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The Effect of Operations Research on Program changes in Bangladesh

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Abstract: *This article is based on the ten-year experience of an operations research project in Bangladesh. It assesses how, and under what circumstances, research-based advice and results of pilot projects contribute to change in large-scale public programs. It discusses project research on issues facing the national family planning program: recruitment and training of field-workers; delivery of injectable contraceptives; management information; field-workers' use of service registers; field supervision; satellite clinics; and contraceptive user fees. These issues are used to illustrate the advantages and disadvantages of a long-term institutionalized project, and to describe the diversity of means for communication with policymakers. The analysis shows that research, policy decision, and implementation can occur in any sequence. Policy advice that disrupts long-standing power relationships and organizational culture takes a great deal of effort to implement. Operations research can produce useful changes in organizational behavior, even when large-scale problems remain. (Studies Family Planning 1996; 27,2:76-87)*

The project described in this article, the Maternal and Child Health-Family Planning (MCH-FP) Extension Project in Bangladesh (1983-93), represents a model that is relatively uncommon: a program of applied research supported with long-term international aid funding and carried out at an international institution located in the aid-receiving country.

In proposals for operations research projects and in many reports of results, the implicit model of the process is a unidirectional sequence of research leading to advice leading to action:

Problem identification - Small-scale tests of proposed solutions - Decision - Large-scale implementation

Ideally the process would include analysis of implementation and continual monitoring, but these are often stunted. The most prestigious model of this kind of research is the randomized controlled trial of a new drug or medical device, with standard procedures (Phase I trials, Phase II trials) leading to the regulatory agency's straightforward decision to approve or disapprove the drug.

The MCH-FP Extension Project, as originally conceived, was meant to elaborate the second step of the sequence. The Matlab Maternal and Child Health-Family Planning Project of the International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) originally the Family Planning and Health Services Project (FPHSP)-had existed since 1977, testing program innovations delivered by a non-governmental organization (NGO). The Extension Project was devised as part of a government program to test the same innovations elsewhere in the country and produce recommendations for implementation nation-wide.

Within a few years, the Extension Project grew out of its dependence on the Matlab project as a source of testable innovations in service delivery. As the cases discussed below illustrate, it also rarely followed the simple sequence shown above. Although the main client for its research (the Family Planning Directorate of the Ministry of Health and Family Welfare [MOHFW]), the main funder (the Bangladesh mission of the United States Agency for International Development [USAID]), and the implementing agencies (ICDDR,B, supported by the Population Council, and, for a time, the University of Michigan) remained constant for ten years, the diversity of service-delivery problems that were the subject of research, problems in implementation, and the varying policy environment led to a profusion of different paths connecting research, advice, decisions, and implementation.

The MCH-FP Extension Project

The Matlab project began in 1977. Integrated family planning and MCH services were delivered to part of the rural area southeast of Dhaka that was covered by demographic surveillance systems originally set up for field trials of cholera vaccines (Bhatia et al., 1980). By 1982, contraceptive prevalence had risen in the Matlab treatment area to levels well above those in the comparison area, and above the national averages that had been recorded in surveys (Menken and Phillips, 1990).

The Matlab project was not designed as a pilot that could be replicated on a large scale. Matlab was and remains a research station where households are visited every fortnight for demographic and morbidity surveillance as well as for delivery of services. Its importance in the history of family planning in Bangladesh lay mainly in the demonstration that rural Bangladeshi women would use contraceptives effectively if they were safely, conveniently, and discreetly delivered by women from the local community. Many maternal-and child-health as well as family planning interventions have been tested over the years in Matlab to study their effectiveness in field conditions (Koenig and Strong, 1993). Services are delivered in the treatment area by ICDDR,B employees, carefully supervised by ICDDR,B managers, and supported by

supply and administrative systems not easily replicated in the government program. Community-based research on the efficacy of interventions was a necessary first step, but whether and how elements of the Matlab MCH-FP program could be transferred to the national family planning program also had to be determined.

The MCH-FP Extension Project was set up in 1982 (fieldwork began in 1983) to explore these issues. "Extension" was included in the name as an analogy to the cooperative extension services designed to spread the benefits of agricultural research to farmers. The impetus for such a project came as much from the government of Bangladesh as from the researchers; in fact, the Extension Project was in part an official condition for continued approval for the Matlab project. Two rural sites were selected, in Abhaynagar thana (administrative area) in Jessore District and Sirajganj sadar thana in Sirajganj District, where ICDDR,B researchers were to work with their government counterparts. They set about figuring out ways to introduce apparently successful elements of the Matlab program into the government services, without requiring much more than the resources available and without changing the overall rules governing lines of authority, recruitment, transfer, promotion, and pay (Phillips et al., 1984).

Salient features of the Extension Project design that have been kept over the years include: {1} field offices used as "policy laboratories"; {2} collaboration with government officers at both central and field levels; {3} demographic surveillance and periodic surveys at project sites, and, increasingly, qualitative research; and {4} a focus on implementation issues.

