation Techniques." In Nutrition Planning in the Developing World. Proceedings of Regional Workshops held by Care in India, Kenya, and Colombia. New Delhi: Care-India, 1976, pp. 59-65.

- Gwatkin, D.R., J.R. Wilcox, and J.D. Wray. Can Health and Nutrition Interventions Make a Difference? Washington, D.C.: Overseas Development Council, 1980.
- Hetzel, B.S. Basic Health Care in Developing Countries. Oxford: Oxford University Press, 1979.
- ICMR and ICSSR. Health for All: An Alternative Strategy" Report of a Study Group set up jointly by the ICMR and the ICSSR. New Delhi, 1980.
- ICMR. Evaluation of Primary Health Care Programs. Proceedings of a Conference held at the ICMR. New Delhi, April 21-23, 1980.
- Kielmann A., C. Ajello, N. Kielmann. "Evaluation of Nutrition Intervention Projects." Report prepared for USAID. Washington, D.C., 1980.
- Mankekar, K., Voluntary Effort in Family Planning: A Brief History. New Delhi: Abhinav Publications, 1974.
- Mitra, A. India's Population: Aspects of Quality and Control. 2 vols. New Delhi: Abhinav Publications, 1978.
- Ninan S. "Mother and Child Care (Indo-Dutch Project)." Monthly Journal of AVARD, Voluntary Action, vol. 23, no. 1. (July-August 1980), pp. 80-86.
- Pyle, D. "From Pilot Project to Operational Program--The Problems of Transition as Experienced in Project Poshak." Cambridge: Massachusetts Institute of Technology, 1976.
- Pyle, D. "Voluntary Agency-Managed projects Delivering an Integrated Package of Health, Nutrition, and Population Services. The Maharashtra Experience." Prepared for the Ford Foundation. New York, 1979.
- Pyle D. "From Project to Program; The Study of the Scaling Up/Implementation Process of a Community Level Integrated Health, Nutrition, Population Intervention in Maharashtra, India." 1981.
- Ridker, R.G. "The No-Birth Bonus Scheme: The Use of Savings Accounts for Family Planning in South India." Population and Development Review, vol. 6, (March 1980), pp. 31-46.
- Rao D.H., K. Satyanarayana, and others. "Evaluation of the Special Nutrition Program in the Tribal Areas of Andhra Pradesh." Indian Journal of Medical Research, vol. 63 (May 1975), pp. 652-60.
- Seshagiri Rao K., A. Rao, S. Yadav, et al. "Experimentation of Alternative Strategies in Family Planning: An Evaluation." Population Centre. India Population Project, Karantaka. 1979.

- Shah, P.M. "The Kasa Model Integrated Mother-Child-Health-Nutrition Project, Primary Health Care, Kasa, Taluka Dahanu, District Thana Maharashtra." Alternative Approaches to Health Care, A Symposium held by the ICMR. New Delhi, 1977, pp. 15-29.
- Sharma, R., and S.K. Chaturvedt. "India." B. Hetzel, ed. In Basic Health Care in Developing Countries. Oxford: Oxford University Press, 1979.
- Shortlidge, R. "Assessment of the Education and Health Impacts of the Mid-Day Meals Program." Report prepared for USAID. Washington, D.C., 1980.
- State Planning Board of Kerala. Applied Nutrition Program in Kerala: An Evaluation Study. Kerala, 1978.
- Taylor, C.E., and others. Malnutrition, Infection, Growth and Development. The Narangwal Experience. Washington, D.C.: World Bank, forthcoming.
- Taylor, C., and others. Integration of Family Planning and Health Services: The Narangwal Experience. Washington, D.C.: World Bank, forthcoming.
- World Bank, Health Sector Policy Paper. Washington, D.C.: World Bank, 1980.

