Transferring Health and Family Planning Service Innovations to the Public Sector: An Experiment in Organization Development in Bangladesh

James F. Phillips, Ruth Simmons, George B. Simmons, and Md. Yunus

The International Centre for Diarrhoeal Disease Research, Bangladesh, has launched a field experiment in two rural thanas of Bangladesh to test the transferability of its successful health and family planning experiment in Matlab to the Ministry of Health and Population Control service system. This paper reviews the Matlab experiment with particular attention to its organization and identifies elements for transfer. The intervention strategy and operations research design of the new experiment are discussed. The proposed design follows an organization development strategy in which collaborative diagnostic research is used to foster institutional change.

Despite an early and relatively strong commitment on the part of the government to family planning programs, there has been little change in fertility and only modest success in increasing the level of contraceptive prevalence in Bangladesh. While research on the national program has not produced evidence of impact there have been several small-scale pilot projects outside of the public sector that have attained a measure of success in reducing fertility. The lessons that can be drawn from these small-scale field experiments and applied to large public sector health and family planning programs continue to be a subject of discussion and debate. In Bangladesh this question has assumed national policy significance. Three years ago the Planning Commission requested the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), which has fielded a successful maternal and child health–family planning (MCH-FP) project in its research station in Matlab, to extend these activities to the government program in other areas of the country. Out of this request evolved a project in two thanas[1] known as the MCH-FP Extension Project, whose major purposes are (1) to collaborate with government health and family planning staff in an attempt to transfer key components of the Matlab approach to the public sector; and (2) to document and analyze the process of this collaborative venture as well as its effect on contraceptive prevalence, fertility, and mortality.

This paper discusses the design of the MCH-FP Extension Project as well as major characteristics of the Matlab experiment upon which it builds. We begin with a brief background discussion of the ICDDR,B, its evolving emphasis on maternal and child health and family planning, and government interest in these activities. We then outline both organizational and service delivery characteristics of the Family Planning and Health Services Project (FPHSP) in Matlab to identify the factors that made this small-scale field experiment successful. Emphasis is given to the relevance of organizational factors. The focus on organizational factors is continued in the second part of the paper, which describes the experimental intervention and associated research strategy of the MCH-FP Extension Project. Intervention activities are based on the premise that a carefully executed "organization development" strategy might succeed in overcoming at least some of the barriers to the transfer of innovations from pilot projects to the complex bureaucratic environment of government programs. The research component of the project, which is subsequently described, consists of the systematic study of the government health and family planning program, careful documentation of the manner in which it responds to the intervention, and the rigorous monitoring of its impact.

James F. Phillips, Ph.D., is Associate, the Population Council, and Scientist, International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), GPO Box 128, Dhaka; Ruth Simmons, Ph.D., is Assistant Professor, and George B. Simmons, Ph.D., is Professor, Center for Population Planning and Department of Health Planning and Administration, School of Public Health, University of Michigan, Ann Arbor; Md. Yunus, M.B.B.S., M.Sc., is Associate Scientist, ICDDR,B.

In the concluding section, we outline a framework that summarizes the basic conceptualization of the extension project. We identify characteristics of (1) public sector program organization and management, (2) the client population, and (3) the contraceptive and MCH services offered by the program as major classes of factors that determine contraceptive use and fertility change. Public sector programs and rural communities are viewed as dynamic elements, capable of change and adaptation in response to carefully targeted interventions.

Background

For the ICDDR,B, focus on maternal and child health and family planning is relatively recent. The Centre began its work in Matlab Thana in 1963 in the area of diarrheal disease research. Matlab Thana was chosen because it was a relatively undeveloped rural area that had experienced regular cholera epidemics. The area was, in most respects, representative of the conditions of rural Bangladesh. As a part of its research program on selected interventions relating to diarrheal disease, a demographic surveillance system was established which, as one of its outputs, produced relatively accurate estimates of fertility and mortality. This capacity to monitor demographic trends was of critical importance when the Centre began to expand its research activities to family planning.

The first family planning experiment began in 1975 and concentrated on the household distribution of contraceptives without much clinical support or follow-up services and without any related efforts in the area of maternal and child health. It had a notable but largely ephemeral impact on the contraceptive prevalence rate and little impact on fertility.[2] The second experiment, begun in 1977, employed a wider range of contraceptive methods, integrated some aspects of maternal and child health into the program, and used a drastically different village-based delivery system. Its impact on both contraceptive prevalence and fertility was immediate and pronounced. More important, the impact has been sustained over the six years that the project has been in existence.[3] Currently the contraceptive prevalence rate is about 40.5 percent; and fertility is approximately 22 percent lower in the treatment area than in the control area. There has also been an apparent impact on mortality.[4] Thus the second Matlab experiment is notable as an example of a relatively poor rural area in which efforts to reduce fertility and mortality have been successful and sustained.

When proposals were being advanced to fund a continued program in Matlab in 1979, the Government of Bangladesh made its concurrence conditional upon the development of a parallel program in other thanas where the ICDDR,B would seek to replicate the success of Matlab by working through the government network. This request initiated the MCH–FP Extension Project. From the beginning it was clear that the new project would involve more than an effort to reproduce the original Matlab project in two new settings. The government wanted the project implemented, to the extent possible, through the existing Ministry of Health and Population Control infrastructure. Given the very different characteristics of the government program and the Matlab experiment, this implied that a large part of the research effort would be devoted to identifying the features and methods of transfer. To be successful the project would have to be adaptive and would have to concentrate on organizational issues as an important part of its work.