In recent years, much of the project's work has dealt with problems encountered in its field areas, with less emphasis on the original model of testing Matlab interventions and their derivatives. Examples include ways of organizing the outreach services of paramedics (called satellite clinics), ways to train and motivate supervisors, and ways to use available management information systems (MIS) data for local-level planning and decision making. These problems often do not have close analogues in Matlab, where services are organized differently and the management system does not have to operate under the constraints of public service.

Cases

The cases described below were selected to illustrate the range of topics on which project staff have worked and the range of different policy outcomes and problems they have encountered. (1) None of the following cases represents an unqualified success and none an unqualified failure, for policy research. Where research or pilot program results preceded a major decision in line with the

recommendations of the researchers, other factors can always be found to have contributed to the decision making, and other problems can be found to have arisen out of the solutions proposed by the researchers. Where results seem not to have led to a demonstrable policy change, an improved understanding or increased salience of the problem it addressed can usually be seen.

1. Recruitment and Training of New Field-workers

An early intervention was the provision of counterpart training from Matlab community health workers (CHWS) for their government colleagues in project sites, but the initial performance gains dissipated after outside support was withdrawn. The project attempted to improve the quality of the worker-client interaction through in-service training, with some success. However, a greater density of workers would have been required to provide increased coverage.

A basic problem for the family planning and health programs in Bangladesh has been the immobility of women. They are unwilling, or are forbidden, to travel far, or often, or for purposes that are socially unacceptable. This situation is changing, albeit slowly outside the cities (Balk, 1991). Women have not used fixed-site clinics adequately. In the 1970s, several NGO programs had shown that community-based distribution by itinerant female workers could succeed, among them the programs of the Academy for Rural Development in Comilla, the FPHSP in Matlab, and even its lesser-known predecessor, the Contraceptive Distribution Project (Caldwell and Caldwell, 1992).

Under the first two Bangladesh plans, female Family Welfare Assistants (FWAs) were hired and trained. By the mid-1980s, 12,000 FWAs were deployed, roughly three per union (averaging 20,000-30,000 in population). Research in Extension areas showed that women who lived far from the FWA's residence were less likely to use contraceptives than were the FWA's neighbors. (2) Other factors, including distance to the fixed-site clinics and some worker characteristics, mattered little (Simmons et al., 1988). This research, and the NGO examples, supported the conclusion that the employment of a greater density of workers would pay off, and that recruitment of workers specifically from the areas to be served was crucial, because workers would not commute far. (3) The government decided to expand greatly the number of FWAs (from 13,000 to 26,000, later scaled back to 23,500), and a consortium of donors agreed to fund the new positions.

During 1986-89, much of the Extension Project's technical assistance to the government focused on helping plan and implement recruitment and training of FWAs, and on ensuring the integrity of the hiring process, for a nationwide expansion of the work force (Hussein et al., 1991). This expansion made possible

a worker-client ratio that appeared to be practical for a bimonthly visitation round, though it did not approach the ratio in Matlab where workers make fortnightly visits.

An unusual feature of this case was the involvement of the project staff in implementation of the recruitment. Extension Project staff had advised against sudden expansion; in previous instances, recruitment on too large a scale had allowed serious abuses and swamped the training system. Project staff were posted to help division and district officials as each district in sequence recruited more workers. Their task was to make sure that the rules about publicizing the openings were followed and that the women hired met the job criteria (local resident, married, with at least a Secondary School Certificate). The project was responsible to the Director of Administration in the Family Planning Directorate for a special reporting system to monitor the nationwide progress of the recruitment. Project staff served on boards investigating allegations of irregularities.

The recruitment of the FWAs proved successful generally, in that the great majority of the women recruited exist, met the criteria, were trained, and are now on the job. The period in the late 1980s and early 1990s, when these additional FWAs began work, coincided approximately with an increase in contraceptive use. Much of the increase was accounted for by use of oral contraceptives, and most of the users reported the government as their source of supply, as shown in Table 1.

Table 1: Number of Government Family Planning Workers and Contraceptive Prevalence Rate, Bangladesh, for selected years, 1975-94

Year	Family Welfare Assistance(N)	Contraceptive Prevalence Rate (%)	
		All Methods	Oral Contraceptives
1975-76	(3,600)	8	3
1979	(12,200)	13	4
1985-86	(12,200)	25	5
1989	(18,200)	31	10
1991	(23,500)	40	14
1993-94	(23,500)	45	17

Note: By 1990, approximately 10,000 NGO field-workers, performing jobs similar to those of the government FWAs, were active in both rural and urban Bagladesh.

Sources: Cleland et al. (1994); (Bangladesh Demographic and Health Survey, 1993-94 1995)

2. Delivery of Injectable Contraceptives

Injectable contraceptives have proved to be acceptable among Bangladeshi women, despite common side effects including bleeding and Amenorrhoea. Since 1977, most of the growth in contraceptive use in the Matlab treatment area, and most of the difference between Matlab and the rest of rural Bangladesh, is now accounted for by the use of the injectable contraceptive DMPA (Caldwell and Caldwell, 1992). Among the reasons that workers and clients in focus groups commonly mention for the popularity of injectables are the prestige associated with injections (and with the people who give them), the convenience and effectiveness of the method, and the fact that delivery is fairly discreet and infrequent.

