

Translating Pilot Project Success into National Policy Development : Two Projects in Bangladesh

*The Matlab and Maternal/Child Health and Family Planning
Extension projects prove that change
can be induced even under difficult circumstances*

By James F. Phillips*

Prescriptions for policy change pervade the research literature on population programmes. While the audience for such conclusions may be receptive to the wisdom imparted, established bureaucracies resist systemic renewal and reform. Even if policies are modified in response to research, the promulgated changes often fail to influence what public-sector programmes actually do, since bureaucratic traditions outweigh reasoned responses to research outcomes.

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This is particularly problematic where programmes have matured as complex bureaucracies before an operational model has been developed with demonstrable potential for making an impact on fertility dynamics. For research in such settings to influence implementation, findings must identify not only what ought to be done differently, but also how bureaucratic change can be induced and sustained.

That much of the applied research in population is never, in fact, applied to policy development is well known: operations research, however well targeted on practical organizational issues, often fails to affect operations. Policy research findings, however well focused on relevant policy themes, often fail to overcome the bureaucratic inertia of public-sector programmes. Nonetheless, eliminating the gaps between research, policy and implementation is rarely the subject of systematic inquiry.

The studies in Bangladesh reviewed in this article address the need for a paradigm that not only conducts operations research, but also fosters its utilization. The literature on this theme spans the fields of organizational theory, change and development with applications in the fields of agriculture, manufacturing, commerce and human services.^{1/}

While even a cursory review is beyond the scope of this brief report, the experience of two studies in Bangladesh have been informed by this perspective and may be relevant to research planning and population policy development elsewhere.^{2/}

For three decades, Bangladesh population policies have aimed to reduce rates of rapid population growth through the dissemination of contraceptive services. Although modest increases in contraceptive prevalence have been reported in recent years, demographic impact has fallen far short of official goals.^{3/} Debate focuses on the question of whether this experience represents a policy failure – suggesting that the reliance on contraceptive services is a misdirected effort, or an implementation failure – suggesting that existing demand for services is inadequately addressed by the national programme.

Reliance on research to resolve such fundamental issues has been minimal, not only in Bangladesh, but also in similar settings where the central direction of policy is the subject of discussion and debate. Moreover, where implementation has failed and where operations research is thus presumably needed most, research results typically contribute least to programme development. Weak implementation capabilities are associated with weak capacities to utilize research. Piecemeal prescriptions for change in non-functioning systems are contravened by the broader institutional malaise that operational tinkering is intended to resolve.

What, then, can be done to develop non-functioning programmes in settings where demand for contraceptive services is limited? No setting is more appropriate for investigating this question than Bangladesh. With a population that currently exceeds 100 million, and annual growth rates that exceed 2.5 per cent, it is the most densely populated country in the world, and among the poorest.

Bangladesh's social and economic institutions perpetuate high fertility; natural calamities, political upheaval and economic adversity perpetuate these institutional constraints to the modernization of reproductive behaviour. Although recent evidence suggests that contraceptive prevalence is increasing, the modest changes observed are consistent with the view that contraceptive services will not succeed in Bangladesh because the institutional climate is unfavourable to widespread fertility regulation^{4/}

Quite apart from the societal constraints to the demand for contraception, there are severe organizational constraints to effective service delivery: outreach is sporadic, supervision is weak, staff training is poor, the range of available methods is limited and paramedical support is inadequate^{5/} Structural problems obfuscate lines of authority and weaken co-ordination and control.

Officially, the Bangladesh Government has a multisectoral multimaterial programme with components addressed to demand generation as well as contraceptive service delivery.^{6/} The resources and activities of the national programme are nevertheless concentrated in the Family Planning Division of the Ministry of Health and Family Planning, where links to the health delivery system, the political system and development resources are weak. The structural changes introduced over time have more typically involved the adding of components and functions to the bureaucratic vestiges of earlier policies, than the restructuring of operations in response to research.^{7/}

This pattern of uninformed programme evolution changed with the development of the recent Third Five Year Plan. Research findings from two rural projects informed changes in the national policy process, and subsequently guided the implementation of revisions in the Ministry's programme.^{8/} Taken together these projects and their contribution to the Third Plan constitute a research paradigm that may be termed "implementation-based policy development."^{9/} The design of these projects, their contribution to policy and the lessons from this experience are reviewed in this article for applied research activities elsewhere.

Developing a service model

For operations research to foster planned change where programmes have been developed prematurely, an operational model is needed that generates

commitment to undertake change by providing a credible alternative to existing operations. Such a working model is exemplified by the Matlab Project.

Origins of the Matlab Project

Established in 1977 as an experiment to ascertain whether family planning services could succeed in unfavourable societal contexts, Matlab functions as an autonomous project, isolated from the formal government bureaucracy and insulated from operational constraints which hamper implementation. This isolation was necessary to protect the logical integrity of the design: demonstrating success in Matlab would require research showing the existence of contraceptive demand that can be activated with an appropriate system of supply. Demonstrating that services fail would require a design that minimizes the range of interpretations of failure, and hence an experimental system of supply that is sufficiently rigorous as to lay to rest arguments that failure arises from flawed implementation.

Matlab is a field research station of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). Located in an isolated rural riverine subdistrict 35 miles to the south of Dhaka, Matlab is in many respects typical of the ecological, social and economic situation in the vast deltas of the Meghna and the Padma rivers. Economic deterioration, famine, political upheaval and environmental adversity have prevented the development of towns, slowed the introduction of modern amenities and social services, perpetuated poverty and sustained high mortality. These adverse circumstances nevertheless enhance the importance of Matlab research, since success there lends credence to the hypothesis that family planning can work, even in unpromising societal settings.

Research on contraceptive service delivery in Matlab was not initially successful, however. An earlier project, known as the Contraceptive Distribution Project (CDP) was conducted during the period 1975 to 1977 to test the hypothesis that household distribution of oral contraceptives would reduce fertility.^{10/} Although services failed to affect fertility,^{11/} the CDP experience guided the design of the second Matlab project.

Thus, to understand why the Matlab Project succeeded, it is important to understand why the earlier experiment failed. Owing to its emphasis on contraceptive technology, the CDP design minimized the role of supply-side sociology.

Social research for developing the service delivery strategy was minimal, so that the organizational structure, staffing pattern, training programme, service regimen, information systems and supervisory system were based on imported ideas of what would succeed rather than diagnoses of what works in the

Bangladesh social context. As an inappropriate supply system, services generated controversy rather than behavioural change.

Use prevalence initially increased, lending support to the notion that demand was present, but prevalence soon declined, and returned to pre-project levels within 24 months, suggesting that the CDP system of supply could not sustain lasting behavioural change. The demographic failure of CDP demonstrated that “supply” is not simply the provision of pills; instead, it concerns the complex science of interfacing of service systems with social systems.^{12/}

Matlab Project design

In the Matlab Project experiment, special services were introduced in 70 villages with a baseline population of 89,350 and demographic dynamics were monitored in a neighbouring 79-village comparison area with a baseline population of 85,596. In the comparison area, usual government services were provided, and social, economic, and demographic conditions were otherwise comparable to those in the treatment area villages. Since October 1977, all currently married women in the treatment area have been visited twice a month, consulted about their contraceptive needs and provided with contraceptive care. Basic health problems are addressed by maternal/child health (MCH) outreach, and referral services are available at nearby clinics. In the initial project period, health care was family planning support oriented, but with time the service regimen has been expanded to incorporate increasingly comprehensive services for the priority problems of mothers and children.^{13/}

By 1978, evidence of demographic impact was apparent, and by 1981 the effects were substantial. Modern contraceptive prevalence rose from 5 to 35 per cent and fertility declined by 25 per cent. That observed changes occurred in treatment areas only and areal fertility differentials commenced nine months from the onset of project services strongly suggests that the fertility decline in treatment areas was caused by the experimental service regimen in that locality.

Explanations of the surprising impact of the project focus on its successful strategy of adapting the service delivery strategy to social conditions in rural Bangladesh, a process that has been referred to as the “sociology of supply.” Four elements of the design collectively comprise the sociology of supply in Matlab.^{14/}

Client oriented services. Particularly critical to the success of the Matlab experiment is the role of young, married and literate village women as primary service providers. As community health workers, they are responsible for visiting twice a month all women in their village, discussing contraceptive preferences, providing methods and referring women to nearby clinics for basic

health or family planning services. Each village has one such female worker, 20 of whom comprise a team assigned to a cluster of villages termed a "union," where a clinic is staffed by a resident female paramedic. One male supervisor is assigned a union to provide overall administrative support for operations.

The Matlab system attempts to confer special status on the female village workers, building upon what is known about the origins of social status in Bengal, and its importance in all aspects of village life. Female workers were hired from influential families in the villages where they lived and worked.

Although high social status contributes to their credibility as family planning workers, their youth and relative wealth are inconsistent with the extra-familial activities required by their job. Because village workers are women who are in *pardah* or seclusion (see page 47 for further details about this system) and restricted to their hamlet, supervisory support is addressed to enhancing their status as health referral workers and community liaison personnel. Work areas are delineated by socially acceptable boundaries, a strategy that minimizes social opposition to routine household visitation.

Given basic training in household communication and service techniques, and field support from supervisors, female workers can interact effectively with their village clientele. Supervision thus aims to support female village workers in the execution of the socially challenging task of introducing reproductive behavioural change where such change would not spontaneously occur.

The Matlab Project outreach strategy was guided by CDP findings which showed that service credibility derives from providing a wide range of contraceptive options and basic health care services in a manner that permits women encountering problems readily to switch methods or receive counselling and care from household workers. The complex method regimen, in turn, requires staff competence in the delivery of multiple methods, and readily available health referral services.

The continuous regimen of field visitation, together with the complex service regimen has demonstrated that, by building rapport and understanding, providing support for fertility regulation behaviour and offering contraceptive supplies to women in their homes, services can influence contraceptive use dynamics.

Internal cohesion. Social institutions in rural Bangladesh are not conducive to the formation of peer networks among unrelated women. A woman facing problems with contraceptive practice has neither familial support nor an extrafamilial peer network to support contraceptive practice. Similarly, a worker facing problems in her job has no natural social network supporting their resolu-

tion. Simple but effective support systems have been developed in Matlab to build internal cohesion in the work force, so that a worker is not alone in efforts to confront task-related difficulties. A system of information collection, compilation and exchange is used in conjunction with frequent and regular staff meetings to foster peer support among project staff. Workers meet twice a month in a local clinic with paramedics and supervisors jointly to review progress, problems and future activities.

The Matlab worker support system is hierarchical, as well as lateral, with gender roles delineated in culturally acceptable ways that nevertheless confer upon women an unusual degree of authority. Two lines of support form a dual leadership system, i.e. one is clinical and female-operated and the other is administrative and male-directed. Taken together, these lines of support comprise a network of relationships designed to substitute strong system support for the social support that reproductive behavioural change would otherwise require.

Critical to achieving cohesion is designating appropriate gender roles for project supervisory staff. Thus, female paramedical supervisors, residing in nearby clinics, provide clinical support for the village service workers and conduct household visits on request. Male supervisors liaise with village leaders; they support women's contraceptive preferences in discussions with husbands and confer with religious leaders as needed.

Task accountability. Mechanisms for achieving accountability include an information system which records reproductive histories about each woman in a village, and routine reports provide supervisors with information about the pace of work, the content of services and the problems encountered. Workers can readily ascertain their own performance from the service registers, set rational goals, solve problems and place demands on supervisors to help solve them. Supervisors, in turn, can discipline or replace workers who fail to perform their duties.

Community relations. Bangladesh rural society is often characterized as diffused, lacking structure and rife with conflict.^{15/} A common theme in the literature on family planning programme is the "need for community participation." In the Bangladesh context, however, the uncritical application of this axiom can inflict the consequences of social diffuseness on the programme rather than engendering the support of traditional village government. Therefore, organizing services must accommodate conflicting operational needs – the need to be detached from village factionalism, yet linked to elites. In general, activities that require sustained and continuous organization or resources are provided by the project with minimal reliance on community organization. Nonetheless, intermittent and ad hoc community contributions to project functioning have been substantial. For example, each union served by the project

was requested to donate facilities for clinics, in exchange for assurances of project-provided paramedical services, pharmaceuticals and maintenance. Contributions engender a spirit of community collaboration even when operations are administratively autonomous.

In sum, findings demonstrate that an appropriate system of supply, with structures and functions that are adapted to client needs and consistent with village institutions, can affect reproductive behaviour, even in the absence of social conditions that independently induce demographic change. Matlab thus represents a service model with potentially important implications for Bangladesh policy.

Although the replicability of the operational design may be questioned, the fact remains that the project worked – a conclusion supported by demographic data of unequivocal quality.^{16/} The success of the project has thus shifted the focus of research to the supply-side: since demand exists that can be met with services, the new challenge is to identify what is transferable, to institute operational change and to sustain bureaucratic transition in the national programme to a new operational design.

The Matlab experience also has international policy implications. Apart from the central finding that services could succeed, the paradigm represented by Matlab is broadly relevant to policy. However, the specific elements of the design are not necessarily exportable, since the sociology of supply necessarily differs from setting to setting. Nevertheless, the principles of informed system development, of diagnosing institutional constraints and tailoring services accordingly, is broadly relevant to programmes elsewhere, particularly where the demand for contraception is fragile, and the need for rigorous systems of supply are correspondingly acute.

Policy response to the Matlab Project

Given the questions that have been raised about the demographic relevance of family planning services in rural Bangladesh, it seems that the unequivocal findings from Matlab would have immediate policy effects. By 1981, however, none of the findings from Matlab was under active review by the Government of Bangladesh and operational implications were widely dismissed by senior officials as irrelevant to policy.

Several reasons for these reservations were apparent in the course of discussions:

- The question that the project was designed to answer was addressed to international concerns about the efficacy of family planning services in a rural, traditional society. Confirmation of impact was reassuring,

but not indicative of a need for change in the national programme. Rather, the design of the programme appeared to be fundamentally sound.