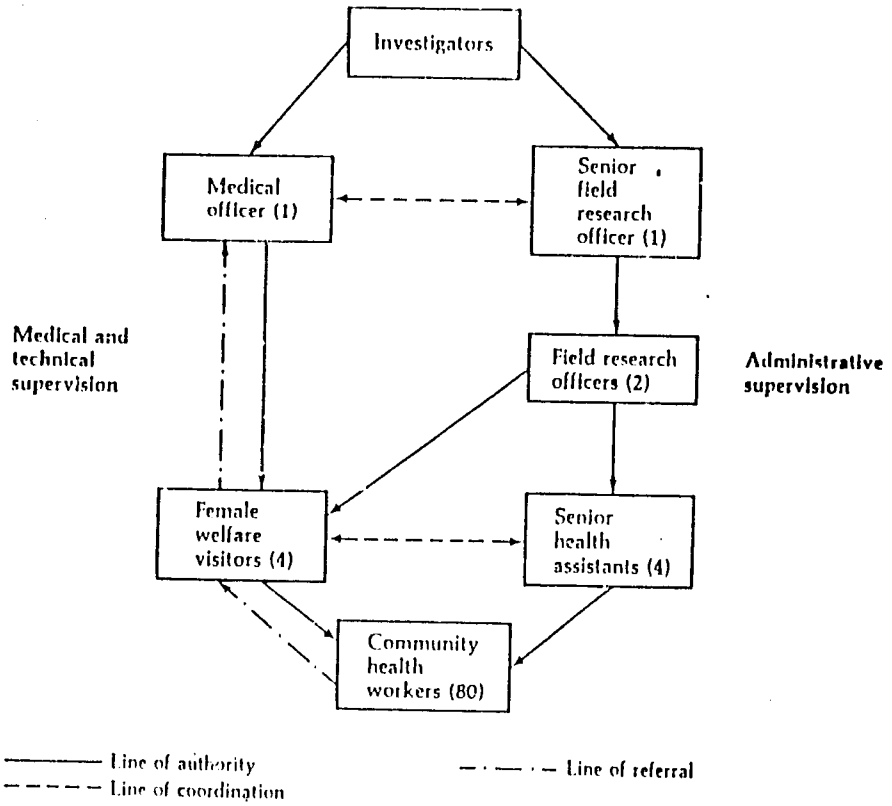
Organization and Management of the FPHSP

The Family Planning and Health Services Project (FPHSP) was designed to provide a broad range of contraceptive and immunization services and oral rehydration therapy to households in a study area of Matlab Thana. Its staffing pattern is diagrammed in Figure 1. The primary service providers of the FPHSP are literate, young, married, and contracepting women who have been recruited from the villages they serve. Each worker serves about 250 families (or a population of about 1,100) and is expected to visit each family every fortnight. The operational aim has been to maintain comparable and manageable workloads for female village workers and to assure that they can efficiently provide both MCH and family planning services. The resulting density of female workers is about six times higher than the density of female staff in the national program. Training of these community health workers emphasized client-oriented approaches—building close rapport with the rural population, and responding to felt needs.

Community health workers are grouped by "blocks," with 20 workers supervised as a reporting unit. Each worker has two backup and supervisory systems, one focused on administration and community relations and the other on the technical and medical aspects of service delivery. Administrative supervision is exercised by a male supervisor and two assistants, field supervision at the block level is conducted by four block supervisors; and technical supervision by a family welfare visitor and a female physician.

Female welfare visitors provide paramedical backup in the village and in static health centers known as family welfare centers. The welfare visitors reside permanently in these health centers; each serves a population of 20,000. A female physician has technical authority over the field project. She attends fortnightly meetings to provide MCH care and is available in a central clinic in Matlab for medical backup services for serious complications. The physician conducts regular training for all workers in the subcenters with emphasis on maintaining clinical standards and continuing expansion of the village service component of the MCH program over time.

Figure 1 Organization of the Matlab Family Planning–Health Services Project



Strong management control is vested in the nonmedical, male supervisory staff. The project supervisor has the authority to hire, fire, and discipline village workers who fail to perform. In the interest of encouraging and maintaining high standards of performance, efforts have been made to supplement careful recruitment and training of workers with rigorous management control, the systematic review of information about individual and group performance, and the use of disciplinary procedures when necessary. Decision making is decentralized. Supervisors have authority and flexibility to change the system of work or take actions when problems arise. Fortnightly meetings of supervisors and community health workers, and management information systems are designed to ensure appropriate linkages at all levels.

Utilization of existing community resources of the Matlab field station and of community leadership has been extensive. The project supervisory personnel were selected from the pool of field-workers who knew the Matlab area through previous research and were thus known to the village elites. Community leaders were involved in establishing the health centers, the selection of village workers, and in informing the community of project goals and purposes. There was no construction of facilities as all the family welfare centers were donated by the community. There was minimal reliance on high technology, except for the use of speedboats that had been originally obtained for vaccine trials and demographic surveillance work. Pay scales of community health workers are comparable to those of workers in the government program; but much higher scales exist for the supervisory cadre. A well-paid, highly disciplined supervisory team has been a critical element of the project's success.

Contraceptive and MCH Services

The FPHSP followed an incremental services development strategy. While the project is integrated in the sense that community health workers provide both health and family planning services, training at any given point has emphasized a single component and its subsequent implementation. Thus during the six weeks of health worker training that launched the program, only family planning was introduced. Much of this training period involved field demonstration. After six months of successful implementation of family planning, tetanus immunization was added, and six months later, oral rehydration therapy. More recently, measles vaccination, antenatal care, and traditional birth attendant training have been integrated by this stepwise approach. Implementation of each successive component was operationally evaluated before the next component was introduced.