The addition of injectables may increase costs of materials for the program, though its long-term effects on all types of costs, and on program effectiveness, have to be estimated to facilitate policy choices. One major effort has been made to measure the cost-effectiveness of the Matlab family planning program; it showed that despite the heavy reliance on home delivery of injectables and the high ratios of workers to clients, the Matlab program compared favorably with the government program, since output per worker was high (Balk et al., 1988).

Home delivery of injectables was introduced in the Extension areas in 1985-86 and was followed by rapid growth in the contraceptive prevalence rate (CPR) in Sirajganj, the field site that had previously lagged behind the rest of the nation in contraceptive use. Pressure mounted for a quick expansion of this method of delivery, to the rest of the country. Non-governmental organizations working in family planning, for example, saw expansion of home delivery as a way to lift contraceptive use from the plateau that was feared when the results of the 1988 Contraceptive Prevalence Survey came out. Officials of the Family Planning Directorate were also eager to expand the program rapidly. Professional groups and the medical staff of the program itself objected that FWAs could not be trusted to screen and counsel clients correctly and administer injections safely on a large scale (whatever the results of a small scale pilot test). A national seminar in 1989 brought together officials of the Directorate, NGOs, donor agencies, and researchers, and adopted resolutions calling for a phased expansion (Whittaker, 1990). MOHFW officials agreed later to expand the program to eight thanas, which would allow time to put in place the necessary training and safeguards before a nationwide expansion.

This test was carried out in eight thanas where ICDDR,B had only a minimal field presence. Project staff monitored management, supply, and needle-disposal problems, and they estimated costs and the effects of the program on adoption and continuation (Rahman et al., 1993). Implementation was delayed three years, halted mainly while action was awaited from the Directorate office responsible for securing approval of the proposal from the Ministry and from development planning authorities. The field test that was approved and implemented differed from the original plan in that FWAs were not entrusted with the screening of clients or the provision of the first dose of contraceptive. More highly trained female paramedics (Family Welfare Visitors, or FWVs) were supposed to screen clients, and FWAs were to deliver the second and subsequent doses.

The implementation analysis showed that problems of supply and disposal of needles and syringes could be solved within the government system, and that no major problems were caused by unsafe technique. The development of self-destructing needles may further alleviate future safety concerns, and a plan for a large-scale field test of such devices has recently been approved. The number of women using injectable contraceptives doubled in the first year, but much of this growth has been attributed to method switching, rather than to the attraction of new contraceptive users, because overall contraceptive use did not increase in the eight thanas at so rapid a rate as it had in Abhaynagar and Sirajganj in the 1980s (Mirza et al., 1994).

A task force appointed by the government in 1994 decided to continue expanding the program slowly, but concerns about cost are still unresolved, and many in the government and donor agencies are more interested in expansion of the satellite clinic program (see Case 5 below) as an alternative to home delivery of services.

3. Targets and the Use of Management Information

The project worked for several years, at varying levels of intensity, with the Management Information Systems Unit of the Family Planning Directorate. This work has covered technical "supply-side" issues, such as developing a field-workers' record-keeping system and reducing the number of separate forms that were formerly required of thana offices. It has also covered managerial "demand-side" issues, exploring the uses to which basic indicators could be put at local levels (Ashraf et al., 1992).

One of the keys to success in Matlab had been the workers' ability to help clients dissatisfied with one method, or whose needs had changed, to switch to another method rather than simply drop out (Phillips et al., 1984). Workers were not judged on the basis of new acceptors or method-specific targets. Contraceptive

prevalence is not used in Matlab as a strict criterion for a worker's performance, although declines or persistently low levels do attract attention from supervisors. The emphasis on performance indicators is nuanced by the supervisors' intimate acquaintance with work conditions and the population covered. Such detailed local knowledge could help avoid the harmful consequences of a precise adherence to targets.

In the national program, until the late 1980s, workers were given method-specific targets, and officers could withhold the salaries of those who did not meet their targets. This system was loosely enforced; in practice, family planning officers had a great deal of discretionary power, and the threats of enforcement became a way for supervisors to extract salary kickbacks from subordinates. The system of method-specific targets was abandoned and replaced by a modified version of the CPR called the "contraceptive acceptance rate," for which the numerator is the number of new or continuing users recorded in the FWA registers and the denominator is the total number of couples known to the FWA in her area. The change probably resulted, in part, from the experience in both the Matlab and the Extension Project sites with the feasibility and benefits of ensuring clients greater method choice. The concerns of local women's groups, of NGOs, and of donors about the potential for abuse of the target system probably had an even greater effect on the decision, which followed a protracted battle about the payment of incentives to workers and clients for surgical contraception. Since the decision to abandon method-specific targets, fewer reports have been received from the field sites concerning abuses of this system and fewer complaints have been heard from FWAs and FWVs concerning the pressure they feel to achieve the targets.

However, having abandoned the target system, high-level managers still need an information flow to help them control this geographically dispersed program. The reported contraceptive acceptance rates bear little relation to the CPRs periodically measured in nationally representative surveys; little feedback was given to lower levels of management, nor was there a clear idea of who would do what in response to rising or falling indicators. Targets and reports of target fulfillment, despite their other faults, had at least given managers and subordinates something to say in their communications. They needed to be replaced with some other, more meaningful, system of communication about program performance.