- Since the special resources of the Matlab project were not replicable, the project's operational design was considered irrelevant to policy. Features of the Matlab system that were obviously not replicable, such as the availability of speedboats for supervisory work, detracted from the broader policy lessons that investigators sought to convey.
- Although the operational design of the Matlab project was accepted as a model of what works in Bangladesh society, it was not accepted as a model of what works in the national bureaucracy. For example, changing the staff composition of the Matlab model was not feasible; for – even if resources could be found to hire more women – it is not possible to fire men.

Thus, the project was viewed by Bangladesh government officials as probably irrelevant to their programme because the additional resources, highly trained staff, sophisticated supervisory systems, the organizational structure and other aspects of the project were thought to be non-replicable on a national scale.

Extension Project: a systemic intervention

The Matlab 1981 annual report documented for the first time the demographic impact of the experiment and the operational design that led to its dramatic effects. In response to reservations about the policy relevance of the project, the Bangladesh Planning Commission made resolution of the replicability question a condition for government concurrence with further external funding. ICDDR,B was requested to expand Matlab activities to other areas of the country, but to utilize Government resources, mechanisms and procedures to the extent possible. This new project was to be collaborative, with research direction provided by ICDDR,B and operational direction provided by the usual government administrative system.

Simply replicating the Matlab experiment would have incurred serious risks: a test of overly ambitious change in the public-sector programme would lead to operational failure and official rejection of the policy implications of Matlab. Launched in 1982, the Maternal/Child Health and Family Planning (MCHFP) Extension Project is thus substantially different in its design and objectives from the Matlab experiment. Rather than simply test whether the Matlab system would work if extended to the public sector, the Extension Project identifies the specific barriers to transfer and how those barriers can be removed through sustained organizational change. As an experiment focused on

the supply-side, it does not aim to ascertain whether demand exists, but rather to determine whether existing demand can be activated with the appropriate system of supply in the public-sector programme.

The design has two basic components: a research strategy to assess, through a variety of instruments, the efficacy of the existing MCH/FP programme; its resource, technical and structural constraints; the operational changes introduced by interventions; and the impact of the interventions on MCH/FP programme effectiveness, and an intervention strategy in which ICDDR,B staff use organization-building and training to transfer elements of the Matlab project to the public sector MCH/FP programme.

Research strategy

The Extension Project resembles a paradigm referred to in the organization research literature as “organization development.” In this approach, research is typically initiated by senior management who invite consultants to assist their organization in identifying operational problems and improving organizational functioning. Social science research is used to identify problems and worker focus-groups are constituted to identify solutions, test alternatives and provide feedback on results to programme managers.

The idea of the approach is not so much to focus the attention of managers on the problems of a small segment of the organization, so that the problems there can be readily diagnosed and dealt with without major prior commitments to structural change, but to represent all levels of the organizational hierarchy in the design so that the system is the subject of analysis and collaborative problem-solving. In this way work cannot be dismissed as relevant only to a particular issue, unit or locality.

Joint “ownership” of research and decision-making is cultivated in order to foster utilization of results. Typically, 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.^{17/}

While the available research literature informed the design, much of what was tried departed from conventional notions of the organizational development paradigm,^{18/} since much of what has succeeded elsewhere is obviously inappropriate for Bangladesh.

Developing a consensus among senior officials that change was needed and developing research strategies that could contribute to the planning process were major components of project activities. Although the organization development approach assumes that change agents are competent organization researchers,

ICDDR,B expertise derives more from its experience as a biomedical research centre with excellent field epidemiological skills than as an organization skilled in operations research. It was thus necessary to develop organization research capabilities within ICDDR,B as the project was launched. Although some of the usual features of the organization development paradigm were missing, the Extension Project experience may be relevant to situations where bureaucratic functioning is rarely the subject of systematic review.

The initial ICDDR,B response to the order creating the Extension Project was to resist and subsequently to placate the Government with token activity that would contribute nothing of significance to scientific knowledge. Largely in response to donor pressure, ICDDR,B ultimately agreed to undertake a serious scientific investigation of the replicability of Matlab.

The Extension Project thus arose out of a series of negotiations relating to the preservation of Matlab rather than a commitment, either from the Government or ICDDR,B to engage in organization development activities. As a project with a formidable research and implementation agenda, but a weak institutional footing, the Matlab operational model and the continuing operation of the Matlab project, was critical to the implementation of the Extension Project. As a motivating model, the Matlab success became the basis for exchanges and negotiations at all stages in the course of the implementation of the Extension Project.

Although a review of operations does not naturally arise in non-functioning bureaucratic systems, the obvious contrasts between Matlab and the government system made it possible for the project to stimulate discussions at various levels about what could be changed, given the limitations of the Government system, and how to proceed with the institution of operational improvements.

The experimental design. Research is conducted in the MCH/FP Extension Project within the framework of an experimental design. Panel data from a representative sample of the population monitor the intensity of service outreach and the adoption of health and contraceptive practices. The systematic study of the government programme and the manner in which it changes during the experimental interventions functions together with other components of the research system to form a unified approach in which each component complements other parts of the research system. Each component is reviewed in turn.

The treatment design has three cells, each with sample demographic surveillance data about fertility, mortality or morbidity and contraceptive practice. Unlike Matlab where cells measure the impact of interventions, in the Extension Project two cells have the same interventions, but contrasting processes of introducing change in the public-sector system. The design is thus "process oriented,"

with the aim of generating variance in the way the system is changed so that barriers to the transfer of Matlab strategies are elucidated.

The two treatment cells vary the intensity of ICDDR,B field involvement in the transfer process - a "counterpart-support" cell tests whether change can be introduced by ICDDR,B field staff working with the staff of the Ministry for 90 days of joint implementation of work routines, and a "training only" cell tests whether technical training alone is sufficient to introduce change.

The third cell, located in contiguous areas external to experimental districts has a research only focus, and permits evaluation of treatment area impact.

To avoid the limitations of generating a special administrative zone that becomes atypical of the larger system, two subdistricts in different geographical areas were identified for the study, each with a full complement of treatments, interventions and research activities. Within these areas, nine treatment unions were randomly chosen; in contiguous subdistricts, four comparison unions were chosen.

Longitudinal observation of households. The analysis of the project's impact is achieved through a longitudinal household-based data system that provides information on social, economic and demographic characteristics of households and the individuals within them; on vital events including fertility and mortality; on service delivery interventions including family planning and maternal/child health interventions; on contraceptive use; and on utilization of health services by household members. The principal use of this system has been to study the relationship between project interventions and the quantity of household visitation, and the relationship between visitation and the dynamics of contraceptive use.^{19/}

Organizational analysis. Based on the premise that human service programmes are shaped by the larger social, economic, political, cultural and bureaucratic forces in society, the organizational systems analysis investigates the "interconnectedness" and mutual causality of programme elements and the larger context within which they function. Particular emphasis has been addressed to questions about the nature, quantity and quality of the exchanges that take place between service providers and clientele. This critical interface represents the proximate operational determinant of reproductive behaviour, and observation of motivational strategies, client-worker relationships (extent of rapport, trust, hostility, conflict) and worker-community relations are key indicators of service quality and performance.

The public sector system is also the focus of analysis. Resources, legitimacy and support for its activities in the larger environment are analyzed, as well

as systems-support capabilities (logistics, personnel systems and mechanisms for establishing supervisory, community and political support).

The sociology of work is the subject of observation: decision-making, conflicts, peer support and leadership. Lines of communication and authority are studied to ascertain ways in which information can be collected, compiled and used to develop cohesion.

The aforementioned organizational diagnostic activities guide the development of the Extension Project intervention strategy. Panel data are collected to analyze the process of change in the Ministry system and to permit rigorous statistical analyses. More important, however, is the role of research in the implementation strategy. Lessons learned regarding the structure and functioning of the Ministry system are shared with project participants to stimulate change and organization development within project areas and to foster change in the national delivery system.

The mixed research paradigm. The Extension Project utilizes four types of research activities. Each has a unique contribution to the policy development process:

- The Extension Project is undertaking activities initiated by senior Government officials and implemented by subdistrict officers with project staff playing a facilitating and co-ordinating role;
- Case studies, written by experienced Ministry officers at the district and subdistrict level, aim to stimulate high-level analysis of the programme based on practical field experience with implementation;
- Technical studies are conducted on such issues as staff composition and density, the determinants of worker performance, the efficacy of clinical services and other operational issues. Such research aims to identify sources of problems and the prospects for improving programme performance; and
- Basic demographic research is conducted in the “controlled” environment of Matlab on broader policy and demographic issues, including the health and mortality impact of selected MCH interventions.

All four types of research have had policy impact, the first because initiatives from the Government are central to strategic planning; the second because the insights of government field officers can provide a form of communication from the field to central authorities that is otherwise lacking; the third because key operational issues not readily identified by administrators can be articulated and communicated to policy makers; and the fourth because assumptions that underlie general policy are often untested by systematic research. Throughout

this process social learning takes place, affecting researchers and administrators alike, and informing key policy makers about the functioning of the Ministry's programme in a way that would not otherwise take place. These four types of research are used as basic tools in a co-ordinated programme to facilitate policy development and management improvement.

Intervention strategy

Project interventions are inseparable from the research design, and are designed to compliment the contribution of research to policy development. Four strategies are particularly noteworthy:

Collaborative problem solving. A mechanism for translating research into administrative action, i.e. project implementation committees, were constituted to direct field activities and to provide feedback on results to senior programme managers. In a successful intervention, these committees function as focus groups at each level of the organization to synthesize lessons and communicate research findings within the bureaucracy through established channels. The idea of the approach is to focus the attention of managers on the problems of a small segment of the organization, so that dysfunctions there can be readily diagnosed and dealt with without major prior commitments to structural change. By feeding research outcomes, deliberations and directives upwards and downwards, all levels of the organizational hierarchy are the subject of analysis and collaborative problem solving. ICDDR,B change agents attempt to facilitate change through participation in these committees in close liaison with workers at all levels. While the ICDDR,B has no formal authority over the work system or the implementation of the project, its informal influence is extensive.

The critical, initial point of collaboration in the project took place at the subdistrict level, the primary unit of organization of health services in rural Bangladesh. Subdistricts typically have a population of about 300,000, an elected government council, an administrative headquarters with basic government facilities, including a health complex staffed by resident physicians and paramedics. The health complex is a rural 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 Family Planning, the subdistrict 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. Below the subdistrict are 10 to 12 "unions," each governed by an elected council. Roughly a third of the unions in Bangladesh have standing government clinics with a resident paramedic.

In the initial period of the project, joint planning and decision-making meetings involving ICDDR,B staff and subdistrict health officials were launched under a special government order constituting the project. The subdistrict health administrator, medical officer, family planning officer and health inspector were instructed in the original order to be the key field-level collaborators in the project. By working with these officials, ICDDR,B field officers seek to strengthen field orientation, technical competence and planning capabilities at this mid-management level to ensure greater control and support capabilities for programme implementation in the villages.

The use of replicable resources. The process of transferring the Matlab operations to the Government's system in areas under the Extension Project was deliberately constrained: special operational inputs were disallowed, staffing was provided by the Government and patterns of supervision and supplies were unchanged. The areas retained their ministerial character so that the project would not take on a special quality that would dilute its relevance to policy. The assumption underlying the project is that ICDDR,B has technical skills that can be transferred to the Ministry's system through training and counterpart support, without introducing incremental resources or major structural change. The training programme focused on technical deficiencies and counterpart support focused on transferring certain aspects of the Matlab field management system.

Maintaining a systemic focus. In keeping with the observation that systemic diagnosis is more likely to lead to sustained change than activities in a few localities or a series of small-scale ad hoc studies, the project aimed to develop a co-ordinated strategic plan over a sustained period of time, tested and refined in limited areas, but developed in concert with national authorities and donors, with a view towards wider implementation. This process has yet to mature in Bangladesh, but efforts to develop the Extension Project are guided by this systems perspective.

Introducing the project as a transfer of Matlab innovations. Initial efforts to establish project operations were unfocused, with government participation more characteristically being passive compliance with ICDDR,B requests than meaningful collaboration on field activities. In the early months of establishing collaborative mechanisms with the Matlab model, questions of transferability and prospects for testing strategies in the field provided a focus to discussions and concrete objectives to pursue.

Improving field activities in health and family planning and communicating mechanisms for change to senior officials was a long-term aim, but initial efforts focused on government primary service workers affiliated with the health and family planning divisions 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 were to remedy deficiencies in technical knowledge, to redirect field methods towards client-oriented approaches, and to introduce a more effective management control and support system. A series of training courses each four weeks long was organized for groups of 20 workers. Three key components of the Matlab training programme were covered, namely, family planning, oral rehydration therapy, tetanus immunization and other health subjects assigned to these workers by government policy. Priority was 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 was placed on establishing the rudiments of the Matlab system in the field: calendar-based work routines in "door-step" family planning and MCH services, systematic follow-up, regular meetings for problem solving, supervision and support. A simple household record book was introduced that permits workers to keep track of their clientele and monitor their own performance. Major change agents for this activity were Matlab community health workers and supervisors who had five years of experience in the Matlab system. They provided counterpart support to government field staff and their immediate supervisors as agents of planned change for a period of three months following training.