Certain family planning activities of the Matlab FPHSP improve contraceptive access: Depo-Provera injections and Copper T IUD insertions are offered in the home, along with pills, condoms, and foam; regular prean-

nounced tubectomy services are available at the Matlab clinic. Approximately half of all contraceptive use prevalence is attributable to Depo-Provera, the availability of which has contributed to the impact of the project.

The combined emphasis on family planning and maternal and child health in the Matlab project reflects an underlying hypothesis about the interaction effect of these two types of services. Treating widely prevalent conditions of minor illness is posited to be a prerequisite for effective and lasting contraceptive use under the conditions that characterize rural Bangladesh. Unless minor ailments are attended to, the presumption on the part of villagers that ailments originate in contraceptive use is likely to lead to discontinuation. Research on use-effectiveness in Matlab lends support to this hypothesis. Overall continuation of contraceptive practice is associated with careful paramedical follow-up; and encouragement of method switching has alleviated concern about the deleterious health effects of particular contraceptive methods.[5] Nevertheless, MCH interventions less directly related to the common health problems of women have had no discernible statistical association with family planning efficacy.[6]

Lessons from the FPHSP

The success of the Matlab family planning project depends upon both its MCH-FP service component and its organizational component. Previous discussions of the project have emphasized its service dimensions, such as the availability in the village of a wide range of contraceptive methods, insertion of IUDs in the home, and referrals for tubectomy.[7] However, technical interventions do not function in a vacuum. They are implemented in an organizational context that is an integral part of the experiment. The Matlab program is carried out by an organization characterized by high management effectiveness; a competent, technically trained, disciplined, and field-oriented supervisory staff; a team of community health workers with a well-articulated task orientation; and a system guided by performance rewards and sanctions. Necessary external resources were available, although local resources were used and care was taken to select field staff with the appropriate social characteristics.

These organizational dimensions of the FPHSP are so tightly intertwined with the MCH-FP service dimension of the project that it is impossible to sort out the extent to which its success is due to one or the other. Formally, the Matlab experiment has a two-cell design, but the treatment area differs from the control area in a variety of service and organizational features. Thus the experimental structure of the FPHSP is more complex than is frequently recognized. Since the formal design focuses on differentials in service components, it is difficult to partition the contribution of organizational factors. The Matlab experiment has nevertheless demonstrated that it is possible to intervene in a rural setting and reduce fertility and mortality. The study did not, however, demonstrate the circumstances necessary to produce such a result on a larger scale through the public sector.

The MCH-FP Extension Project

The public sector health and family planning programs in Bangladesh aim to achieve results that small experimental projects have shown to be possible. However, both the inability of the national program to effectively offer more than a narrow range of MCH and contraceptive services and organizational weaknesses have blocked attainment of these objectives.[8]

The extension project addresses the question of whether it is possible to apply the lessons of Matlab to the public sector and thereby achieve at least some of the results of the small experimental projects.[9] Three main barriers to the utilization of the experience of pilot projects have been emphasized in the literature on organizational change:[10] (1) Pilot projects are typically fielded with special resources;[11] (2) they are implemented through small, autonomous agencies in the private sector;[12] and (3) the hypotheses and goals of research frequently bear no relation to the practical questions that concern policymakers and administrators.[13]

These limitations of pilot projects are in several respects relevant to Matlab. The FPHSP was organized with the help of an extraordinary array of special resources: extensive financial support for data collection and project implementation; a pre-existing data system and organizational infrastructure in Matlab; and the professional competence and expertise of other ICDDR,B staff. The Matlab project largely ignored the government health and family planning program in the thana and established a small delivery system of its own. Research emphasis was on a question that continues to engage the interest of academics in the population field: Can family planning and MCH programs, if implemented, change the fertility behavior of rural populations? Policymakers and administrators are also interested in this question. But the currently more urgent issue for them is how the management of public sector delivery systems can be improved.

While the extension project seeks to apply successful innovations to the public sector, it does not pretend to answer all questions associated with the issue of how to make government health and family planning programs more effective. It asks whether collaborative efforts between the Ministry of Health and Population Control and the ICDDR,B can lead to improvements in the service and managerial components of the government programs in two thanas. As such it remains a small-scale, experimental, pilot project. It constitutes but a beginning point to the larger issue of how the entire system managed by the Ministry can be revitalized and whether it is possible to establish mechanisms that make such renewal independent of outside change agents.

While the extension project has the characteristics of a pilot project, it does deal explicitly with some of the conditions that have been identified as barriers to the

wider utilization of research results. The project limits the use of special resources to training and other organization-building and research activities of the ICDDR,B team, without adding additional inputs to routine program activities. Moreover, while the ICDDR,B change-agent team operates out of an autonomous, nonprofit, private organization, it collaborates with the government and attempts to achieve its aims with minimal change to the formal structure of the Ministry's program. Finally, the project seeks to determine the conditions under which public sector programs can be more effective and attempts to involve government officials at all levels to ensure that they perceive research issues addressed by the project as meaningful.

The MCH-FP Extension Project has two components: (1) an intervention strategy in which ICDDR,B staff use organization-building and training to transfer elements of the Matlab project to the public sector; and (2) a research strategy that aims to assess, through a variety of instruments, the efficacy of the existing program; its resource, structural, and technical constraints; the operational changes introduced by the intervention; and their impact on program effectiveness.