The Extension Project worked with the MIS Unit of the Family Planning Directorate to improve reporting, mainly by simplifying and consolidating formats and helping to devise and test feedback reports. The theory was that program simplicity and greater feedback would increase both the ability of lower-level officials to obtain accurate reports and their incentives to do so (Ashraf et al., 1992). A promising intervention, now in place in one project site

and one non-project thana, relies on workers and supervisors at several levels meeting with each other to use local problem-solving data that were formerly reported routinely only to the higher levels. The workers and supervisors discuss performance and set up action plans, making specific requests for support from higher levels of management. The results showed that these meetings were useful if they received the support of thana family planning officers, the key internal communicators (Hasan and Maru, 1993).

4. Use of Registers and Screening Algorithms

To help family planning clients make informed choices, workers need to know something of their contraceptive and health histories. A register was devised for the FWAs to use to promote continuity of care (for side-effect management, work planning, and referrals); it was also used to keep records for reporting and for supervisory purposes. The register was modeled on the record book used by the community health workers in Matlab, modified to reflect the different tasks of the government workers. The FWA register was tested in Extension Project areas and adopted nationwide in 1990.

The effort of simplifying and organizing the information used by the workers in counseling clients about method choice bore disappointing results. The training curricula and manuals presented inconsistent lists of contraindications for particular methods. In practice, the FWAs rarely asked questions of a client that would uncover any contraindications or that would otherwise test the suitability of a method for her. Project staff, therefore, translated lists of contraindications that had been agreed upon by an interagency working group into relevant questions set forth for clients in a logical sequence. Other agencies argued that separate algorithms were needed for each method, and considerable effort went into testing various alternatives in the field. The single algorithm seemed to work better than separate ones, and it was added to the revised FWA field book. However, in subsequent field observations, FWAs were never observed to refer to the algorithm, nor did they ask--the questions of clients, in any sequence. In some cases, the FWA might be expected to know, without asking, a neighbor's age and parity, or whether she smoked. But the workers' failure to ask questions explicitly also may have resulted from the lack of incentives for adapting methods to clients and from the FWAs poor understanding of the importance of alternative methods.

5. Improved Supervision

Noteworthy elements of the Matlab MCH-FP program have been continuous in-service training and close and supportive supervision of the field-workers. The management team at Matlab has been stable and highly motivated. Managers

receive detailed, timely, and accurate information about family planning and immunization coverage from the Matlab Record-Keeping System. Such conditions are rare in the government program. At the Extension Project, much work has been devoted to finding ways to strengthen management and supervision, particularly at the lower levels (Koblinsky et al., 1989).

Simple checklists or diaries of salient points with which supervisors should be concerned have been developed and field-tested for the Senior Family Welfare Visitor, who supervises paramedics working in the fixed-site and satellite clinics, and for the Family Planning Inspectors (FPIs), the fund-level supervisors of the Family Welfare Assistants. (Most FPIs are men who were hired originally as field-workers before the recruitment of female FWAS.) Use of these checklists, or the supervisory training they embody, cannot be guaranteed. But they serve as signals to the supervisor and to the worker of the points that the program designers think are important.

Results have been mixed. Managers have often adopted one element of a package enthusiastically and ignored the others. In the case of the supervisory checklists, they were accepted, but the changes in supervisory behavior that they were meant to facilitate did not occur. Those supervisors who wanted such a tool often found that to be useful. Checklists and diaries have always proved to be popular with senior managers as non-disruptive reforms, but in the absence of more basic changes in power relations and organizational culture, they have not proved significant.

6. Satellite Clinics for Health and Family Planning

The immobility of women has been the besetting problem for safe motherhood and other women's health programs, as well as for family planning. In an effort to make both MCH and clinical contraception more accessible, the MOHFW mandated in 1985 that family welfare visitors-women paramedics assigned to Family Welfare Centers serving populations averaging about 30,000-should leave the fixed-site clinics eight times a month to hold one-day satellite clinics in clients' homes or other buildings scattered around their catchment areas. To increase their convenience (and to make attendance possible for women who need to have a child-health excuse for traveling outside their villages to attend to their own concerns), the Family Planning Directorate mandated in 1988 that satellite clinics be held at the same place and on the same days as immunization outreach sites.

Research revealed that effective catchment areas for the fixed-site clinics had a very small radius, and that the clinics were underused. These findings may have affected the decision to institute satellite clinics, but the results of the research

appeared mainly after the decision had been made. Feedback from field sites indicated that FWVs were not holding the prescribed clinics. Clearly, supply and transport were crucial to the effort. FWVs had to share their medical supplies with male colleagues at the clinic, and when they went out to satellite clinics they were taking along a haphazard assortment of available stock. Almost by definition, the satellite clinic locations were at some distance from the fixed-site clinics, and FWVs could not be reimbursed for travel expenses. Travel allowances for trips of less than five miles were precluded; if FWVs were given travel allowances, all government workers would demand them, an expense that could not be borne.