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

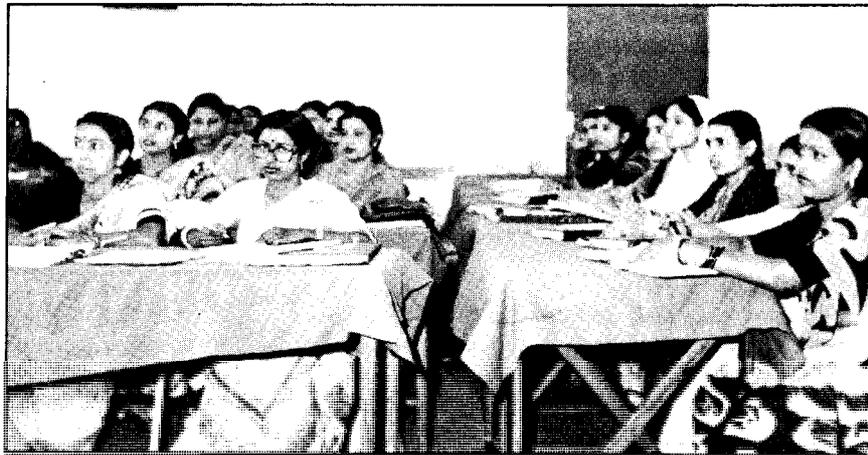
Policy response to the Extension Project

The Matlab and Extension projects have neither transformed population policies in Bangladesh nor radically redesigned the service programme. What has been developed, however, is a new paradigm of research-informed planning, leading to significant changes in the staffing pattern, training system and management system that would not have occurred without the collaboration of the ICDDR,B and the Ministry on the Extension Project. As previously mentioned, key elements of the Matlab success are related to the project's sociolo-

gy of supply – its capacity to establish client-oriented services, internal cohesion in the work-force, task accountability and appropriate mechanisms of community relations. Although the attempts to develop these elements in the government programme were associated with corresponding obstacles, considerable success has been realized by adapting each Matlab project strategy to the public-sector system rather than replication *per se*. Some examples of this adaptive process are as follows:

Developing client-oriented services. In government service areas, three female village workers are responsible for 20 villages – a work area assigned to 20 such workers in Matlab. Where Matlab has one male worker in charge of a union, the Government has four, and little structural clarity about how they relate to one another or to the female workers. Other aspects of the Matlab sociology of work are also missing in the public sector programme, but none represents a more formidable constraint to transferring the Matlab experience than the shortage of female village workers. From statistical studies, participant observation and other research, it was soon obvious that the Extension Project could not replicate Matlab, or even part of the Matlab system, until this fundamental problem of staff composition was resolved: in the absence of female service providers, the programme cannot reach women with services. No amount of training, staff development or management system improvement would overcome this fundamental problem.

It could be argued that this insight could arise from a variety of research



The hiring of more women to provide family planning services in rural areas was one of the keys to enable the success of the Matlab project to be replicated elsewhere in Bangladesh.

sources – that something so complex as the Matlab and Extension projects is unnecessary for so basic a research finding. However, in the absence of the Extension Project, it is unlikely that the response to this finding would have been as comprehensive and systematic as has been the case with the contribution of the project to the Third Plan. More than a statistical result, the finding generated reports, memoranda and minutes emanating from within the Ministry of Health and Family Planning, written about ministerial operations in partnership with ministry personnel. As a finding that was developed and owned by those who were using the results, the decision to change the staffing pattern was a natural outcome of research.

In a 1984 response to project findings, the Government of Bangladesh ordered an expansion of the female work force by 10,000 women. That decision, in turn, led to project-based field testing of the hiring process, which generated guidelines for the national hiring process. This, in turn, has led to revisions in personnel hiring procedures, training, supervision and other aspects of the field operation that could not have been developed as piecemeal ad hoc outcomes of operations research. For so extensive a change to occur, a systemic research design is required, a sequential development of policy in response to implementation experience in the Extension Project areas, and internal ministerial review of progress at critical stages in the implementation process.

Developing internal cohesion. Staff cohesion and lines of authority are poorly developed in the government health and family planning system. Workers rarely meet to discuss work, set goals or solve problems. In project areas, progress has been in transferring the Matlab information system, establishing regular meetings and developing the rudiments of team-work. Visitation is more regular and intensive as a consequence and prevalence has increased.

The project has not yet had a corresponding impact on the work system at the national level, however, because changes in the management information system, supervisory training system and the pattern of work will require several years of effort and additional experience with scaling-up innovations developed to date.

Developing task accountability. Worker accountability cannot be readily imposed in the public sector. Targets are routinely set, but rarely achieved. Schemes designed to motivate workers to work through incentives, sanctions, travel compensation and the like inevitably fail because support mechanisms are so weak that workers cannot successfully respond to “motivational gimmicks.” Success soon creates a need for supplies when the supply system is unreliable, accumulates clients in need of paramedical support when clinics do not function, and generates users when capacities to follow up existing clientele are already overstretched. The more a worker succeeds, the greater the need

for supervisory support. Consequently, individual achievement strains work relationships.

Social and economic pressures on the work force exacerbate this operational malaise. Female worker familial roles require women to stay close to home, since domestic responsibilities persists when women are employed. Owing to the low pay in the public sector, male workers are increasingly pressed to pursue economic roles that compete with time available for their formal job. Routine compliance with work regimens thus threaten a worker's welfare. While workers are neither lazy nor unproductive in the pursuit of family welfare, non-performance on the job is a systemic necessity.

In response to these barriers to instituting accountability, the Extension Project, through training and counterpart support, attempted to adapt the Matlab system to the government system in project areas. Work routines were defined, meetings established, information systems were developed, supervisory field visitation was imposed and other aspects of the work system were improved. Matlab was the operational model, but its imposition was the source of constant negotiation, trial, adaptation and tension. To the extent possible, problems, barriers and difficulties were communicated to central authorities and became a source of social learning at the policy level and operational change in project areas.

Developing community relations. As an externally funded effort, resources for the Bangladesh population programme are centrally allocated, according to rigid rules and regulations that obviate the need for community resources or relations. Clinic construction lags owing to procedural delays, and all implementation of clinical services lags as a consequence. The Matlab system of staff interchange, paramedical support and community relations could not be replicated as a consequence of the absence of clinic facilities.

In response to field reports addressed to this issue, project committees were ordered to implement Matlab-like clinics, where facilities are community donated but continuing operations are project provided. After successful demonstration of this scheme in eight project unions, a national policy of implementation of community-donated facilities was promulgated during the Third Plan.

While this successful introduction of policy change represents a possible contribution to programme impact, key elements of the Matlab system of community relations are not yet developed in project areas, most notably the support system of male workers' liaison with elites on work-related issues.

In sum, key revisions in national policy and implementation have been initiated and sustained in response to Extension Project activities, What has

emerged is an operational model that is neither the Matlab system nor the Ministry's system, but something new and unique to project areas that must be scaled up into national operational planning. Some 20 districts, comprising about a third of the country, are currently engaged in a programme development exercise, with procedures that are informed by project experience. Whether the national system of work is ultimately affected remains to be determined, but key objectives of the organizational development exercise are consistent with project findings: staff density will be increased so that specified work routines become more realistic. Recruitment, training and posting procedures are to be developed along the lines of the Extension Project model. These changes, together with improvements in logistics and information systems, make it possible to improve the national climate of worker accountability on the Extension Project model. Thus, the adaptation of the Matlab model to the public sector has produced a new model for services in project areas that differs from both the pre-project government system and the Matlab system. Although this new model, when developed on a national scale, may not represent a systemic change of the sort attempted by the project paradigm, changes have been substantial and may ultimately improve the national system of contraceptive care.

Conclusion

This article has reviewed the design and accomplishments of two field research projects that are conceptually interlinked and yet operationally distinct. The Matlab Project is a demographic success that had little practical impact on government policy until the Extension Project researched the policy development process. Matlab nevertheless demonstrated that an appropriate system of supply can have a sustained impact on contraceptive behaviour and fertility trends in an unfavourable social, institutional and economic context. The MCH/FP Extension Project has begun to demonstrate that systemic diagnosis of service delivery problems and a continuous research programme tailored to the needs and interest of programme managers can lead to improved policy development and programme performance in an unfavourable bureaucratic context.

Lessons from the research strategy

To date, four implications may be derived from the Matlab and Extension Project research experience:

- ***Where programmes do not work, the development of an operational model is a necessity.*** An important practical outcome of the rigorous Matlab studies was that they established the scientific credibility of the Matlab system and ICDDR,B staff in the eyes of the Ministry and

interested donors. This scientific credibility was an essential aspect of the Ministry's willingness to collaborate with ICDDR,B staff and of the donor agency's willingness to provide support for the research effort. The model that Matlab represents was crucial to establishing mechanisms for diagnosis of barriers to implementing the national programme.

- ***Demonstrating the demographic impact of pilot projects is not enough. Underlying operational issues and strategies must also be studied and understood.*** Simply demonstrating that something works has no policy impact, unless the operational implications of the successful strategy are clearly understood by key decision-makers. Careful study of project implementation and the processes by which policies and implementation strategies change and develop should therefore be incorporated in programme research designs. This emphasis on process research, in addition to demographic impact research, is a critical distinction between the Extension Project design and the Matlab Project on which it is based.
- ***Research project decision-making should be collaborative at all levels.*** Only when the management approaches used in Matlab were tested by the Ministry of Health and Family Planning using its own workers (within government resource constraints) were operational lessons from the field readily discussed and reviewed for their national implications. Only then did Matlab receive the careful scrutiny from policy makers that it deserved. This process of transferring "ownership" of the Extension Project from an outside research institution to the Ministry was facilitated by the establishment of committees of researchers and programme managers at each organizational level to collaborate in setting objectives, diagnosing problems, developing plans and reviewing policy and management implications of study findings. Programme research thereby becomes a management tool undertaken in response to the needs of policy development and management improvement, rather than a series of ad hoc activities.
- ***Research and intervention should follow a systemic design.*** Programme operations and management cannot be isolated from the organizational and societal contexts in which they occur. Hence a systemic approach to problem identification and problem solving is necessary. In this approach, research addresses the broader context of operational problems and the interconnected barriers to improving performance. Proposed changes anticipate the complexity of bureaucratic malaise and the need to intervene on a range of issues that interact to impede programme success.

Lessons from the operational design

What has been learned from the Matlab and Extension Project intervention strategies that could inform policy development elsewhere? It should be noted that no generalized package of service approaches has been identified, or ever will be identified, that will work everywhere. What has succeeded in Bangladesh merits consideration, testing and development elsewhere, but specific operational approaches developed in one setting, to succeed elsewhere, must be adapted and modified for the host environment. Nonetheless, it may be argued that the paradigm for policy development which the Bangladesh projects represent is broadly relevant to other settings, even if the specific elements of the operational design are not. Four phases in this process are critical to informed programme development:

- ***Where demand for contraception is fragile, programmatic research must be grounded in careful social research, diagnosing constraints to demand for contraception.*** It is unlikely that any configuration of interventions will succeed unless strategies are informed by a thorough understanding of the societal constraints to fertility change and adapted to those institutional realities. One could argue that the search for appropriate interventions in Matlab, represented by the CDP two-year trial-by-error approach, would have been more efficiently pursued by microstudies, focus group review of proposed operations or other established social research methods for identifying socially promising operational strategies. Nonetheless, while the research techniques to be used and the operational outcomes proposed will differ from setting to setting, the role of diagnosis in the design of the sociology of supply will be particularly crucial to success wherever supply-oriented strategies are pursued in settings where the demand for contraception is weak.
- ***Pilot testing of the system of interventions is critical to the successful development of policy in settings where no known operational model for success exists.*** In settings such as Bangladesh, no amount of social diagnostic research will definitively answer the question of what works, or obviate the need for rigorous controlled trials of the Matlab variety. Field experiments not only test hypotheses, they also develop a credible operational model for success that can inform the development of policy. As Matlab illustrates, pilot success can demonstrate a vastly more appropriate operational design than the established public sector programme. To facilitate the process of developing the most sociologically appropriate operational design possible, pilot projects should be developed in a bureaucratic vacuum – isolated from existing programmes, and structured to address social rather than public-sector bureaucratic constraints.

- ***Bureaucratic systems diagnosis and experimental change is crucial to the utilization of pilot projects.*** With the development of an operational model that works, given the climate of demand for services, the new challenge is developing a model for organizational change that will work, given the established public-sector system of supply. It may be argued that policy research must address the problem that the appropriate operational model may differ from existing designs, and that public bureaucracies have rules, structures and traditions that resist change.

Just as the search for selected service interventions must be informed by an understanding of the cultural setting, the search for feasible operational alternatives must be informed by an understanding of the bureaucratic culture. This search is appropriately pursued in a systemic research design, employing a variety of instruments and methods, with a transfer experiment of the Extension Project variety at its core. Extension represents a vital intermediate step that can bridge the gap between a small-scale pilot project and large-scale operations in the effort to translate research into policy.

- ***Mechanisms for scaling up operations should be incorporated into experimental designs.*** The utilization of results was a natural outcome of the findings and the decision-making system that the Extension Project represents. Moreover, the promulgation of policy is not the end product of the paradigm. Decisions to utilize research at each stage have generated new questions about what will work, how to develop policy further and how to guide the implementation process. Project staff, formerly confined to two subdistricts, are currently working throughout Bangladesh to monitor implementation and to assist senior officials with linking problems in the larger system back to the decision-making resources in the more controlled and administratively digestible environment of the Extension Project.

In sum, the Bangladesh studies are potentially instructive to policy development efforts elsewhere. In contrast to the Matlab Project, which was launched to determine whether services could succeed despite societal constraints to contraceptive practice, the Extension Project was launched to determine if organization development in the public sector is possible despite bureaucratic constraints to operational change. Just as the Matlab Project has shown that reproductive change can be induced with the appropriate sociology of supply, the Extension Project has shown that a system for research and decision-making pilot projects can induce organizational change even in bureaucratic contexts that are not conducive to sustained organizational development.