Intervention Strategy

The intervention paradigm for the project is derived from the literature on organization development and planned organization change. French and Bell define organization development as "a long-range effort to improve an organization's problem-solving and renewal process . . . with the assistance of a change agent, or catalyst, and the use of the theory and technology of applied behavioral science."[14] Organization development typically entails the following:

1 External organization development consultants are invited to assist an organization in improving its functioning.

2 Social science research techniques are used to identify problems. Research results are fed back to program managers.

3 Joint action teams involving managers and consultants are formed at various levels to take action and feed relevant information to superiors who initiate the consultancy. In this way joint "ownership" of research and decision-making is cultivated in order to foster utilization of results.

4 Change agents are affiliated with the consultant organization and have no formal authority in the host agency. They facilitate change through counterpart support and close liaison with implementation committees.

Successful change is typically produced by a series of steps beginning with building of trust and collaboration between change agents and counterparts,[15] the diagnosis of problems,[16] and clarification of responsibilities for implementing mutually agreed upon changes.[17] Given a clearly defined, jointly developed plan for implementation, the prospects for transfer of innovation are enhanced. Organization development interventions are generally designed to upgrade both technical skills and managerial functioning. In the extension project, organization-building and technical interventions occur at several levels: the thana, the field, and the national level.

The critical, initial point of collaboration in the project takes place at the thana level through the establishment of joint planning and decision-making meetings between project staff and managers of the thana health complex. The health complex is a rural government health facility that provides curative services and also functions as the major administrative level for rural health, MCH, and family planning field activities. A physician from the Health Division of the Ministry of Health and Population Control, the thana health administrator, is the chief administrative officer at the health complex. He is supported by a staff of medical officers for clinical services, one medical officer for providing technical supervision of rural family planning and MCH services, and two administrators, one for the supervision of family planning and MCH, the other for health activities.

The thana health administrator, thana medical officer, thana family planning officer, and health inspector are the key thana-level collaborators in the project. The intervention seeks to strengthen field orientation, technical competence, and planning capabilities at this mid-management level to ensure greater control and support capabilities for program implementation in the villages.

Field activities in health and family planning are conducted by a range of government workers affiliated with the health or the population control wing of the Ministry. Male workers from the health division have traditionally been responsible for health education and the control of communicable disease, while female field and paramedical staff, supervised by a male family planning worker, have been in charge of MCH and family planning work. Key objectives of the extension project intervention strategy at this level are to remedy deficiencies in technical knowledge, to redirect field methods toward client-oriented approaches, and to introduce a more effective management control and support system. A series of four-week training courses is fielded for groups of 20 workers. Three key components of the Matlab training program are covered—family planning, oral rehydration therapy, and tetanus immunization, as well as other health subjects assigned to these workers by government policy. Priority is given to practical demonstration of field methods: household visiting patterns, motivational techniques, community relations, referral and record keeping.

Following a month of formal training, emphasis is placed on establishing the rudiments of the Matlab system in the field: calendar-based work routines in "doorstep" family planning and MCH services, systematic follow-up, regular meetings for problem solving, supervision, and support. A simple household record

Table 1 Service components of the Matlab service system and mode of transfer to the Ministry system

Matlab system	Mode of transfer
1 Comprehensive family planning services in the home: pills, Depo-Provera, Copper T IUD, condoms.	1 Assist with implementation of team approach to fieldwork. Initial focus of door-to-door visits on pills, condoms, and injectables.
2 Subcenter Copper T services with comprehensive MCH, contraceptive backup, and referral services.	2 Assist in establishment of FWCs. Retrain FWVs in MCH care and Copper T insertion. Develop the referral information system.
3 Follow-up for both MCH and FP services.	3 Devise a plan and implement follow-up of all women and visitation methods.
4 Central clinic facilities for tubectomy. Referral services to trained physicians.	4 Assist in developing a THC referral system. Assist in regularizing tubectomy services in the THC.
5 Comprehensive immunization services, village-based ORT, antenatal care, nutrition advice.	5 Assist in developing cold chain procedures.* Train staff in MCH care, ORT, and EPI.

Note: FWC = family welfare center; FWV = female welfare visitor; THC = thana health complex; ORT = oral rehydration therapy; EPI = expanded program for immunization.
* Procedures ensuring refrigeration of vaccines to keep them potent from manufacturer to delivery to patient.

Table 2 Operational components of the Matlab service system and mode of transfer to the Ministry system

Matlab system	Mode of transfer
1 Primary care by CHW posted at a ratio of 1:1,000 population.	1 Foster better use of female workers.
High proportion of female workers.	Develop teams of male and female workers.
2 Decentralization to the union level:	2 Foster FWC development to include:
a One male supervisor with all administrative authority.	a Clear lines of supervision.
b Simple-to-use MIS with no computer necessary.	b Train workers in a simple adaptation of the Matlab MIS.
c Fortnightly meetings of all union-level workers.	c Arrange monthly meetings of union-level workers in the FWC.
d Task goal setting, activities planning.	d Demonstrate goal setting.
3 Special logistics: speedboats for supervisors, country boats for village workers.	3 No special logistics.
4 Continuous training: Component by component introduction of new MCH activities; continuous refresher training.	4 Four-week training course, with counterpart support continuing three months beyond formal training.
5 Government pay scales for village staff; higher salaries for supervisory staff.	5 No change in salary structure.
6 Clear delineation of roles:	6 Clarify roles in the course of meetings (no change in administrative structure).
a Technical (medical supervision) by physician over FWV and FWV over CHW.	
b Administrative (task supervision) by paramedic supervisor over male assistant supervisor (union level).	

Note: FWC = family welfare center; MIS = management information system; FWV = female welfare visitor; CHW = community health worker.

book is introduced that permits workers to keep track of their clientele and monitor their own performance. Major change agents for this activity are Matlab community health workers and supervisors who have had five years of experience in the Matlab system. They provide counterpart support to government field staff and their immediate supervisors as agents of planned change for a period of three months following training. The technical and operational components of transfer are listed in Tables 1 and 2.