Joint scheduling of satellite clinics and Expanded Program on Immunization spots did improve attendance but was difficult to arrange without outside initiative (Sullivan et al., 1993). Joint scheduling required an advance exchange of information between the health and family planning officers (and required that one of them agree to accept at least some of the sites chosen by the other). Frequently, the two officers did not cooperate with, or even speak to, each other because of intra-organizational strife.

The Extension Project devised several solutions to these problems. Checklists of necessary supplies for preventing or treating the most common diseases, and for family planning needs were worked out, and special kits were developed to ensure that the FWV had separate, portable supplies in appropriate quantities. These kits also simplify the task for the logistics directorate, and the World Bank Population and Health Project has recently allocated funds for greatly increased procurement of the kits.

Project staff, with active cooperation from local administrators and elected officials, worked out a scheme whereby rickshaw peddlers provided transport to FWVs twice a week in exchange for the personal use of a rickshaw on the other days and the promise of eventual ownership. This scheme had several desirable features; it reduced the amount of available expense money (its use open to numerous abuses) passing through the system; the male rickshaw peddler served as a security guard for the women workers traveling far afield; and the peddlers had an incentive to show up for work and maintain their vehicles. (Previously, bicycles and motorcycles that were provided directly to workers disappeared or were not maintained.)

Project reports and briefings helped call attention to the transport problem, but the policy finally adopted did not resemble any of those tested in the Extension sites. MOHFW officials argued that the provision of transport in-kind would be administratively difficult on a large scale, and could lead to labor disputes with rickshaw peddlers who would lobby for civil-service benefits. The Ministry and

the World Bank Consortium agreed on a fixed reimbursement of 100 taka (\$US2.50) per clinic, to be paid to the FWV for transport costs, for incidental supplies, and for payment to a cleaner. Since June 1993, implementation of this plan has been inconsistent. FWVs report that they are not receiving the money they were promised, and other cadres have been angered by what they see as favoritism.

7. Fees for Condoms

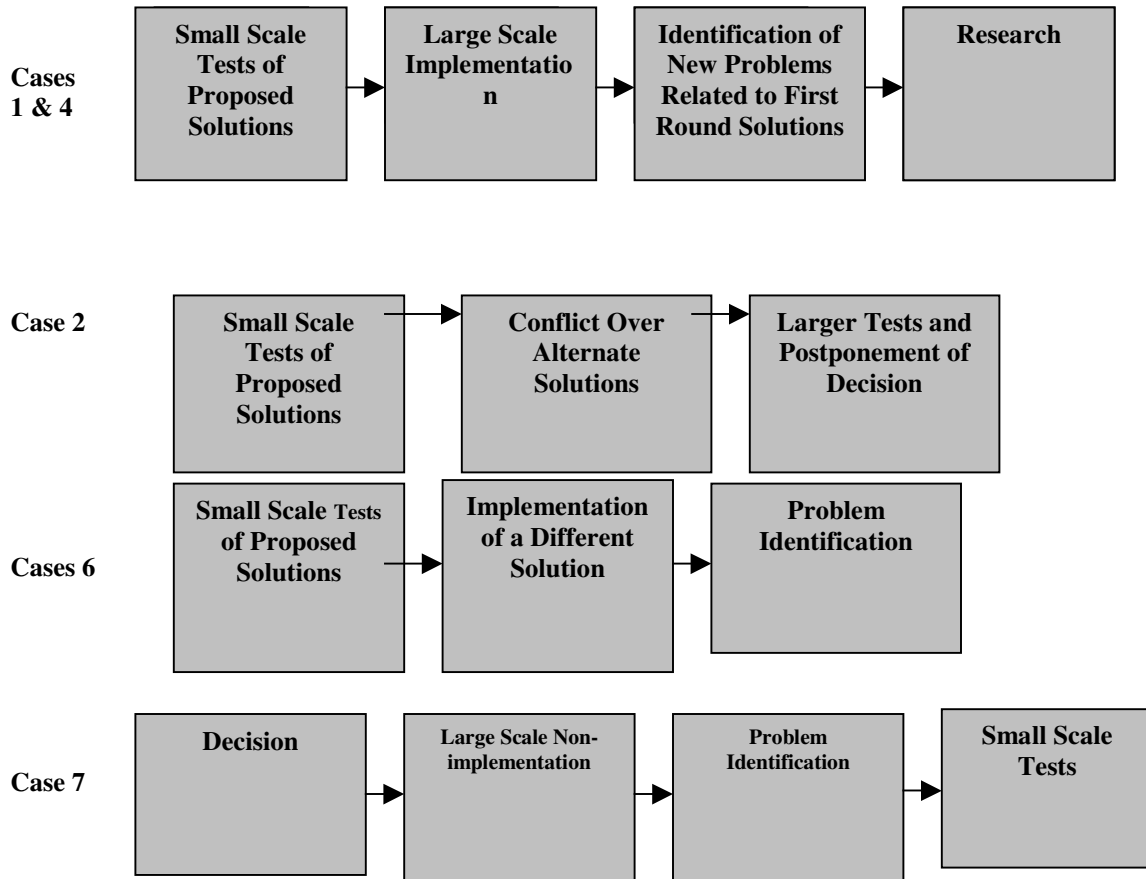
In June 1990, the Family Planning Directorate instructed FWAs to begin charging 1 taka (later reduced to half a taka) per dozen for condoms, which had previously been distributed free of charge. The government and the donor agencies had been discussing charging a fee for contraceptive supplies for years, and a private research institution (URC-Bangladesh) had been engaged to test condom and contraceptive pill pricing on a small scale, but the 1990 decision to introduce fees nationwide was an abrupt one (Barkat-e-Khuda et al., 1991).