Footnotes

1. A review of relevant literature appears in Glaser *et al.*, 1983.
2. See Phillips *et al.*, 1984.
3. Prevalence estimates of Mitra and Associates, 1983 and 1985.
4. For a review of the institutional constraints to fertility regulation in Bangladesh, see Arthur and McNicoll, 1978. The implications of these constraints for supply-oriented policies are reviewed by Demeny, 1975, and by Phillips *et al.*, 1985 and 1987.
5. By most assessments, the operational limitations of the programme cited in the Second Five Year Plan (Ministry of Planning, 1983, p. 349; and 1985) persist into the period of the Third Five Year Plan. See, for example, Koblinsky *et al.*, 1984.
6. A useful review of the structure and design of the Ministry of Health and Family Planning appears in MOHFP, 1985. The policy changes over the post-independence era have been reviewed by Duza, 1985.
7. A history of organizational change in the Bangladesh population programme is in Duza, 1985, *op. cit.*
8. See Phillips *et al.*, 1986 and Simmons *et al.*, 1987.
9. Overviews of this research paradigm appear in Simmons *et al.*, 1987, *op. cit.* and Phillips *et al.*, 1984 and 1985, *op. cit.* Efforts to develop this paradigm in the Extension Project have encountered considerable difficulties. Rather than review these lapses, which are uninformative in this context, an overview of the design and a synopsis of elements that worked are presented. For a discussion of the limitations of the organization development approach in constrained institutional environments, see Koblinsky *et al.*, 1987a and 1987b; Yunus *et al.*, 1984.
10. Stinson *et al.*, 1982.
11. For a discussion of the CDP design, see Rahman *et al.*, 1980.
12. Rahman *et al.*, 1980; *op. cit.* review lessons from the Matlab CDP and the contribution of CDP to subsequent project design is in Phillips *et al.*, 1986. Simmons *et al.*, 1987 review the implications of the Matlab Project for the sociology of supply. See also the review of the determinants of the impact of the Matlab Project in Phillips *et al.*, 1982 and 1987, *op. cit.*
13. See the discussion of the design of the Matlab Project in Bhatia *et al.*, 1980 and Rahman, 1986.
14. See discussions of the sociology of supply in Simmons *et al.*, 1987, *op. cit.*; and Phillips *et al.*, 1986, *op. cit.*
15. See Hartman and Boyce, 1983.
16. Research has shown, for example, that the probability of use is a function of the distance to workers' homes. Distance, in turn, influences the contact rate, and contact affects the odds of contraception and the choices that are made. In this way, modelling of data shows the relationship between service dynamics and contraceptive use dynamics (Phillips *et al.*, 1986). See also qualitative research on the client relations issue in Simmons *et al.*, 1984, 1986 and 1987.
17. See Phillips *et al.*, 1982.
18. See French and Bell, 1987.
19. Koblinsky *et al.*, 1987b; and Phillips *et al.*, 1986, *op. cit.*

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Ethnic Models of Fertility Behaviour in Sri Lanka

*Ethnic differences in fertility behaviour
demonstrate that socio-economic factors have a strong impact
on demographic and family planning variables*

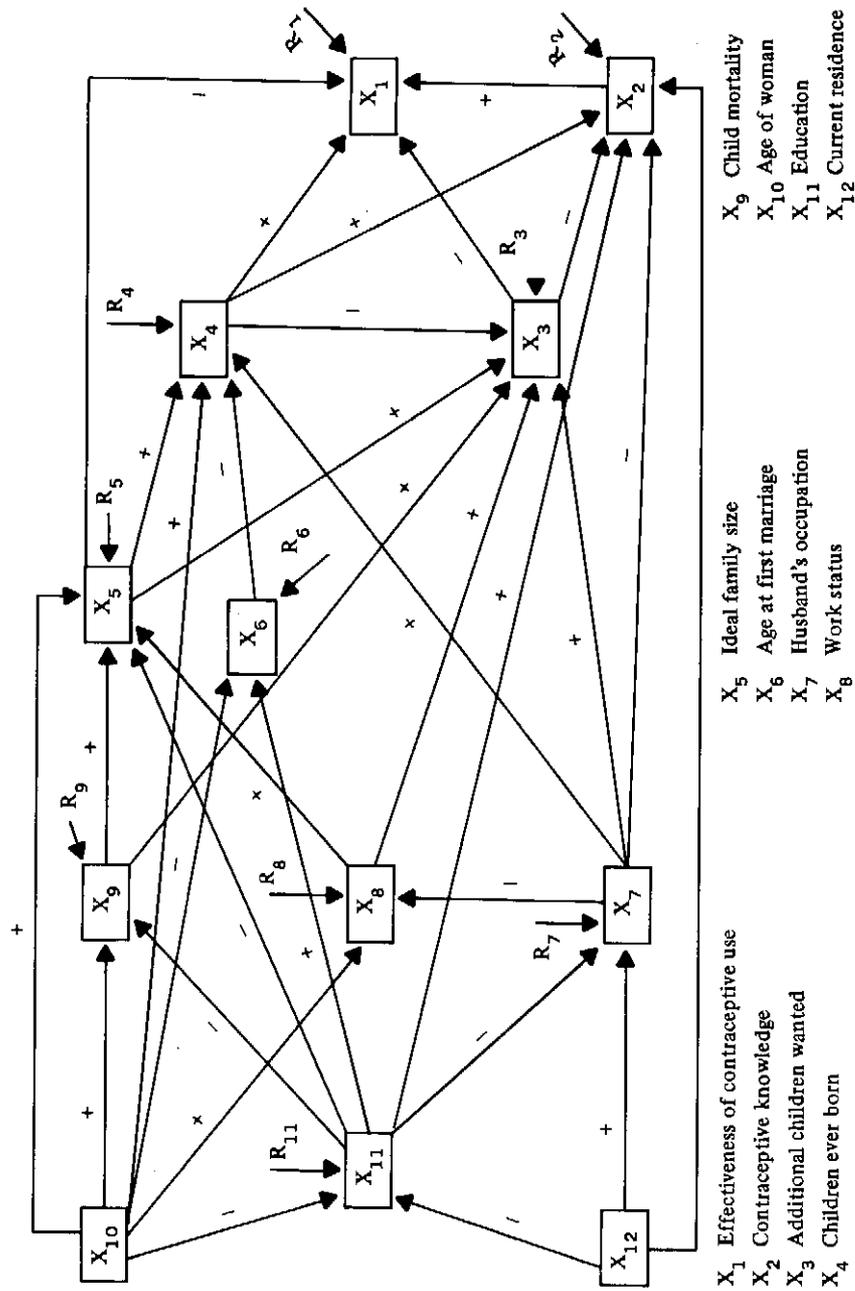
By A.T.P.L. Abeykoon*

Ethnic differences in fertility behaviour have become increasingly important and of much concern to policy makers, programme planners and managers in many pluralistic societies of the Asian and Pacific region.

Sri Lanka's multi-ethnic society is composed of distinct ethnic groups.

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Figure: Causal model of fertility behaviour for ethnic groups



The Sinhalese are the majority group comprising 74 per cent of the population. Sri Lankan Tamils constitute about 13 per cent, Moors 7 per cent, Indian Tamils around 6 per cent and the balance comprise less than one per cent of the population. The majority of Sinhalese live in the south-western, central and north-central regions of the country. The Sri Lankan Tamils are concentrated mostly in the northern part of the country, while most of the Indian Tamils live on the tea plantations in the central region. The Moors are concentrated in the eastern part and in small pockets in urban areas of other parts of the country.

The Sinhalese population of Sri Lanka is believed to have stemmed from a people speaking an Indo-Aryan dialect who migrated to Sri Lanka from northern India about five centuries before the beginning of the common era. Periodic invasions since the fifth century A.D. by the Dravidians of southern India implanted in Sri Lanka another ethnic group, members of which are currently referred to as Sri Lankan Tamils. Arab traders also permanently settled in the country around 1000 A.D. Despite some intermarriage with the Sinhalese and Tamils, the Arabs have maintained themselves as a separate ethnic group known as Moors. During the British administration, Indian Tamils were brought from South India as indentured labour to work on tea and rubber plantations.

The multi-ethnic composition of Sri Lanka has had various effects on fertility behaviour. One of the objectives of this article is to study the possible sources as well as the extent and nature of the variation in fertility behaviour among the four major ethnic groups: Sinhalese, Sri Lankan Tamils, Indian Tamils and Moors.

The data for the study come from the 1982 Contraceptive Prevalence Survey conducted by the Sri Lankan, Department of Census and Statistics in collaboration with Westinghouse Health Systems. The study sample consisted of 4,483 ever-married women aged 15 to 49 years.

In order to explain the effects of ethnicity on fertility behaviour, predictive models of fertility behaviour were developed for each of the four ethnic groups (figure). The models consist of four hierarchical sub-models focused on four dependent variables: (1) children ever born, (2) additional children wanted, (3) contraceptive knowledge and (4) effectiveness of contraceptive use, the ultimate dependent variable.

Specifically, the article examines in sequence how (a) children ever born are affected by socio-economic factors (education, current residence, work status and husband's occupation) and demographic variables (age, age at marriage, child mortality and ideal family size); (b) additional children wanted is influenced by predictor variables in (a) plus children ever born: (c) contracep-

tive knowledge is affected by all the variables given in (b) plus additional children wanted and (d) the ultimate dependent variable, effectiveness of contraceptive use, is affected by contraceptive knowledge plus all the variables given in (c).

The path models used in developing predictive models utilize a series of ordinary least squares (OLS) regression equations. One of the limitations of OLS regression is its insensitivity to interaction. Therefore, this problem is overcome by dividing the total sample into sub-groups using the ethnic groups separately.*

The path models to be estimated, therefore, are based on the conceptual model developed in the figure. In path analysis, OLS regression equations estimate the path coefficients, which measure the strength of the relationship between any pairs of variables included in the model.

The aim of the analysis is to summarize the complex relationship among the selected variables in a simplified manner by using a linear recursive path model involving only measured variables in a one-way causation model. For the sake of simplicity, a non-recursive system involving feedback or simultaneity was not considered owing to the strong assumptions required for such application. The predictor variables are measured either on an interval or ordinal scale, or in a dummy variable form.

However there may be reciprocal causation among some of the events and these causal orderings may not fit every individual case. As shown in the figure, each variable is assumed to have a causal relationship on the variable to its right and the path coefficient measures the relative strength of the direct relationship of one variable on the other.

* Using conventional notations, X_i is designated as the measured variables and R_i as the unmeasured variables, or residual or error terms. The coefficients P_{ij} are path coefficients which represent the relative impact of the effects of the independent and residual variables on the dependent variables. The subscript i identifies the dependent variable while j denotes the independent variable, the direct effect of which is measured by the coefficient. To obtain estimates of path coefficients, ordinary regression analysis was used and each endogenous variable was regressed for those variables that directly affect it. For example P_{12} , P_{13} , P_{14} and P_{15} were obtained by regressing X_1 on X_2 , X_3 , X_4 , and X_5 . The residual path coefficients were also obtained by ordinary regression analysis since they have a direct regression interpretation. The general form of a residual path coefficient is $\sqrt{1-R^2}$ where R^2 is the fraction of explained variance in the appropriate regression equation. (See Herbert B. Asher, *Causal Modeling*, Sage University Paper Series on Quantitative Applications in Social Science, (Beverly Hills and London, Sage Publications, 1983).

Path model for Sinhalese

Age has a negative direct effect on education, which is consistent with the expectation that younger women are better educated. Similarly, current residence has a negative direct effect on education, implying that women in urban areas are better educated than those in rural or estate areas. Age of women has a positive direct effect on child mortality and on ideal family size. It shows that older women experience a higher level of infant and child mortality and tend to prefer larger ideal family size. This implies that there is a certain amount of rationalization of the woman's reproductive experience. Age has a negative direct effect on work status and a positive direct effect on age at first marriage. It has a weak positive indirect effect on husband's occupation via education. Current residence has a positive direct effect on husband's occupation, meaning that women residing in urban areas enjoy higher economic status. It also has a weak positive indirect effect on husband's occupation via education.

Education has a strong positive direct effect on age at first marriage. It has direct negative effects on husband's occupation, child mortality and ideal family size. This implies that higher education leads to higher economic status, lower child mortality and smaller ideal family size. Education has a weak positive indirect effect on work status via husband's occupation.

Child mortality has a weak positive direct effect on ideal family size indicating that higher child mortality leads to a larger ideal family size. Husband's occupation has a direct negative impact on work status, indicating that women in higher economic status households are less likely to be engaged in economic activity. Husband's occupation has a weak indirect positive impact on ideal family size via work status.

How do all these variables affect fertility behaviour?

The most important determinant of children ever born is age. It has a strong positive direct effect and a weak indirect effect via ideal family size. The other positive direct effects on children ever born come from husband's occupation and ideal family size. Age at first marriage has a strong negative direct effect on children ever born. The indirect effect of education on children ever born via age at marriage is quite substantial, while its other indirect effects via husband's occupation, child mortality and ideal family size are very small. Age and age at marriage together with husband's occupation and ideal family size account for 60 per cent of the variance in fertility.

Children ever born has the strongest direct effect on additional children wanted. Ideal family size has the next strongest direct effect. Child mortality

has a moderate positive direct effect, implying that those who experience infant and child mortality would want a larger number of additional children. Husband's occupation has a weak positive direct effect. Education has a negative indirect effect on additional children wanted via child mortality. The variance in additional children wanted accounted for by the three direct predictors is about 37 per cent.

Education has the highest positive direct effect on contraceptive knowledge. It has a weak positive indirect effect via husband's occupation. Additional children wanted and husband's occupation have negative effects on contraceptive knowledge. Age has a negative indirect effect via education, implying that young women with little education are less likely to have a good knowledge of contraception. The variance in contraceptive knowledge accounted for by the three predictors that have direct effects is about 16 per cent.

Contraceptive knowledge has the greatest positive direct effect on effectiveness of contraceptive use followed by children ever born. Thus, better contraceptive knowledge leads to more effective practice of contraception and a larger number of children induces women to use more efficient methods of contraception. As expected, the variable additional children wanted has a negative direct effect on the effectiveness of contraceptive use. Education has a positive indirect effect via contraceptive knowledge. The variance in effectiveness of contraceptive use accounted for by these three variables is 20 per cent.

All these imply that Sinhalese who live in urban areas tend to have better education and have higher economic status. In turn, they marry later, have lower child mortality, a smaller ideal family size, better knowledge of contraception, use more effective contraception and experience lower fertility. Education appears to be the most important factor among the socio-economic variables influencing fertility behaviour.

Path model for Sri Lankan Tamils

The path model for the Sri Lankan Tamils is similar to that for the Sinhalese for paths that have strong influences. For instance, current residence has a negative direct effect on education and a positive direct influence on husband's occupation. It has a positive indirect effect on husband's occupation via education. Education has a negative direct influence on child mortality, ideal family size and husband's occupation, and a positive direct effect on age at first marriage. Age of women has positive direct effects on child mortality and age at marriage and a negative impact on work status. Husband's occupation has a negative direct effect on work status. Child mortality has a positive direct impact on ideal family size.