At the national level a formally constituted coordinating committee, consisting of senior officials from the Ministry and relevant research organizations, reviews findings from the thana and field level. This committee receives reports from the thana committees, reviews progress, and assists in overcoming operational barriers

Table 3 Treatments of the MCH-FP Extension Project

Intervention	Training areas	Comparison areas[a]
Counterpart support	5 unions[b]	—
No counterpart support	4 unions	4 unions

Note: Half of the unions in each cell are allocated to a thana of North Bengal, the other half are in a thana in southwestern Bangladesh.
[a] Comparison unions are contiguous areas located in two thanas outside of study area districts.
[b] In one thana there are two unions in this treatment owing to the small populations of areas affected by flooding.

to project implementation. Through this process the project aims to communicate operational problems and means of solving them to key decision-makers who can subsequently utilize project findings for large-scale policy planning.

Research Design

The research design of the MCH-FP Extension Project includes the following elements: First, the project is conducted within the framework of an experimental design. This approach is undertaken because a comparison of outcomes in the various cells in the experiment is of policy significance. Second, we collect panel data from a representative sample of the population that can be used as an empirical basis for a wide range of studies related to the adoption of health and contraceptive practices. Third, the project incorporates the systematic study of the government program and the manner in which it changes during the experimental interventions. While each research approach is important in its own right, they form a unified research design in which each component complements or improves other parts of the system.

Experimental Framework

Two thanas in different geographical divisions have been identified for the study by the Government of Bangladesh. Within the study thanas, nine treatment unions were chosen; and four unions from thanas neighboring the two study areas were selected as comparison areas. Comparison unions are in contiguous areas but are outside the study districts. The design aims to determine whether change can be achieved with a training program alone, or whether training must be supplemented with a sustained period of field support from special project workers. To address this question, unions of the study area have been divided into two groups: one in which the ICDDR,B assists actively in the implementation of the technical components of training courses with change agents assigned to their counterparts in the Ministry program, and another where training alone is provided.

As shown in Table 3, nine randomly selected unions in the two study thanas receive treatment interventions and are the subject of ongoing demographic surveillance. Each study thana has two research unions that receive training alone and two that receive the combined package of training and counterpart support. Each thana also has one demonstration union; they are not shown in Table 3 because they are outside of routine research areas. Comparison unions have been purposely selected from contiguous thanas of the neighboring districts. In the residual areas of the two study thanas no research is conducted but thana workers are provided the same training available in the experimental unions.

The treatment design has two overall aims: First, information about fertility, mortality or morbidity, and contraceptive practice can be calculated for each of the three cells in the design. Calculation of effects by treatment should measure the impact of the alternative patterns of intervention. The difference between the Table 3 quadrants indicates how much additional impact can be generated when training and counterpart support are provided compared with no intervention. Second, the experimental design introduces variation on key variables that facilitates tests of hypotheses about both individual behavior and program performance.

Study of Household Variation

The analysis of effects is achieved through the longitudinal observation of households with a sample registration system. A random two-stage cluster sample of study area households is visited by ICDDR,B interviewers in a 90-day work cycle. Although the primary purpose of the system is to develop a demographic data base, interviewers also collect information on the social, economic, and health status characteristics of members. Interviewers also record information on Ministry workers' exchanges with clients, and indicators of the quantity of health services contacts. Thus the registration system is a multipurpose monitoring system that compiles continuously cross-referenced data on demographic dynamics, cause of death, household characteristics, contraceptive use, and program operations.

The statistical analysis is informed by recent methodological work on multilevel analysis.[18] The health and family planning behavior of individuals and household demographic dynamics represent the fundamental units of analysis (see Table 4), with background characteristics of households serving as controls and treatment indicators as covariates. Characteristics of villages and thanas that may contaminate results in some way are introduced into the analysis as control variables. In this way modeling affords a test of whether treatments have an effect and, if so, the net magnitude of effects adjusting for background characteristics of villagers served by the project.[19]

Multivariate methods, while they are appropriate for the final analysis of the project, will be of little use in the research feedback process. Evaluation studies are planned that are simple to use and quick to implement and will provide continuous data on program functioning. Continuous research is part of the intervention, in that feedback of output information to Ministry col-

Table 4 Categories of sample registration system dependent variables and specific indicators measured

Variables	Indicators
Impact variables	
Fertility	Crude birth rates, age-specific rates, total fertility rates, and general fertility rates.
Mortality	Infant mortality rates, neonatal mortality rates, age-specific rates, "cause of death" data.
Intermediate variables	
Morbidity	Diarrheal episodes, measles.
Contraception	Current use by method.
Operational outputs	
Quantity of work	Frequency of client contact with MOHPC staff, by type of worker.*
Quality of work	Type and content of exchange.

*MOHPC = Ministry of Health and Population Control.

leagues is intended to stimulate change in the system.[20] Similarly, diagnostic research findings (to be discussed below) are to be shared with Ministry staff. A continuous flow of interim output information is reported to project participants through quarterly hand tabulation of routine sample registration system reports of operational research findings and birth and death rates by treatment areas. Thus the project data system permits routine areal analysis of time series data and rapid feedback to decision-makers.