Some project staff had participated in the general policy dialogue about this issue, but the project had conducted no research on user fees before the decision was taken. However, because the project had in place both a system of demographic surveillance and mechanisms for collecting independent feedback from FWAs before and after the charges were instituted, implementation of the decision to charge could be monitored, and the impact of fees on condom use could be evaluated with a crude before-and-after design. Some of the problems identified by workers could have been avoided had there been greater lead time before the directive was implemented. Many women were angry when they were charged without warning for a commodity previously distributed free (Nessa et al., 1991). A profound public mistrust is created when government workers demand money for previously free services; in this case, clients naturally, though mistakenly, assumed that condom pricing was another instance of improper charges. The short-term effects on condom use as measure demographic surveillance systems in project areas were small: The rate of condom use had been lower than 1 percent of eligible couples both before and after the charges were introduced. This case proved to be one in which service statistics alone would have been misleading; Service statistics for the same areas show condom use to be around 5 percent, falling to just over 1 percent at about the time that workers were required to collect money for the supplies that were distributed (Nessa et al., 1991).

Inferences about Research Design and Strategy

The model presented at the beginning of this article the idea for an innovation leading to small-scale testing leading to implementation-has often been supplanted in practice by variants (see [Figure 1](#)).

Figure 1: Various Pathways Whereby Ideas for Program Innovations Can Lead to their Implementation, With Reference to the Cases Described in the Text



No single algorithm can describe adequately more than one or two of the cases. A consistent sequencing of research, decision, and unplementation has not been found.

Changes in the Treatment During the Tests

Except for small, discrete alterations of existing routines, the innovations tested in field trials are rarely exactly the ones that were originally proposed for the test. The situation for operations research differs greatly from that of randomized controlled trials of new drugs, where researchers are fairly confident that they

know which drug was tested. In Case 2, the protocol adopted for large-scale delivery of injectables (in, which FWAs were able to deliver only the second and subsequent contraceptive doses) represents a compromise between a complete reliance on FWAs that the earlier tests had suggested was possible and the complete exclusion of FWAs that the medical society and some policymakers would have preferred. In Case 6, the transport problem was dealt with by the adoption of a policy different from the ones that had been tested in the field trials that brought the issue to the fore. In Case 1, the Matlab model relied on workers with at least eight years of schooling, and even this requirement may not have been crucial for their effectiveness (as Caldwell and Caldwell 1992 argue). The government adopted as a criterion the Secondary School Certificate (SSC), requiring ten years of schooling, and imposed a written test that included an English-Bangla translation to ensure that candidates still had the skills they would have needed to pass the SSC. Nothing in the job of the FWA requires knowledge of English, or so much schooling, which is rare among rural women older than 25. Between 10 and 20 percent of candidates who were apparently suitable otherwise were excluded for not having passed the written test, even in parts of the country where FWA vacancies are still a problem. The MOHFW was concerned that FWAs be comparable in status to the (male) health assistants, and the SSC is administratively easier to implement than a lesser qualification (typically, no certificate is awarded after eight years of schooling).

If researchers were to insist on adhering to a test's original design, the goal of increasing the sense of ownership of the research by its intended audience would be lost, and the test would be doomed to failure. Policymakers have multiple objectives to fulfill, and they take advice selectively. The important lesson for researchers is to prepare for this selectivity by producing interval estimates rather than point estimates. (4) The relevant question is rarely "What is the most effective feasible package of interventions?" More commonly, it is "What would happen if we do more of this and less of that?" and "We can finally agree on the following package; will it improve the existing situation?" If field trials are over specialized to investigate the one or two alternatives the researchers first had in mind, they will not answer these latter questions efficiently.

Involvement of Researchers in Implementation

Of the cases described above, project researchers were most involved in implementing the work of recruiting an expanded force of FWAs. The involvement of the outside research organization likely limited corruption in hiring. Salary kickbacks and workers' purchasing informal exemptions from residence criteria are still problems (Haaga and Maru, 1993), but at least the objective hiring criteria were implemented during the recruitment (Rahman et al., 1991). This substantial involvement in recruitment, however, occurred at the

expense of the diversion of project leaders' time and attention, as they recruited, managed, and then disbanded their own widely dispersed work force that was largely disconnected to the project's other activities.