Among the Sri Lankan Tamils the four variables, namely age of women, age at first marriage, ideal family size and husband's occupation, affect children ever born in ways similar to the Sinhalese. Age at first marriage has a stronger direct effect on children ever born than for the Sinhalese, as is evident from the unstandardized path coefficients $-.26$ vs $-.23$ (see table on next page). This suggests that age at marriage predicts children ever born better for the Sri Lankan Tamils than for the Sinhalese. The indirect effect of education on children ever born via age at marriage is quite strong. The four variables that have direct effects on children ever born account for 63 per cent of the variance.

The variables children ever born, ideal family size, child mortality and husband's occupation have similar direct effects on additional children wanted for the Sri Lankan Tamils as they do for the Sinhalese. The four variables explain about 43 per cent of the variance in additional children wanted.

As for the Sinhalese, education has the strongest positive direct effect on contraceptive knowledge. However, current residence has a negative direct effect and children ever born a positive direct effect on contraceptive knowledge. This suggests that those who live in urban areas have greater knowledge of contraception and those who have a higher number of children would be induced to seek more knowledge about contraception. The variance in contraceptive knowledge accounted for by the three variables that have significant direct effects is 16 per cent.

Also for the Sinhalese, the variables contraceptive knowledge and additional children wanted have similar direct effects on effectiveness of contraceptive use. Likewise, education has a positive indirect effect via contraceptive knowledge. The variance in effectiveness of contraceptive use accounted for by contraceptive knowledge and additional children wanted is about 21 per cent.

Path model for Indian Tamils

Unlike in the case of the Sinhalese and Sri Lankan Tamils, current residence has a much larger direct effect than education on husband's occupation. This is because a large majority of Indian Tamils live in the estate sector where they are engaged in agricultural work.

Age has a positive direct effect on child mortality. Education has a positive direct effect on age at first marriage and negative direct effects on child mortality and husband's occupation. Husband's occupation has a negative direct effect on work status.

The variable children ever born is directly affected by age and age at marriage in a similar manner for the Sinhalese as for the Sri Lankan Tamils. These two variables, however, account for about 53 per cent of the variance in children

Table: Summary of unstandardized path coefficients by major ethnic group

Type of effect	Major ethnic groups			
	Sinhalese	Sri Lankan Tamil	Indian Tamil	Moor
X ₂ → X ₁	.08	.10	.07	.08
X ₃ → X ₁	-.63	-.58	-.76	-.38
X ₄ → X ₁	.04	-.01*	.11	.08*
X ₅ → X ₁	-.05*	-.10*	.35	-.003*
X ₃ → X ₂	-.70	-.13*	-.14*	-.52*
X ₄ → X ₂	-.03*	.21	.60	.35
X ₇ → X ₂	-1.04	-.61*	-2.06	-1.83
X ₁₁ → X ₂	.45	.45	.63	.23
X ₁₂ → X ₂	.19*	-.85	-1.31*	.38*
X ₄ → X ₃	-.26	-.30	-.24	-.36
X ₅ → X ₃	.22	.30	.18	.39
X ₇ → X ₃	.14	.18	.08*	.09*
X ₉ → X ₃	.25	.22	.13	.29
X ₅ → X ₄	.35	.22	.10	.27
X ₆ → X ₄	-.23	-.26	-.22	-.24
X ₇ → X ₄	.32	.39	-.02	.07

X ₁₀ → X ₄	.19	.21	.17	.23
X ₈ → X ₅	-.19	.10*	.03*	.16*
X ₉ → X ₅	.08	.18	.05*	-.002*
X ₁₀ → X ₅	.02	.01*	.001*	.02
X ₁₁ → X ₅	-.07	-.03	-.004*	.03*
X ₁₀ → X ₆	.13	.08	-.01*	.03*
X ₁₁ → X ₆	.56	.65	.34	.60
X ₁₁ → X ₇	-.03	-.04	-.02	-.05
X ₁₂ → X ₇	.31	.21	.76	.31
X ₇ → X ₈	-.21	-.11	-.31	-.13
X ₁₀ → X ₈	-.01	-.01	-.002*	-.002*
X ₁₀ → X ₉	.02	.03	.02	.04
X ₁₁ → X ₉	-.03	-.06	-.06	-.05
X ₁₀ → X ₁₁	-.06	.01*	-.04*	-.02*
X ₁₂ → X ₁₁	-1.79	-1.69	-1.74	-.92

Note: * = Statistically insignificant.

X₁ Effectiveness of contraceptive use X₄ Children ever born X₇ Husband's occupation X₁₀ Age of woman
 X₂ Contraceptive knowledge X₅ Ideal family size X₈ Work status X₁₁ Education
 X₃ Additional children wanted X₆ Age at first marriage X₉ Child mortality X₁₂ Current residence



Sri Lanka's multi-ethnic society is reflected in the differing fertility behaviour of its people. However, for all groups, higher education means greater practice of contraception. (United Nations photograph)

ever born. Education has a negative indirect impact on children ever born via age at marriage.

Children ever born has a negative direct effect on additional children wanted. Ideal family size has a positive direct effect. It is of interest to note that child mortality has no significant effect on additional children wanted. This is so despite the relatively high level of child mortality among the Indian Tamils.

As the path coefficient is relatively high, the statistical insignificance may be due to the small sample size of Indian Tamils. Children ever born and ideal family size account for about 32 per cent of the variance in additional children wanted.

Education has the greatest direct effect on contraceptive knowledge; children ever born has the next highest direct positive effect. Husband's occupation has a negative direct impact on contraceptive knowledge. These three variables together account for about 19 per cent of the variance in contraceptive knowledge.

Additional children wanted affects the variable effectiveness of contraceptive use in a similar manner for the Sinhalese and Sri Lankan Tamils. Contraceptive knowledge, ideal family size and children ever born have direct positive effects on effectiveness of contraceptive use. These four variables account for about 30 per cent of the variance in effectiveness of contraceptive use.

Path model for Moors

Among the Moors, age has positive direct effects on child mortality and ideal family size. It may also be seen that the effect of age is much greater than that of education on child mortality. Education has a positive direct effect on age at marriage and a negative direct effect on husband's occupation. Current residence has a negative direct effect on education and a positive effect on husband's occupation. Husband's occupation has a negative direct impact on work status.

As in the other ethnic groups, age has the greatest direct effect on children ever born. Ideal family size has a positive impact and age at marriage a negative effect on children ever born. These three factors contribute about 57 per cent of the variance in the variable children ever born.

It may be seen that the effect of work status on ideal family size is significant only for the Sinhalese. The effect of child mortality on ideal family size is stronger for the Sri Lankan Tamils than the Sinhalese. Age affects ideal family size in a similar manner among the Sinhalese and Moors. Education appears to have a slightly higher effect on ideal family size for Sinhalese than it does for the Sri Lankan Tamils. Similarly, age has a greater effect on age at marriage for

the Sinhalese. The effect of education on age at marriage is strongest among the Sri Lankan Tamils. Education affects husband's occupation in a similar manner among the four ethnic groups. However, for Indian Tamils who reside mainly in the estate sector, current residence shows a relatively high effect on husband's occupation. Likewise, the influence of husband's occupation on wife's work status is strongest for the Indian Tamils who are engaged mainly in agricultural activities. Age affects work status in a similar way for both the Sinhalese and the Sri Lankan Tamils. Age and education seem to have approximately the same effects on child mortality among the four ethnic groups. The effect of age on education is significant only for the Sinhalese. Current residence has a relatively lower effect on education for the Moors. In other words, for the Moors, residence seem to have a relatively lower impact on their level of education despite the fact that a high percentage of them are represented in urban areas.

Summary

As hypothesized, current residence has direct negative effects on education for all four ethnic groups, implying that women in urban areas are better educated than those in rural or estate areas. It may also be seen that this effect is lowest for the Moors despite their higher representation in urban areas. Similarly, for all ethnic groups, it is observed that current residence has a positive direct effect on husband's occupation, suggesting that women residing in urban areas have higher economic status. Education appears to have a strong positive effect on age at marriage. This effect is strongest for Sri Lankan Tamils. Education also has moderate negative effects on child mortality and husband's occupation in a similar manner among all ethnic groups. This implies that higher education leads to higher economic status and lower child mortality. Husband's occupation has a direct negative impact on work status, which indicates that women in higher economic status households are less likely to be engaged in economic activity.

The most important determinant of the category children ever born is age. Age at marriage has strong negative effects on fertility for all ethnic groups, showing the greatest impact on Sri Lankan Tamils. This indicates that fertility limitation among the Sri Lankan Tamils operates mostly through delay in the age at marriage. Child mortality and ideal family size are found to have positive direct impacts on additional children wanted. The effect of ideal family size is strongest for the Moors, while the effect of child mortality on additional children wanted is weakest on Indian Tamils, suggesting that it has a lesser "replacement effect" despite the high level of child mortality among this group. As expected, the variable children ever born has a strong direct negative effect on additional children wanted among the Indian Tamils, thus showing the relatively lower effect of this variable among the different ethnic groups. Education has a moderate positive effect on contraceptive knowledge, with the strong-

est effect being shown among Indian Tamils while it is least among the Moors. Contraceptive knowledge has a direct positive effect on the effectiveness of contraceptive use while additional children wanted has a direct negative effect. Education also shows an indirect effect on effectiveness of contraceptive use via contraceptive knowledge among all four ethnic groups.

Contraceptive knowledge appears to have about the same effect on the variable effectiveness of contraceptive use in all four ethnic groups. Thus, the provision of information and educational facilities in family planning as well as access to subsidised, safe and convenient services would greatly enhance the decline of fertility among all the ethnic groups.

As for other ethnic groups, children ever born has a strong negative direct effect on additional children wanted. Ideal family size and child mortality have positive direct effects on additional children wanted. The three variables account for about 47 per cent of the variance in additional children wanted.

Education and children ever born have positive direct effects on contraceptive knowledge. Husband's occupation has a negative direct effect. These three factors together account for about 11 per cent of the variance in contraceptive knowledge.

As expected, additional children wanted has a negative direct effect on effectiveness of contraceptive use, while contraceptive knowledge has a positive direct effect. These two variables account for about 24 per cent of the variance in effectiveness of contraceptive use. Education has an indirect positive effect on effectiveness of contraceptive use via contraceptive knowledge.

Comparison of path models

The unstandardized path coefficients may be compared since they are not affected by the different variances in the same variables that may arise owing to sub-grouping of the total sample.

The unstandardized path coefficients of the models of the four ethnic groups are shown in the table. Contraceptive knowledge appears to have about the same effect on effectiveness of contraceptive use among all four ethnic groups. The effect of additional children wanted on effectiveness of contraceptive use is highest for Indian Tamils, while it has the least effect on the Moors. This suggests that the Indian Tamil women who do not want additional children are more likely to use effective contraception than women from the other groups. Similarly, it may be observed that Indian women who have a larger number of children are more likely to be induced to use effective contraception. It is also seen that the effects of ideal family size on effectiveness of contraceptive use is significant only for Indian Tamils.

The effect of children ever born on contraceptive knowledge is highest for Indian Tamils. It may also be seen that among the Indian Tamils husband's occupation has the greatest effect on contraceptive knowledge. The effect of education on contraceptive knowledge is also highest for Indian Tamils and lowest for the Moors while it has about the same effect on the Sinhalese and Sri Lankan Tamils. The effect of current residence on contraceptive knowledge appears to be significant only for Sri Lankan Tamils. Likewise, the effect of additional children wanted is significant only for the Sinhalese.

The effect of children ever born on additional children wanted is highest among the Moors followed by the Sri Lankan Tamils. The same pattern may be observed with regard to the effect of ideal family size on additional children wanted. These effects imply that Moors and Sri Lankan Tamils who have fewer children ever born are more likely to want additional children than the Indian Tamils and the Sinhalese. Similarly, the Indian Tamils and Sinhalese who prefer a smaller ideal family size are more likely to want fewer additional children than the Moors and Sri Lankan Tamils. Husband's occupation has a greater effect on additional children wanted for the Sri Lankan Tamils than for the Sinhalese. Child mortality has the highest effect on additional children wanted for the Moors while it has the lowest effect on the Indian Tamils. This suggests that the Indian Tamils who experience high child mortality are less likely to want additional children than the other ethnic groups. In other words, the mortality "replacement effect" among the Indian Tamils appears to be the weakest despite their relatively high level of child mortality.

For the Sinhalese, ideal family size seems to have a stronger effect on children ever born than for either the Sri Lankan Tamils or the Moors. The effect of age at first marriage on children ever born is highest for Sri Lankan Tamils, while it is lowest for Indian Tamils. Also for Sri Lankan Tamils, the effect of husband's occupation on children ever born is higher than for the Sinhalese. Age has the strongest effect on fertility among the Moors.

The analysis also provides information about the relative effects of socio-economic factors on fertility and contraceptive behaviour in Sri Lanka. Basically it shows that, among all the ethnic groups, those who are better educated have higher economic status, marry later, have lower child mortality and exhibit lower fertility. All ethnic groups also show that the better educated people have a better knowledge of contraception and use more effective methods of contraception.

These results suggest that socio-economic factors do have a strong impact on some of the demographic and family planning variables. In other words, socio-economic assimilation will facilitate more modern behaviour such as later age at marriage and increased knowledge and use of effective contraception.

Female Autonomy and Fertility: An Overview of the Situation in South Asia*

*Until women in South Asia gain the necessary autonomy
to resist pronatalist pressures,
fertility will decline very slowly*

Fertility in the Asian and Pacific region has been falling with notable unevenness over the past one and half decades and there has been considerable variability in the decline among the subregions. Fertility in the region declined 36.8 per cent from 1960-1965 to 1980-1985 and most of the decline (30.8 per cent) occurred during the period 1970-1975 to 1980-1985.

East Asia experienced the steepest decline (53.1 per cent), almost all of which occurred since 1970-1975. The remarkable transformation in East Asia was greatly influenced by the decline in China where fertility dropped by 54.9 per cent during the more recent period.

The decline in South Asia (28.1 per cent) closely followed that of the Pacific (30.8 per cent), where a significant decline started in the earlier decade. East Asia is close to reaching replacement level fertility. In contrast, the total

* This article was prepared by the Fertility and Family Planning Section of the ESCAP Population Division.

fertility rate (TFR) is close to 5 in South Asia and 4 in South-east Asia. The future rate of decline for the Asian and Pacific region as a whole depends primarily on these two subregions.