Organizational Analysis

The theory embraced by the analysis of statistical data of program operations is predicated on the partitioning of sources of variation in individual behavior according to client characteristics and characteristics of exchanges between worker and clients. This partitioning process is not possible when operational problems are invariant in all areas. For example, resource constraints, formal rules, and structures that characterize the institutional environment cannot be analyzed in a statistical framework unless some change is introduced that is variable across study areas and can be posited as contributing to variation in health behavior. Training and counterpart support may produce changes in the informal characteristics of the organization or in the human resources of the project, but we chose not to try to alter the structure of the program in study areas. Thus analysis of this institutional environment must emphasize nonstatistical techniques of organizational research and analysis. This entails diagnosing critical barriers to implementation through participant observation of the elements of the Ministry system and monitoring diagnostic indicators over time.

The organizational analysis of program functioning, barriers to implementation, and change in response to the intervention requires an "open systems" approach in which the structure and functioning of the Ministry program is the focus of investigation.[21] This approach starts with the understanding that the family planning, MCH, and other preventive health programs organized by the Ministry do not function in a vacuum. They are shaped by the larger social, economic, political, cultural, and bureaucratic forces in society. What happens at one program level is not isolated from policies, decisions, and patterns of behavior at other levels. The systems concept emphasizes the interconnectedness and mutual causality of program elements and the larger context within which they function.

Specifically, the organizational analysis is guided by the following set of questions:

1 What is the nature, quantity, and quality of the organization's output? Some of these issues, as we have noted, are monitored by the sample registration scheme—number of contraceptors, prevalence rates, methods used, method shifts, immunizations, and utilization of oral rehydration therapy. Other issues are best researched through participant observation and analysis of program records—the quality of medical services, the quality and quantity of motivational and educational efforts, the quality of follow-up and immunization services.

2 How are clients recruited? This requires observation of motivational strategies, the role of client and worker sterilization allowances, the nature of relationships with villagers (extent of rapport, trust, hostility, conflict), and the degree of worker responsiveness to client needs.

3 How does the organization procure its physical and human resources, and how does it create legitimacy and support for its activities in the larger environment? This requires an inventory of financial resources available in study thanas and assessment of critical shortages; a review of logistics systems for medical supplies and contraceptives; analysis of personnel recruitment; and observations of efforts to solicit community support and exert political influence.

4 How are decisions made, conflicts resolved, activities at different levels within the organization coordinated, and supervision, control, and leadership within the local organization exercised? Is there meaningful interaction among staff about work issues? What is the quantity and quality of supervisory support? How are decisions made and what are the patterns of communication? Do lines of communication conform to lines of authority? Do subordinates communicate to superiors about task-related issues? How is information compiled and shared? Does information flow contribute to management control?

5 How does the organization mobilize the energies of the staff toward productive purposes? How are new members introduced and trained? How are nonproductive needs of the members of the organization provided for? Relevant issues to be explored are the extent of job motivation, the existence of rewards and sanctions for performance, the quantity and

quality of training, and the interpersonal relationships at various levels.

6 How does the organization adapt to changes in its environment? Research addressed to this issue requires analyzing responses to changes in the availability of resources (if any), and responses to changes in client needs and demands.

The organizational diagnostic activities summarized above are guiding the development of our intervention strategy. Panel data are collected to analyze the process of change in the Ministry system and to interpret the statistical analysis that we conduct at the conclusion of the project. More important, however, is the role of operations research in our implementation strategy. Lessons learned regarding the structure and functioning of the Ministry system and feedback to project participants are used to stimulate change and organization development.

Conclusion: Determinants of Program Success

We have described the intervention strategy and associated research plans that comprise the MCH-FP Extension Project. Implicit in this discussion is a theory of the determinants of the success or failure for programs designed to facilitate contraceptive acceptance and fertility and mortality decline.

Three sets of factors are hypothesized to determine the impact of a family planning and MCH project. First, there are the characteristics of the client population and its physical and social environment. Second, there is the interface between the client population and the organization seeking to provide it with services. This interface can be described either in terms of the specific health interventions or contraceptive services offered (e.g., IUD insertions, tetanus toxoid inoculations, or follow-up visits), or in terms of the contacts between the target population and the organizational staff. Third, the nature of the interface is determined by a complex set of factors relating to the nature of the organization (e.g., its staffing pattern, management system, or level of available resources). These organizational characteristics are a major indirect element in the overall set of forces determining whether a program will succeed.

Figure 2 posits relationships between project activities and the achievement of program goals. The relationships in Figure 2 are drawn from our reading of the experience in Matlab and the literature on organizational change and the determinants of demographic behavior.[22] On the right side of the figure, a chain of variables represents interrelated outcomes of the project. While the immediate goal of the project is to influence the health and contraceptive status of individual client families, the ultimate goal is to improve the well-being of the population by reducing fertility and mortality. This diagram thus represents a simplification of the full set of determinants of these outcome variables. The fertility and mortality experience of the population are, for example, influenced by many factors in addition to the use of contraceptive practice or the use of the specific health interventions offered by the project. Thus the diagram represents only a partial set of the determinants of the outcomes indicated in the last three boxes on the right.