The supporting role played by project staff in recruitment has had parallels in other sectors of Bangladesh, notably the Expanded Program on Immunization. In this program, workers and officers from the Bangladesh Rural Advancement Committee, CARE, and other NGOs were virtually paired with government counterparts to offer support and encouragement, to solve problems using their own organizations' resources when the government system broke down, and even to shame their colleagues into doing their jobs. This instance can be considered a "facilitation model" of policy implementation, in which an organization in the public sector is motivated and assisted by an outside agency to implement a charge that may have been mandated already. This model may be particularly useful in a rigid administrative context where change that is initiated entirely from within the bureaucracy may not be feasible (Maru et al., 1987). The goal is to employ outside facilitators to ease incorporation of the program into the routine practice of the large organization and then to reduce and eliminate the role of the outsiders. This procedure may be more effective than the usual abrupt 'transition from small-scale demonstration to large-scale policy (Pyle, 1980), but the crucial test remains whether the program becomes part of the organizational routine.

Problems in Maintaining Quasi-experimental Designs

The Extension Project originally copied from its parent in Matlab a quasi-experimental design, with treatment and comparison areas (Phillips et al., 1984). In a natural setting, without massive interference in all sorts of government operations, maintaining such a distinction is difficult. In the Extension Project, the treatment consisted of many different efforts at organizational change, continuously adjusted as problems were encountered. When public services are delivered in widely dispersed settings, typically with no direct supervision, workers have a great deal of autonomy, no matter how detailed their formal job description may be. Rather than adhere rigidly to a research protocol, workers do what makes sense to them.

Sometimes developments beyond researchers' control upset the design. Fairly early in the testing of changes in supervisory practices in Abhaynagar, the thana family planning officer, an enthusiastic and effective manager, was transferred, as it happened to Fultala, the comparison area. He proceeded to introduce in his new post many of the changes he had implemented in, Abhaynagar, including the attempt to use volunteers for outreach. Increasing the difficulties, the new officer in Abhaynagar was clearly uninterested in management innovations and

regarded the presence of the Extension Project in his new post as a nuisance. This could have been an opportunity for a crossover experiment; but that did not work out neatly.

Threats to the research design were more subtle, and they endangered the generalizability of findings. Continual interventions were required, in large and small ways, to keep the system working well enough to test a treatment. For example, during the test of field workers' home delivery of injectable contraceptives in Abhaynagar and Sirajganj, ICDDR,B staff had to intervene many times to remind local officers to order more DMPA and needles as supplies ran low. Because injectable use was unusually high in these thanas, the routine formulas used by warehouse managers to decide how many syringes and how much DMPA to send to a thana of a certain size always resulted in shipments that were too small. Sometimes ICDDR,B vehicles had to be used to fetch supplies from the regional depot. For each such instance, the ICDDR,B staff decided that such an intervention was necessary. Otherwise, no test of home delivery could be made, and all that could be learned would be that home delivery of injectable contraceptives does not work when there are no injectable contraceptives. The problem with such an intervention is that the generalizability of the results is not clear. Did the treatment consist of "home delivery of injectables through the government system" or of "home delivery of injectables through the government system, augmented by special logistics and supervision"? Partly in order to resolve this ambiguity (and also because of constraints in training capacity and of problems with the safe disposal of needles), a further testing phase in eight additional thanas was undertaken, rather than large-scale expansion.

However, large-scale testing can create its own momentum, as the research design is forgotten and the new practice becomes part of routine. Home delivery of injectables has proved popular among clients, and among the FWAs in the demonstration thanas, who feel that it is an enhancement of their role and their professional authority. NGOs have petitioned successfully for permission to continue home delivery of injectables in some of the areas for which they have the responsibility for service delivery. An innovation tried on a scale large enough to give a realistic test of implementation problems is also an innovation on a scale large enough to attract both support and opposition, inside and outside the organization being studied. The experimental nature intended originally for the expansion phase may be lost in the process.

Communications with Policymakers

The Extension Project relied on a variety of methods for communication both in setting the agenda and disseminating results; different methods have been more

effective at different times (Koenig and Whittaker, 1991). One of the advantages of continuity, of institutionalizing operations research rather than conducting a series of discrete projects, is that avenues of communication are built over time. For example, research results often reach top managers and policymakers, not so much in the written report or even the executive summary or briefing, but in the form of speech writing, staff work for aid negotiations, and participation by researchers in committees and commissions. Effective communication with policymakers has often been mediated through others. Several Bangladeshi NGO leaders and researchers, for example, serve regularly on advisory and oversight committees for the government and have influence on decisions without having a place in the hierarchy. Ensuring that such people know about research results, and soliciting their views on the research agenda, is often a more effective tactic than communicating with transient and preoccupied officials.

The top jobs in the Family Planning Directorate (Director-General and Director level) have almost always been filled by insiders from closed, technical-service cadres. Policymaking positions above them in the Ministry (Secretary, Additional Secretary, Joint Secretary) have usually been filled by generalist civil servants, who are transferred at least every three years. The fairly rapid turnover both in the Directorate and in the Ministry means that policy advisers are typically reporting results to someone whose predecessor agreed to, or commissioned, the particular study. Some issues are hardy perennials, of course, in which it is safe to invest considerable effort, because anyone in the policymaking post will be interested eventually. But often, turnover in the intended audience can set things back, especially if the task of the researcher is to call attention to a neglected problem of implementation.