Large countries in the region such as Bangladesh, India, Pakistan, the Philippines and Viet Nam have fertility rates that are still very high, i.e. TFRs are in the range of 4 or more. Out of 14 large high-fertility countries, six have Governments that are pronatalist or have no major family planning programme. Of the remaining eight, four are from the Indian subcontinent, namely Bangladesh, India, Nepal and Pakistan. Two other countries, Afghanistan and the Islamic Republic of Iran, border the subcontinent; however, not much is known about their current fertility situation.

Three countries in the subcontinent, Bangladesh, India and Pakistan, constitute about 35 per cent of the population in the region. They are characterized by high fertility in the range of TFR = 4.5+ to 7+. It is evident that the fertility transition has yet to begin in full force in the countries of the subcontinent.

By contrast, the South-east Asian countries, Indonesia, Malaysia, Singapore and Thailand, have made remarkable progress with regard to socio-economic development and fertility reduction. However, slower progress in economic advancement alone cannot explain the lag observed in the three countries of the subcontinent. For example, Pakistan has continued to enjoy appreciable economic development without any corresponding success in family planning, while certain States in India have made remarkable progress in family planning despite only moderate improvements in economic conditions. Bangladesh also has made some progress in family planning in the absence of any significant improvement in economic conditions.

The persistence of moderate to high fertility in the subcontinent appears to be deep-rooted in the structure of society and its culture. When resistance to change lies at the structural and cultural level, policy intervention, the emphasis of which is on service delivery only, is not likely to bring any appreciable shift in the behaviour of the population.

This article explores several important dimensions of the socio-cultural milieu in the subcontinent that seem relevant to answering the question: "Why do a large majority of women in the subcontinent still not practise family planning?"

Most demographic surveys of the subcontinent consistently report that large majorities of women of reproductive age do not want any more children after the initial few births. Survey results also show that these women do not practise family planning.

Socio-cultural factors

These findings are often dismissed on the ground that they are not capturing the realities of the situation. However, not only are they valid, but those findings are also inadequate. The results truly reflect the individual desires of women, but they are inadequate in that they fail to identify the social and cultural constraints which prevent women from translating their desires into practice.

All too often, explanations of fertility change concentrate primarily on the dynamic influences of social and economic change or organized interventions to spread fertility control. Very little attention has been paid to the particular mixture of cultural features that may facilitate or inhibit fertility behaviour. Such an approach has proved useful in comprehending the recent fertility decline in Thailand (Knodel *et al.*, 1984, Knodel *et al.*, forthcoming).

A clear understanding of the social position of women in the subcontinent appears to be the best possible approach to comprehending the discrepancy between reported desires and behaviour (Mitra, 1978). The concept of female autonomy is more amenable to empirical measurement than the concept of status and is therefore adopted for this article. Autonomy indicates the ability (technical, social and psychological) to obtain information and to use it as the basis for making decisions about one's private concerns and those of one's intimates.*

In the agrarian societies of Bangladesh, India and Pakistan, female autonomy is strongly influenced by kinship, family and marriage relationships. It is also greatly influenced by age, religion, the political system and cultural norms and practices, including the division of labour between the sexes.

Kinship, family and marriage relationships

The kinship structure of the subcontinent is characterized by the principles of village and kin exogamy, relatively close ties among patrilineally related males and control of property by males. Of course, there are minor variations in the three countries. For example, although a Muslim woman in Bangladesh has the legal right to inherit property from her parents, in actual prac-

* Subsequent sections of this article draw heavily on the articles by Tim Dyson and Mick Moore, entitled "Kinship structure, female autonomy, and demographic behavior in India", *Population and Development Review*, vol. 9, No. 1, March 1983, pp. 35-60; and by Mead Cain, entitled "Women's Status and Fertility in Developing Countries," World Bank Staff Working Papers, No. 682, 1984.

tice it is more likely that her brothers will seize control of her share of inherited immovable property (land) regardless of her wishes. (She normally would not be entitled to moveable property.)

According to the custom of patrilocal marriage, a newly married women is brought from her family of birth and placed in her husband's house which is usually distant from her parents' house. The preference for lineage and village exogamy attenuates a woman's ties with her family of birth and reduces the possibility that her family will intervene on her behalf after marriage. In the Indian subcontinent, as in most other agrarian societies, kin relationships still constitute the prime avenue of access to such scarce social resources as information, economic assistance and political support for the great majority of people.

An individual's power, influence and social ranking are closely related to his or her ability to exploit kin linkages. Thus cultural practices, such as patrilocal marriage, that tend to constrain or erode personal links between a married women and her natal kin directly diminish a woman's autonomy. At the same time, norms of avoidance (a married woman is regarded as an outsider in her family of marriage) make it difficult for a woman to establish effective links within the household into which she marries; she is, therefore, left almost powerless socially. Arranged marriage and differences of almost 10 years in age at marriage between bride and bridegroom place a woman in a subordinate position relative to her husband at the outset of marriage (Cain, 1984).

Dowry is an essential part of Hindu marriage in India as well as in Bangladesh. Although dowry is not an Islamic tradition, it is gradually becoming the fashion in Muslim marriage in Bangladesh. The size of dowry demanded usually far exceeds the amount of dowry given (either in cash or kind or both), which again puts women at a disadvantage from the outset of the marriage. When a woman from a poor family cannot bring any dowry with her or has nothing to inherit, she is endowed with neither money nor property that is her's alone. This situation further reduces her influence among the members of the husband's family.

Beneath the larger social organization, there exists in each village an organizational subsystem (termed *bari* in Bangladesh and *caste* in India) that regulates the life of groups in the village. It acts as a source of collective security for its members and as a guardian of their mores.

Membership in a *bari* or *caste* is crucial when individuals are faced with a choice, as in the case of accepting an innovative idea or adopting it in practice. Moreover, it puts a great restraint on female autonomy, particularly the movement of women outside the home and the seclusion of women (Rahman, 1986).

Age

Deference for age is strictly adhered to in the subcontinent, regardless of class and creed. As mentioned previously, women are in a disadvantageous position because on average they are almost 10 years younger than their husbands. Among women, solidarity and potential resistance are undermined by an age hierarchy that allies older women with men in dominant positions. The young bride enters her husband's household to find herself under the control and supervision of her mother-in-law. In general, older women dominate younger women: mothers-in-law dominate daughters-in-law and elder brothers' wives dominate younger brothers' wives, and so on.

Religion

Both as an ideology and as a normative force that governs behaviour and expectations, Islam sanctifies male dominance. It is also explicit about the sexual division of labour and responsibility, with men being the providers and protectors of women and women the servers of men. Such beliefs and practices make women subservient to their husbands.

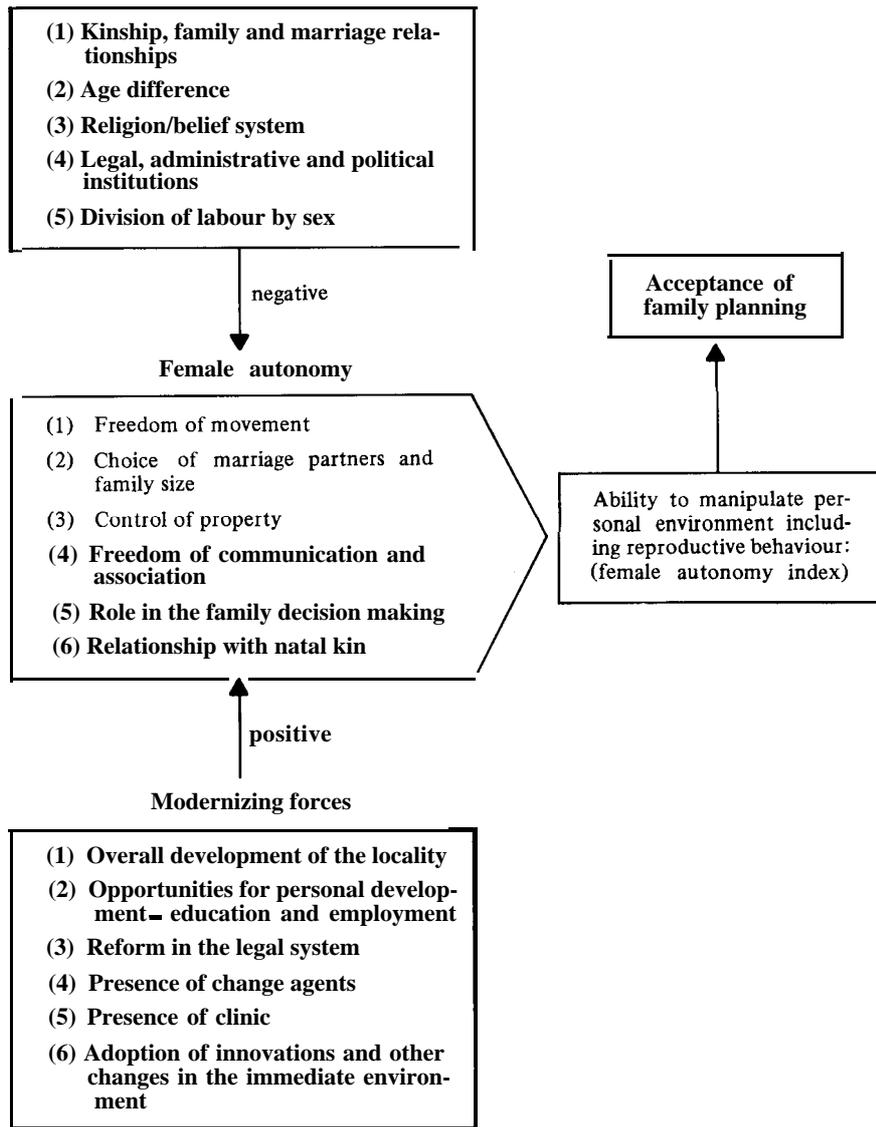
Submission to the husband by the wife is also abundantly glorified by the Hindu religion. A Hindu woman regards her husband as her god regardless of his character. A married woman's prime task is to produce a male heir so that a son can perform the last religious rites at the death of the husband. A woman's standing among her husband's kin is greatly undermined when she does not produce a son. Whereas Muslim inheritance law allows a daughter to receive one-half of the share received by a son, Hindu inheritance law does not allow even the one-half share to be given to the daughter. Both religions therefore reinforce inequality among men and women and allow female subjugation to be perpetuated.

Another important aspect of Islam, as practised in Bangladesh and Pakistan, which has direct effects on female autonomy is purdah, the seclusion of women. Purdah is a system of secluding women and enforcing high standards of female modesty. Its manifestations in Bangladesh and Pakistan include severe restrictions on a woman's movements outside her immediate homestead, and standards of dress that hide face and form.

Women who move out of the homestead into the public domain are considered both provocative and offensive. In India, groups of patrilineally related males would have their honour, reputation and consequently their power undermined should the chastity of their females be subverted. As a consequence, free movement of females is very rigidly controlled. Restrictions on female personal movement and "protection" from other males takes the form of seclusion in India too.

Figure: Social structure and cultural factors, female autonomy and acceptance of family planning

Social structures and cultural factors



Division of labour

The predicament of dependent women that forces them into relative seclusion within their own household compound also denies them access to economic opportunities outside the homestead. In these countries, a division of labour among household members has evolved whereby women specialize in work inside or near the homestead and men specialize in work outside the home. This division of labour itself engenders a powerful element of men's control over women, enforcing women's dependence, on men by denying them direct access to income-earning opportunities. The sexual division of labour applies to all women in the rural areas and the costs, in terms of abuse and loss of status, of engaging in types of work that require movement outside the homestead are indeed very high.

Son preference

In societies in which women are dependent on men, where they are excluded from inheritance and mainstream economic activities, parents place a great premium on sons. This preferential treatment of the male child severely retards the personal development of girls and hence affects their autonomy in later life.

Political system

Political power in the subcontinent, as in other developing areas, is monopolized by men. Until relatively recently, elected and appointed government officials were almost always male. Village councils, which adjudicate most local disputes, are exclusively composed of men. In part because of male domination of political institutions and in part because formal judicial institutions and administrations are weak, particularly in the rural areas, legal protection of women is nominal. If a female litigant is not closely related to and supported by a man, she is likely to lose a case regardless of its merits. Under the influence of *purdah*, women are discouraged from going to court to establish legitimate claims.

Theoretical linkages

The direct relationships linking social structure, female autonomy and family planning acceptance are summarized in the accompanying figure. The complete dependence of younger women on men and older women, deference for age and lack of access to the outside world make it difficult for them to resist pronatalist pressures. Moreover, early marriage increases their period of exposure to the risk of pregnancy in the absence of opportunity to regulate their fertility. Females are brought up to believe that their own wishes

Table: Selected state-level indexes related to women's status and acceptance of family planning in India

Region/State	Per cent of couples protected by family planning ^{a/}	Female labour force participation rate 1971 ^{b/}	Per cent of women practising purdah ^{c/}	Per cent of females literate 1971 ^{d/}	Per cent of births medically attended ^{e/}	Son preference index ^{f/}
South						
Kerala	28.8	13	4.3	54.3	25.1	17.2
Tamil Nadu	28.4	15	4.9	26.9	21.9	11.5
Audhra Pradesh	26.5	24	9.4	15.7	12.2	8.9
Karnataka	22.4	14	5.4	20.9	15.9	11.2
Maharashtra	34.1	20	16.7	26.4	1.5	18.4
North						
Gujarat	20.1	10	41.8	24.7	9.7	20.8
Rajasthan	13.0	8	62.2	8.5	4.1	n.a.
Uttar Pradesh	11.5	1	46.4	10.7	2.5	25.0
Madhya Pradesh	20.9	19	42.9	10.9	5.1	21.9
Punjab	25.0	1	44.5	25.9	11.3	31.3
Haryana	30.1	2	12.6	14.9	15.3	20.7

East									
Bihar	12.2	9	29.6	8.7	2.8	24.3			
West Bengal	21.2	4	n.a.	22.4	n.a.	18.4			
Orissa	24.4	7	27.7	13.9	6.8	15.7			
All India	22.1	12	n.a.	18.7	n.a.	20.2			

Notes: a/ Statistics are cumulative to 1979; source: *The Monthly Bulletin of Family Welfare Statistics*, Evaluation and Intelligence Division, Department of Family Welfare, New Delhi, September 1979.

b/ **Source:** Census of India, 1971, *Series I - India*, Part IIA (ii), Union Primary Census Abstract, New Delhi, 1976.

c/ **Source:** Committee on the Status of Women in India, *Towards Equality: Report of the Committee on the Status of Women in India* (New Delhi, Government of India, 1974).

d/ Statistics include the population aged 0-4; *source:* Government of India, *Pocket Book of Population Statistics* (New Delhi, 1972). Although the statistics relate to the absolute level of female literacy, it is worth stressing that their relative literacy (i.e., *vis-a-vis* males) also tends to be substantially lower in the main northern states. The same point is applicable to labour force participation.

e/ **Source:** Government of India, *Pocket Book of Health Statistics* (New Delhi, 1975).

f/ **Source:** J.C. Bhatia, "Ideal number and sex preference of children in India," *Journal of Family Welfare* (Bombay) 24, No. 4 (1978). An index of zero would imply equal preference for sons and daughters.