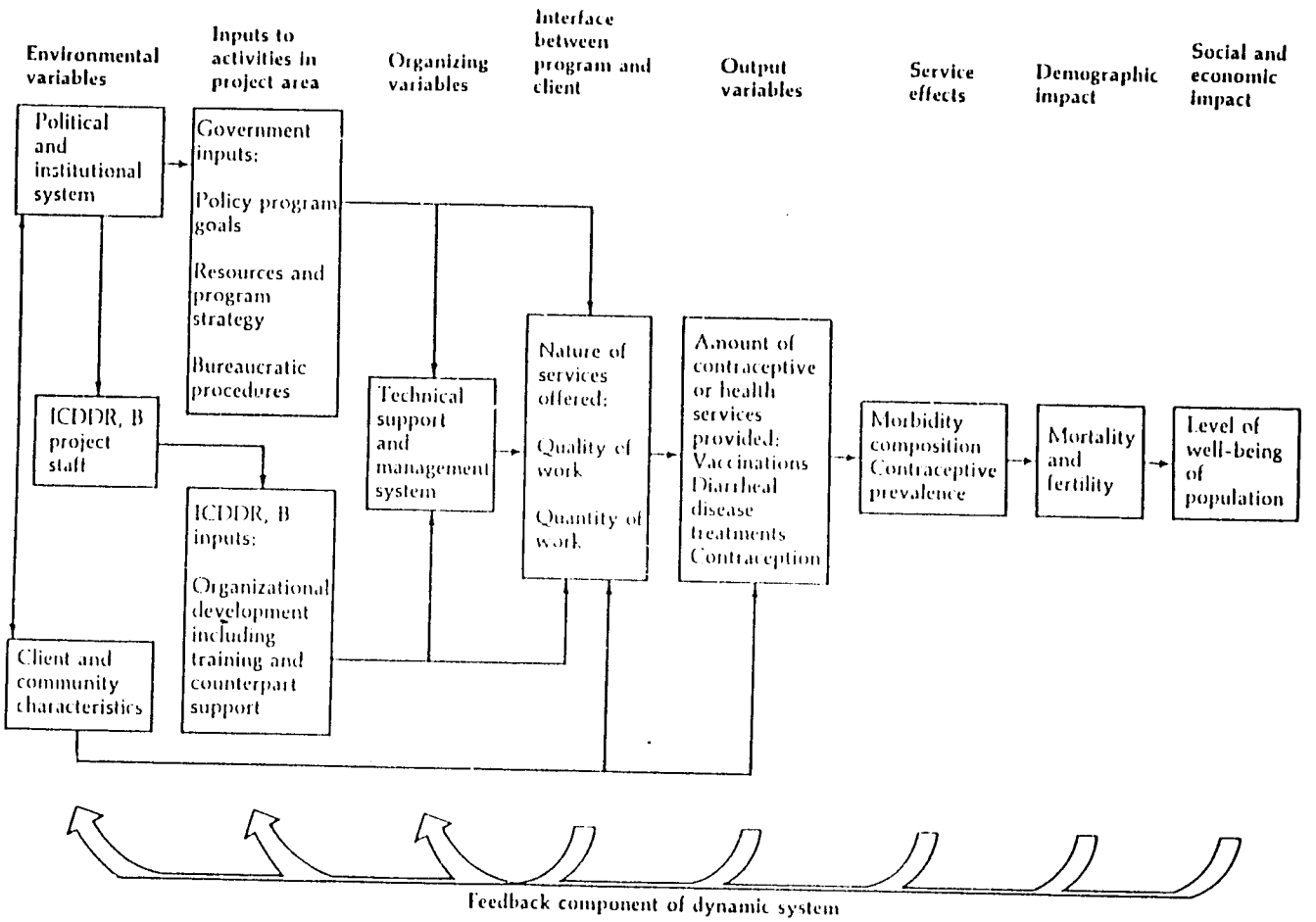
The determinants of contraceptive behavior and the specific health practices promoted by the project are specified more completely. Their direct determinants are the characteristics of the client families and the communities in which they reside, and the nature of the interface between the program and the client population. The client-program interface has three elements: the nature of the services offered by the program, the quantity of work done by the program staff, and the quality of the work. Each of these elements will influence client acceptance of contraception or health services.

The interface characteristics are, in turn, determined by the nature of the organization that provides the services. The most direct of these organizational characteristics is the technical support and management system that controls or influences the work environment of the program staff. In the discussion of Matlab, for example, we have argued that effective supervision and the provision of technical backup and referral services were important elements of program success. At one stage further removed, the organization is characterized by a set of conditions labeled "government inputs." These conditions are largely fixed from the perspective of an individual administrative unit like the thana, but they greatly influence its work. For example, the central government defines the goals of the program, the basic strategies to be used in achieving that set of goals, the resources that will be used to implement the strategies, and the bureaucratic rules under which the program is governed. All of these factors, in turn, are influenced by the larger political and institutional system of Bangladesh. For example, the general poverty of the country limits the resources available for a health and family planning program, thereby affecting all aspects of program operations and impact.

The role of the ICDDR,B in this process is also shown in Figure 2. With the encouragement of the senior government officials, it is using organization development techniques to influence both the working of the local management and technical support system and the nature of the interface between the program and its clients. Rather than augmenting program resources, the intervention aims to influence the way that the resources already available to the government program are utilized. The MCH-FP Extension Project is nevertheless constrained by the fact that ICDDR,B staff have less control of the inputs that go into the program in the project area than they did in the Matlab FPHSP.

The original Matlab experiment posited that a significant proportion of clients desire to limit or space childbearing, but lack contraceptive services for doing so. The experiment demonstrated that there is a set of

Figure 2 Determinants of the impact of the MCH-FP Extension Project



conditions under which a significant proportion of a rural Bangladeshi population will use contraception, and thereby reduce fertility. The Matlab experiment does not, however, address the question of how that set of conditions can be produced by a large-scale public sector program. The basic goal of the extension project is to assess the extent to which the Matlab experience can be replicated through the structure and resources of the existing government program. Whatever the outcome of the experiment, it will contribute to our understanding of the conditions under which health and family planning programs can improve the well-being of the rural poor.

Notes

Research and training activities of the extension project are supported by a grant to the ICDDR,B from the United States Agency for International Development. The authors gratefully acknowledge the assistance and collaboration of the Ministry of Health and Population Control of the Government of Bangladesh on service aspects of the project.