One of the common failings of large organizations that is particularly apparent in the public sector in South Asia is the inability of those at the top to obtain accurate information about performance from lower-level officials or from the outside world. Formal reports tell them what the people writing the report want them to know. Their rare visits to the field are highly orchestrated events. Independent research institutions, when they are trusted, can help the reflective manager by creating an alternative channel that bypasses the intervening layers of officialdom. In the family planning sector, researchers may have a particular role to play in keeping clients' and workers' concerns to the fore. In the early stages of the project, this role was formalized. Extension Project researchers convened discussion groups among workers who would be affected by, or would be expected to implement, proposed directives. Their anonymous reactions were reported to the top officials responsible for issuing the directives.

One of the most effective methods of communication has been researchers joint visits to project sites with high-ranking officials from the government or from the

donor agencies. Once a trip is under way, the researchers and policymakers have time to talk about questions of research and policy and to lobby each other. Land, air, and river travel are all frequently disrupted by storms, floods, and mechanical failures, so the opportunity to talk invariably turns out to be greater than the time that was so scheduled. The immediacy and clarity about things learned on field visits seems to influence not only foreign aid officials but also the Bangladeshi officials whose day-to-day responsibilities and experiences are removed from village or slum life.

Integration of the health and family planning wings of the MOHFW, for example, is a long-standing concern of aid donors. Proposals for integration (or "functional integration") are staples of project documents and supervisory missions. Everyone expresses support for the idea in principle, and difficulties and conflicts of interest are generally expressed in muted terms at formal meetings in Dhaka. But the depth of feeling about the issue has been most clearly displayed for officials of donor agencies and researchers during field visits. Practical concerns about who gets to write whose evaluation report, and who handles whose pay packets, and who controls what buildings and vehicles and supplies, are expressed in ways seldom heard in policy discussions in the capital city. The obvious danger, to which both researchers and policymakers succumb, is an overgeneralization of such concerns from the one or two instances encountered on field visits.

Does Applied Research Matter?

Does applied research affect policy change enough to justify its costs, or do research results merely provide rationalizations for decisions the policymakers were going to make anyway?

Policy advice that is consonant with existing power relations (between layers of the hierarchy, or among functional units) is the easiest to implement. Policy advice that disrupts long-standing relationships is especially liable to remain mere declaration. A record of frustration has been made in attempts to change front-line supervision from an exploitative to a supportive role (Case 3) or to mobilize male family planning inspectors for more work. These changes threaten long-established power relations and accepted, although illegal, practices for work avoidance and the transfer of money. Over the years, the Extension Project has had little influence on the issue of integration or separation of family planning and health services, and has served mainly to generate ideas for working around the problem. On such topics, researchers can give the organization's leaders ideas for what could be done after the organizational culture is changed, or they can document some of the costs of leaving the culture

as it is. Ultimately, however, leadership, not research, determines the pace and extent of change in organizational culture.

In the cases discussed above, perhaps the greatest effect that research had upon a truly momentous decision was in the expansion of the work force of female field workers. Research on patterns of contraceptive use, experience in both the government and NGO services with female community-based distribution workers, and research and observation showing that female workers could be effective in rural Bangladesh, all contributed to the willingness of the government to expand this cadre and of donors to pay for it. Expansion in itself did not require any serious change in the organization's culture or threaten existing power relations. But the willingness of the MOHFW leadership to change the methods of recruitment did require a serious commitment to change. Agencies are not always simply concerned to expand (Wilson, 1989) and even when they are, choices must be made about which parts of the agency should be expanded and how to sequence expansion. Project research, feedback from the field, and technical assistance improved the way the decision was implemented.

Operations research often concerns adjustments to programs and deals with issues of policy implementation rather than with great policy questions. A pipeline of good ideas often exists for public-sector programs in poor countries, corresponding to the pipeline of unspent aid money. What is in shortest supply is usable, context specific knowledge of how to translate general admonitions into behavioral changes within organizations. What is needed from research is not originality (adding to the pipeline of good ideas) so much as clarity and applicability. The ideas that have an impact are those with instructions attached for the users. Finding a one-to-one correspondence between results of discrete research projects and policy decisions is often difficult. For any one issue, change may seem agonizingly slow. With a long view and a broad one, progress is apparent. Dean Inge, the English cleric, once wrote that the best time to influence a child's character is one hundred years before he is born. Research-based policy advice may work on a more rapid time scale, but similar patience is required of its practitioners.

Notes

(1). A similar procedure, using eight cases from health and family planning programs in Taiwan, was used to good effect by (Cernada 1982) in a study of the uses of research.

(2). Reverse causation could account for this finding, of course. Women from areas with high contraceptive use might be more likely to become FWAs. But the

interpretation that proximity caused more contact was supported by direct observations of FWAs at work.

(3). The immobility of workers is, in large part, the obverse of the immobility of clients: Women do not travel far from where they are known, even for paid employment (Koenig and Simmons, 1992). In addition to their serious concerns about respectability and safety, women can travel only a short distance from their homes in the morning in order to return in time to prepare the noontime meal.

(4). In Case 7, for tracing the demand curve for contraceptives, estimates of elasticity's along a significant portion of the curve in different market segments is preferable to an estimate of the arc elasticity between prices of zero and 1 taka per dozen. The question "What about 2 taka per dozen?" is almost certain to arise.

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