Source: *Population and Development Review*, vol. 9, No. 1, March 1983, p. 49.

and interests are subordinate to those of the family group. They are, therefore, likely to sacrifice their own wishes to regulate fertility, even at the cost of risking their health from repeated pregnancies.

Given the situation of relative social isolation faced by newlywed women, there are clear advantages to high fertility. A wife is encouraged to create her own social group by producing children. Confronted with an insecure future that will probably become more unstable when her husband dies, a woman undoubtedly sees children, especially sons, as a potential source of security, both economically and socially. This lack of female autonomy contributes to high fertility. The links between female autonomy and acceptance of family planning can be seen in the table on pages 50-51 (Dyson and Moore, 1983).

Conclusion

The Asian and Pacific region has experienced a remarkable decrease in the fertility level over the last decade, with notable variations in magnitude among the subregions. East Asia, particularly China, contributed much to this decline in fertility but there are still large areas with high fertility (TFRs in the range of 5 to 7) particularly in the subcontinent and its neighbouring countries.

There has not been any major decline in fertility in the subcontinent in the last decade or in the previous one. The reason appears to be deep-rooted in the structure of these societies and associated cultural practices. The forces of modernization, which are gradually gaining momentum, will perhaps help women to gain the necessary autonomy to resist pronatalist pressures. Until such time, fertility will tend to decline at a very slow pace.

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Fertility Transition in Bangladesh : Trends and Determinants*

In the late 1970s there was a consensus that pronounced fertility declines had occurred in many developing countries (Dyson and Murphy, 1985; Knodel, 1984). Bangladesh however was an exception and, even if some changes in fertility did take place, any analysis of those changes would be severely hampered owing to the poor quality and unreliability of its data. Nonetheless, because of recent improvements in data quality, particularly since the middle of the last decade, it is possible to examine trends in fertility patterns for the period 1975 -1985. However, some data from earlier periods are also used for drawing conclusions. Note should be taken of the fact that these data have specific methodological problems that raise questions about their comparability over time and cross-sectionally. Therefore, caution must be exercised in interpreting the estimates.

Many recent studies have indicated a modest decline compared with what was observed in the mid-1970s (Mahbud, 1987; CPS, 1985). The small change in overall fertility may be attributed partly to changes in age at first marriage and partly to the increased use of contraception. The age at marriage for females has increased from about 14 years in 1961 to about 18 years

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Table 1: Trends in crude birth rates, according to sources, 1911 - 1986.

Year	SYB ^{a/}	PGE ^{b/}	NIS ^{c/}	BRSFM ^{d/}	BFS ^{e/}	Plan-Comm. ^{f/}	USAID ^{g/}	NFPS ^{h/}
1911	53.8							
1921	52.9							
1931	50.4							
1941	52.7							
1951	49.4							
1961	50.0							
1962-1965	-	53.0						
1969			42.0	48.3				
1974					47.0			
1975								
1981						43.0		
1985						39.0		
1986							38.9	
1987								38.0

Sources: ^{a/} Statistical Year Book (SYB) of Bangladesh Bureau of Statistics, Dhaka, 1983.

^{b/} M.N.I. Farooqui and G.M. Farooq. Final Report of the Population Growth Estimation (PGE) Experiment, 1962-65, 1971.

^{c/} National Family Planning Board of Pakistan. Report on the National Impact Survey (NIS), Pakistan, 1969.

^{d/} Ministry of Overseas Development, London and Ministry of Planning, Dhaka. Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality (BRSFM), 1977.

^{e/} World Fertility Survey: Bangladesh Fertility Survey (BFS), 1975. First Country Report. Ministry of Health and Family Planning, 1978.

^{f/} National Family Planning and Fertility Survey. Mahbud, Planning Commission, Dhaka, 1986.

^{g/} United States Agency for International Development, Dhaka, 1986.

^{h/} National Family Planning Survey, op. cit.

in 1981 and contraceptive use increased from about 8 per cent in 1975 to 25 per cent in 1983.

The basic question raised in this note is whether any fertility transition occurred in Bangladesh. If there has been a transition, then what is its extent, and what was the timing of the start of that transition. The aim is also to assess the current level of fertility. The findings are discussed in socio-economic and cultural terms; implications for the future are suggested in light of the findings.

Data sources and their quality

Fertility data based on the vital registration system have been inadequate in terms of quality and coverage. The main sources of information for this paper are the national censuses, the population growth estimation, the National Impact Survey conducted in 1968/69, the Bangladesh Retrospective Survey of Fertility and Mortality conducted in 1974, the Bangladesh Fertility Survey (BFS) conducted in 1975 in collaboration with the World Fertility Survey and the Contraceptive Prevalance Surveys (CPS) conducted in 1979, 1981, 1983 and 1985. In addition to those sources, data from the Demographic Surveillance System of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) and the Bangladesh Bureau of Statistics provide supplemental information for the assessment of fertility levels and trends.

Retrospective fertility estimates derived from BFS birth history data have been found to be deficient for the distant past. There was a tendency for older women either to omit mention of births or to incorrectly date them (Brass, 1980) a pattern consistent with similar data sets elsewhere in the sub-continent (Booth and Shah, 1984). For this reason, past estimates of fertility should be taken with caution because of suspected backdating of more recent births.

Crude birth rate trends

Table 1 reveals the trend in crude birth rates from 1911 to 1987. The rates were obtained from various sources and are subject to varying sampling and non-sampling variability. As may be seen, the crude birth rates fluctuated around 50 per thousand population until the mid-1960s. Since independence in 1971, fertility declined slightly to about 47 per thousand. However, because of the varying quality of data, it is difficult to be precise about the onset of the fertility decline.

Table 2 : Crude birth rates from demographic surveillance and sample registration system, 1966-1985

Year	ICDDR,B ^{a/}	BBS ^{b/}
1966	47.1	
1967	45.4	-
1968	46.6	
1969	45.3	
1970	53.5	
1971	44.5	
1972	41.8	
1973	45.6	
1974	42.9	
1975	29.4	
1976	43.3	
1977	46.4	37.0
1978	34.8	33.4
1979	40.9	34.6
1980	41.2	34.8
1981	39.5	35.9
1982	40.7	34.8
1983	38.3	34.2
1984	42.5	

Sources: **a/** Demographic Surveillance System -Matlab. Vital Events and Migration Tables, International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B).

b/ Statistical Year Book of Bangladesh, Bangladesh Bureau of Statistics (BBS), Statistics Division, Ministry of Planning, Dhaka.

The ICDDR,B demographic data, although not representative of the country, are comparatively reliable. The information provided in **table 2** does not suggest a declining trend in crude birth rates. The sharp fall in the birth rate in 1975 may be attributed to the 1974 famine followed by severe monsoon flooding. The 1974 famine exerted a profound depressing effect on the birth rate, and the death rate climbed to a higher level than during the 1971 war of independence.

It is difficult to identify temporal trends in fertility and the factors that affect them. It may be argued that fertility levels in Bangladesh have been relatively high and fluctuating within a narrow range except in catastrophic



Catastrophic events in Bangladesh have depressed the birth rate and increased the death rate. However, difficulties caused by the quality of data in Bangladesh hampers any precise analysis of the country's fertility decline.

Table 3: Trends in age-specific fertility rates, 1983-1986
(per 1,000 women)

Age (years)	1953-1956 ^{a/}	1957-1960 ^{a/}	1960-1962 ^{b/}	1960-1962 ^{c/}	1963-1965 ^{d/}	1974 ^{e/}	1975 ^{f/}	1979 ^{g/}	1983 ^{h/}	1985 ^{i/}	1986 ^{j/}
15-19	292	331	234	321	253	198	111	306	265	114	126
20-24	372	301	337	333	331	331	289	252	267	274	235
25-29	337	250	280	334	335	311	291	239	229	282	266
30-34	246	206	258	274	241	262	250	203	181	224	135
35-39	152	123	161	160	140	197	185	153	108	167	135
40-44	70	48	34	93	52	95	107	68	49	45	87
45-49	-	17	18	-	18	14	35	17	6	12	35
(TFR per woman)	7.35	6.43	6.61	7.58	6.85	7.07	6.34	6.25	6.05	5.60	5.55

Source: a/ T-P. Schultz and J. Devanzo, *Analysis of Demographic Changes in East Pakistan* (USAID, 1970).

b/ M. Obaidullah, *Demographic Survey in East Pakistan*, 1961-62, ISRT, Dhaka.

c/ I. Sirageldin, D. Norris and M. Ahmed, "Fertility in Bangladesh, Facts and Fancies", *Population Studies*, vol. 29, No. 1, 1975.

d/ These data are the average of longitudinal registration data on estimated age-specific fertility rates and those of Chandrasekar - Deming. In M.N.I. Farooqui and G.M. Farooq, *Final Report of the Population Growth Estimation Experiment*, 1962-1965, (Dhaka, Pakistan Institute of Development Economics, 1971).

e/ Ministry of Overseas Development, London and Ministry of Planning, Dhaka, *Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality*, 1977.

f/ World Fertility Survey: *Bangladesh Fertility Survey* 1975.5. First country report, Ministry of Health and Family Planning, 1978.

g/ The 1979 Contraceptive Prevalence Survey (CPS), Ministry of Health and Family Planning, 1981.

h/ The 1983 Contraceptive Prevalence Survey, Mitra and Associates, 1985.

i/ Agency for International Development, Dhaka, 1986.

j/ National Family Planning and Fertility Survey, (Mahabud, Planning Commission, Dhaka, 1986).

situations such as war and famine. Although there are divergences between different series, the general trends are fairly similar. Presumably a transition in the crude birth rate began some time after 1975.

Age-specific fertility rate trends

Age-specific fertility rates for Bangladesh at various periods between 1953 and 1986 for Bangladesh as a whole are shown in **table 3**. The data suggest that in the 19.50s and 1960s the total fertility rate was over 7.0 children, which in the late 1970s seems to have fallen to about 6.3, a decline of about 13 per cent. A comparison of age-specific fertility rates obtained from ICDDR,B data also shows a similar trend in fertility (**table 5**).

Detailed investigation of age-specific fertility suggests that much of the change in fertility occurred among the younger age groups, those 10-14 and 15 -19 years of age. Fertility has declined substantially for the age group 15 -19, changing from 172 in the 1951-1955 period to 111 in the period 1971-1975. This is probably due to changes in marriage patterns, which occurred between 1951 and 1974. As mentioned previously, there has been an increase in the age at marriage, owing to a rise in the age at menarche (Chowdhury *et al.*, 1978). As age at marriage in traditional rural societies is closely associated with the onset of puberty, an increase in age at menarche leads to postponement of marriage. Besides, the poor nutritional status of females may also be a reason for adolescent subfecundity (Huffman *et al.*, 1978). The age-specific fertility rates shown in **table 4** reveal an irregular pattern. In the case of the age group 20-24, there is no consistent trend. The pattern of fertility shown in **tables 3 and 4** may be described as an early marriage, high fertility pattern.

The change in fertility may be directly attributed to two important factors. These include an increase in the contraceptive prevalence rate and a change in the proportion married in the younger age groups. The age-specific marital fertility rates obtained from various sources are given in **table 6**. The data indicate a noticeable drop in marital fertility rates between 1962 and 1983. According to the 1962-1965 schedule, a woman would have borne 8.0 children, on average, throughout her child-bearing period. If the age-specific marital fertility rate of 1983 prevailed, women would have given birth to 6.0 children.

Unlike age-specific fertility rates, marital fertility rates demonstrate a gradual change since 1962- 1965. The age-specific marital fertility rates have declined for the age group 15 - 19, although there was a slight rise in 1983.

Table 4: Age-specific fertility rates estimated from 1975 Bangladesh Fertility Survey pregnancy history data, 1951-1975

Age of women at birth of child	Period				
	1975-71	1970-66	1965-61	1960-56	1955-51
15-19	111	177	186	187	172
20-24	289	360	337	300	308
25-29	291	360	343	305	274
30-34	250	332	303	242	
35-39	185	241	222		-
40-44	107	146			
45-49	35				-
Total fertility rate	6.35	8.26*	7.86*		

Note: * Truncated exposure.

Source: Same as table 3.

Despite the relatively poor quality of the data for Bangladesh, the age pattern of marital fertility is plausible because very few young women practise contraception and, since age at marriage is low, a relatively large number of 15 - 19-year-old women are married.

Table 5: Age-specific fertility rates in Matlab (1976-1983)

Age of women	Age-specific rate per 1,000 women							
	1976	1977	1978	1979	1980	1981	1982	1983
15-19	158.8	177.1	117.4	129.7	126.1	115.7	122.2	114.2
20-24	351.0	349.1	237.2	296.1	283.9	283.5	271.4	260.6
25-29	289.6	316.0	241.2	301.9	292.9	283.0	211.2	258.5
30-34	266.3	215.9	209.7	245.3	246.6	218.2	237.9	215.6
35-39	127.3	152.4	135.1	153.8	154.2	151.8	154.3	143.2
40-44	41.3	49.3	50.7	40.0	57.8	42.8	46.2	51.9
45-49	11.4	12.4	10.5	8.1	12.4	10.5	11.4	12.4
Total fertility rate	6.2	6.6	5.1	5.9	5.9	5.5	5.6	5.3

Source: Vital events and migration tables, Demographic Surveillance System, Matlab.