1 The thana is an administrative unit comprising a health complex and a police station serving a population of approximately 200,000. The 437 thanas of Bangladesh are grouped into 20 districts. A thana is divided into 8 to 15 unions each with a population of approximately 20,000–25,000. Unions are further subdivided into three wards.

2 The design of this project, the Contraceptive Distribution Project (CDP), and the lessons learned from it are discussed by Rahman et al., 1980. CDP impact is analyzed in a paper by Stinson et al., 1982.

3 This second project, the Family Planning Health Services Project (FPHSP), is described in the paper by Bhatia et al., 1980. The demographic impact of this project is discussed in Phillips et al., 1982. This analysis shows that prevalence rose from 10 to 32 percent in the first year of the project and remained constant at 32 percent for three years. In the fourth and fifth project years, prevalence gradually increased from 32 to nearly 40 percent. See Phillips et al., 1984.

4 See L.C. Chen et al., 1983.

5 Rob et al., 1983; and Akbar et al., 1982.

6 Research has shown that the addition of MCH components to a project of comprehensive family planning and minimal MCH services has not had an impact on family planning but that the caseload of child care in rural clinics is positively related to family planning prevalence in the locality where the clinic operates. However, addition of oral rehydration

therapy has been associated with a negative effect on family planning use. Thus, the relationship between MCH and family planning efficacy is complex. See Phillips et al., 1984.

7 See Bhatia et al., 1980; and Phillips et al., 1982.

8 For a brief discussion of these organizational weaknessess, see Planning Commission, People's Republic of Bangladesh, 1983, p. 349.

9 One other project in Bangladesh bears certain similarities with the extension project, but used special resources and employed direct project supervision of the Ministry staff. See Christian Council for Development in Bangladesh, 1980.

10 See, for example, the report of the Human Interaction Research Institute (HIRI), 1976. The report reviews several medical, agricultural, and industrial innovations in the United States and notes that the mean duration between the time of development to the time of public utilization was 19 years. Since this gap is not fully explained by technological problems, the report formally reviews factors that explain delay in the adoption of research findings.

11 Havelock (1969) has reviewed several projects and concluded that this incompatibility of costing is a critical problem. Costs to the researcher cannot be compared with the potential costs of the innovation to the utilizer. Several reviews of research and its utilization cite this problem as a barrier to transfer of innovation. See Davis, 1973 and 1971; Havelock, 1969; Glaser, 1973; and HIRI, 1976.

12 Structural differences between special projects and larger systems can represent an important barrier to utilization of project findings. See Lippitt et al., 1958; Miles, 1964; and Rubin et al., 1974. This is particularly problematic if the target organization defines the role of workers by emphasizing formally defined job descriptions (see Aiken and Hage, 1968), as opposed to formally prescribed goals and clearly developed mechanisms for achieving them (see Glaser et al., 1967).

13 Scientists testing hypotheses and theories, however, often have little to say that is directly relevant to administrative operations. See Van de Vall and Bolas, 1980. Thus the greater the scientific rigor (i.e., reliance upon theory) the less likely that social research will affect social policy. See Boalt, 1969; and McTavish et al., 1977.

14 See French and Bell, 1978, p. 14. For a discussion of organization development in health care, see Margulies and Adams, 1982.

15 Research on research utilization consistently shows that joint work fosters identification of research questions that reflect the needs of potential users of the results. See Fairweather, 1967; and Mackie, 1974.

16 Organizational research has shown that objective assessment of problems can facilitate organizational change. This assessment is termed "organizational diagnosis." See, for example, Chin and Benne, 1969; Bowers and Franklin, 1976; and Neff, 1965.

17 Collaborative research can be hampered by conflicting goals of researchers and practitioners. It is therefore important to minimize the risk of conflict through careful identification of reciprocal responsibilities. See Poser et al., 1964; and Mackie, 1974.

18 See Mason and Palan, 1978.

19 Given the sample registration system data at some point in time, and an output indicator, contraceptive prevalence, denoted P_i, a model for predicting use for individual i is:

$$\text{logit } P_i = X\lambda \qquad (1)$$

where X is a vector of variables for the individual, her household, and community, and λ is a vector of unknown coefficients representing the net contribution of each indicator on program impact, P_i. More specifically, X in (1) can be decomposed into individual, village, and service components such that

$$\text{logit } P_i = \alpha + \underbrace{\sum_{j=1}^{J} \beta_j C_{ij}}_{\text{background characteristics}} + \sum_{k=1}^{K} \gamma_k V_{ik} + \underbrace{\sum_{l=1}^{L} \delta_l T_{il}}_{\text{treatment variables}} \qquad (2)$$

where C_{ij} = the jth characteristic of individual i; V_{ik} = the kth characteristic of the village in which individual i resides; T_{il} = the project input indicator representing whether or not counterpart support or training was provided in the area where individual i resides; and where β, γ, and δ are unknown coefficients to be estimated by maximum likelihood.

Note that equation (2) can be expanded to include service variables and their interactions with program inputs and other variables, thereby testing whether the net effect of the quantity and quality of work is significant and where the effect of such variables is conditional on treatment.

With careful development of data on client worker exchanges, equation (2) can be expanded to include quality of work indicators and their interactions with treatment conditions.

20 Aggregate areal contraceptive prevalence statistics are therefore being shared with thana authorities. Baseline results suggest that program performance is low. This, in turn, has generated much discussion and planning in Project Implementation Committee sessions at the thana level. Service indicators of MCH are not yet available, but this information will also be shared with program managers.

21 A useful discussion of open systems theory appears in Katz and Kahn, 1978.

22 Note that the Figure 2 framework informs our specification of statistical models in equations (1) and (2).

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