Table 6: Age-specific marital fertility rates (TMFR) for currently married women, 1962-1983

Age of women	1962-63	1974	1975	1979	1983
10-14	107	—	—	85	28
15-19	312	282	168	221	256
20-24	353	353	320	252	284
25-29	324	314	316	239	246
30-34	262	263	276	203	200
35-39	159	198	219	153	124
40-44	80	96	136	68	60
45-49	—	14	49	17	08
TMFR	8.0	7.6	7.5	6.2	6.0

Source: Same as table 3.

Marital fertility is higher for women aged 20-24 than for younger women, but it declines among those in higher age groups. This pattern is consistent with a rising age at marriage, which may be a factor in the country's fertility transition. Whether the rise in age at marriage is due to a change in social and economic conditions, such as the status of women, education, employment opportunities for women, and urbanization, or due to fertility regulation is a question that remains to be answered.

Urban and rural differentials

Urban and rural differentials were not pronounced in the case of current fertility (**table 7**). The total fertility rates among currently married women were slightly higher in the rural areas than in the urban areas (Ahmed, 1979).

Census and survey data show very small urban-rural parity differences. The mean number of children ever born to ever-married women by their current age shows that except for the younger age groups (15 - 19 and 20-24), all rural women have had a slightly higher fertility rate compared with urban women (**table 8**). There are several explanations for the higher fertility of younger urban women. First, urban women may be less affected by adolescent sterility, secondly, better health and nutrition in urban areas might contribute to higher fertility in urban areas. Rural migrants in urban areas are likely to have better food and nutrition and this might have weakened the fertility-depressing factors

Table 7: Age-specific marital fertility rates, by urban and rural area

Age of women	Urban				Rural			
	1966-70	1971-75	1979	1983	1966-70	1971-75	1979	1983
	15-19	314	319	289	297	370	215	305
20-24	366	304	278	290	298	285	249	283
25-29	308	261	230	213	340	237	240	250
30-34	282	183	200	187	305	200	203	202
35-39	167	122	115	122	198	131	157	125
40-44	91	52	84	26	94	61	65	63
45-49	25	14	26	-	24	16	16	9
Total marital fertility rate	8.065	6.215	6.110	5.675	8.145	6.025	6.175	6.075

Source: Same as table 3.

of adolescent sterility, subfecundity and lactational amenorrhoea among the migrants. Further, the pattern of breast-feeding and lactation could also contribute to higher urban fertility (Huffman *et al.*, 1980). There is empirical evidence that the mean duration of breast-feeding is lower for urban women than for rural women (Kabir and Sufian, 1983).

Table 8: Mean number of children ever born to ever married women, by rural and urban area

Age of women	Urban			Rural		
	1974	1975	1983	1974	1975	1983
15-19	0.7	0.9	0.9	0.6	0.7	0.9
20-24	2.0	2.4	2.1	1.9	2.5	2.4
25-29	3.4	4.7	3.7	3.5	-	4.0
30-34	4.8	-	5.2	5.0	4.9	5.7
35-39	5.9	6.6	6.3	5.9	6.9	6.8
40-44	5.8		7.4	6.2		7.7
45-49	5.8	7.0	7.7	6.1	6.7	7.8

Source: Same as table 3.



Among rural women in Bangladesh, fertility rates are slightly higher than for urban women, except those in the younger age groups.

The better educated, higher income groups usually live in urban areas. As a consequence, any incipient change in reproductive behaviour as well as other factors such as increased age at marriage, improved status of women and their involvement in economic activities outside the home, desire for small family and higher aspirations for children may also play a crucial role in this phenomenon.

From the preceding discussion, it is plausible to conclude that, if the estimated fertility level derived from the 1975 Bangladesh Fertility Survey is correct, then fertility probably began to decline around 1975. This conclusion is also supported by the data derived from other sources. The change in fertility may be attributed to two important factors: change in the marriage pattern and an increase in the contraceptive prevalence rate.

Proximate determinants of fertility

Family size depends not only on the extent to which births are controlled within marriage, but also on the age of entry into marriage. Cultural norms, demographic patterns and socio-economic factors all play a part in shaping the character of marriage in a society (Karim, 1984; Aziz *et al.*, 1985). The downtrend in fertility would occur as a result of the combined effects of socio-economic and cultural changes, notably better education, urbanization, declining infant and child mortality and the increasing use of family planning methods. Access to employment is also a major determinant of reproductive behaviour. These factors, which help to determine marriage patterns, may also influence fertility. A higher level of female education, for example, is likely to encourage women to postpone marriage, and it can also expose women to ideas and information which lead them to accept contraception or to value smaller families. Thus, women who marry at later ages may have fewer children not only because they have less time available for child-bearing, but also because their attitudes and expectations are different.

Efforts to identify important influences on marriage and fertility patterns are complicated by the fact that marriage, fertility and many socio-economic factors interact in many ways. There is no set pattern in the way these elements influence each other; women who seek higher education will probably delay marriage and child-bearing but an early marriage may prevent a woman from obtaining further education.

The singular mean age at marriage provides a summary measure of a country's marriage pattern. **Table 9** shows the changes in that measure over the years. Although the age at marriage is still low in Bangladesh, an upward trend in age at marriage is evident. However, despite the upward trend, it should be emphasized that, even by Asian standards, Bangladesh as a whole still has

Table 9 : Singulate mean age at marriage (SMAM) for women aged 15 to 49,1921-1982

Year	Source	SMAM
1921	Census	12.3
1931	Census	12.6
1941	Census	13.7
1961	Census	13.9
1965	PGE	14.8
1974	BRSFM	16.6
1975	BFS	16.3
1980	BLDS	16.4
1981	VRS	17.8
1982	VRS	17.7

Sources: Recent Trends in Fertility and Mortality in Bangladesh. Proceedings of a National Seminar, Population and Development Unit, Planning Commission, Dhaka.

Note: See tables 1 and 3 for acronyms.

a very early marriage pattern. The change in marriage pattern is also reflected by a change in the proportion never married for the age groups 15-19 and 20-24, respectively (**table 10**). This change in age at marriage has contributed moderately to the fertility decline.

The importance of breast-feeding in regulating individual fertility has been recognized in many studies. The duration of post-partum amenorrhoea suggests that breast-feeding plays an important role in the regulation of ferti-

Table 10: Percentage of never married women in age groups 15-19 and 20-24,1961-1981

YCW	Source	Per cent never married	
		15-19	20-24
1961	Census	08.3	1.3
1974	BRSFM	24.5	3.2
1975	BFS	29.8	4.6
1981	Census	31.3	5.1

Source: Same as table 9.

Note: See tables 1 and 3 for acronyms.

lity in Bangladesh. The Bangladesh Fertility Survey reported an average of 27 months of breast-feeding. As may be expected, the single most important determinant of aggregate fertility in Bangladesh is post-partum infecundity. Previous research has suggested that one of the determinants of the decline in fertility in Bangladesh is the increased use of contraception and perhaps post-partum sterility (Kabir and Mosleh Uddin 1985, 1987).

The need to measure the fertility reduction attributable to contraceptive acceptance and use was recognized with the introduction of the national family planning programme. The importance of the national programme lay not only in the provision of contraception but also in the increasing awareness of the possibility of controlling family size through effective and acceptable means.

Information dissemination by the family planning programme was of great significance. Among populations, contraceptive practice is the intermediate fertility variable primarily responsible for the wide variation in the levels of fertility within marriage. **Table 11** shows the trends in contraceptive prevalence rates since 1975. Between 1975 and 1985, the current use of contraception increased from 7.7 per cent to 25.3 per cent and the current use of modern methods has risen, particularly between 1983 and 1985. **Table 12** shows the distribution of current users, according to the method being used, classified by current age. In 1975, the pill was the most popular method, followed by the condom and sterilization; by 1985, the situation had been re-

Table 11. Contraceptive prevalence rate obtained from various surveys

Source and year overall	Per cent of women using:				Overall percentage
	Pill	IUD	Sterilization	Other	
BFS/WFS 1975	2.7	0.5	0.8	3.7	7.7
BCPS 1979	3.6	0.2	3.3	5.0	12.1
1981	3.5	0.4	4.8	9.9	18.6
1983	3.3	1.0	7.4	7.4	19.1
1985	5.2	1.5	9.4	9.2	25.3

Source: Kabir and Mosleh Uddin (1987). "Fertility in Bangladesh," *Journal of Biosocial Science*, vol. 19, pp. 345-350.

Table 12: Percentage distribution of current users of contraception, by method used and current age

Age	Modern permanent method			Modern temporary method			Traditional method		
	1975	1981	1983	1975	1981	1983	1975	1981	1983
Less than 20	0.1	0.5	0.9	2.2	5.5	6.9	1.0	6.2	7.4
20-24	0.4	2.5	5.6	5.0	6.8	7.7	2.7	8.3	4.8
25-34	1.0	14.5	22.9	6.6	16.4	15.8	2.8	18.2	12.2
35-44	3.0	16.4	22.4	5.8	12.1	9.1	4.1	18.1	16.3
45 +	0.7	4.1	5.3	0.3	2.2	2.7	2.8	6.2	3.4

Sources: World Fertility Survey, Bangladesh Fertility Survey, Ministry of Health and Population Control, Dhaka, 1978; Bangladesh Contraceptive Prevalence Survey - 1981, Management Information System (MIS) Unit, Ministry of Health and Population Control, Dhaka, 1983; and Bangladesh Contraceptive Prevalence Survey - 1983, Mitra and Associates, Dhaka, 1985.

Note: The data do not add up to 100 in either of the ways possible because the percentage of current users in each cell has been calculated with respect to the total number of currently married women in each specific age group.

versed as is evident from **table 11**, with sterilization becoming the most commonly used method (37 per cent) followed by the pill (21 per cent). The increased use of modern contraceptive methods from 4.7 per cent to 18.4 per cent over a 10-year period, when the family planning programme was expanding, is plausible. **Table 12** suggests that the use of permanent methods, such as male and female sterilization, is higher at older ages; modern, temporary methods such as the pill, condom and other such methods are more popular among younger couples. Among the oldest women of child-bearing age (40-49) the lower percentage of modern permanent method users may be due to the number who believe themselves to be approaching menopause and who consider sterilization unnecessary for the remaining child-bearing period.

With regard to family size, the greatest use of modern permanent methods occurs among women with three or more children. Temporary modern methods are popular among women with fewer than four living children. The relationship between current family size and current use provides a direct indication of the influence of couples' actual reproductive behaviour. It appears that couples tend to use contraception after having two living children (**table 13**).

Table 13: Distribution of current users of contraception, by number of living children

Living children	1975	1981	1983
0	2.0	4.8	5.5
1	6.6	12.2	11.3
2	7.9	20.3	21.1
3	11.1	24.5	24.4
4	11.5	23.5	25.8
5+	14.9	23.8	24.4

Sources: World Fertility Survey/Bangladesh Fertility Survey, Ministry of Health and Population Control, Dhaka, 1978; Bangladesh Contraceptive Prevalence Survey - 1981, Management Information System (MIS) Unit, Ministry of Health and Population Control, Dhaka, 1983; and Bangladesh Contraceptive Prevalence Survey - 1983, Mitra and Associates, Dhaka, 1985.

The relative influences of nuptiality, contraceptive use and effectiveness and duration of post-partum infecundity were measured using Bongaart's proximate determinants model (Bongaarts, 1978, 1982). In the model, the indices* measure the fertility effects of the main proximate determinants. The indices of proportion married for different dates are shown in **table 15**. A gradual

Table 14: Components of index of contraception (proportion using contraception and method effectiveness for different surveys)

Source	Year	Proportion using	Method effectiveness
BFS/WFS	1975	0.077	0.818
BCPS	1979	0.121	0.846
BCPS	1981	0.186	0.821
BCPS	1983	0.191	0.864
BCPS	1985	0.253	0.867

Source: Same as table 11.

Note: See tables 1 and 3 for acronyms.

* Cm represents the proportion married; Cc, use effectiveness of contraception; and Ci, post-partum infecundity. Each index ranges from 0 to 1. A value of 1.0 denotes no fertility-inhibiting effect, while decreasing values from unity towards zero signify an increasing reduction of fertility by the determinants; hence, the lower the value the greater the effect. Each index equals 1 minus the proportionate reduction in fertility caused by its associated determinant. The index of proportion married is calculated as the weighted average of the age-specific proportions married with the weight given by the age-specific marital fertility rates.

Table 15: Estimates of the indices of proximate determinants and of fertility levels

Source	Year	Indices			Fertility measures.				
		Cm	Cc	Ci	TF	TN	TM	TFR	Observed TFR
(BFS/WFS)	1975	0.859	0.932	0.524	15.3	8.0	7.5	6.4	6.3
BCPS	1979	0.850	0.889	0.524	15.3	8.0	7.1	6.0	6.3
BCPS	1981	0.838	0.835	0.524	15.3	8.0	6.7	5.6	-
BCPS	1983	0.829	0.822	0.524	15.3	8.0	6.6	5.5	6.1
BCPS	1985	0.810	0.763	0.519	15.3	7.9	6.1	5.0	5.6

Source: Kabi and Musleh Uddin (1987). "Fertility in Bangladesh," *Journal of Biosocial Science*, vol. 19, pp. 349350.

Note: See page 68 for abbreviations.

rise in age at marriage since 1975 is reflected in the decline in this index. However, between 1975 and 1985, this index did not change much, declining from 0.86 in 1975 to about 0.81 in 1985.

Table 15 also shows the index of contraception while **table 14** gives the components of the index of contraception. However it is difficult to assess the reliability and quality of the information and consequently the number of eligible couples protected, through the family planning programme (Kabir and Mosleh Uddin, 1985). In the mid-1970s, the effect of contraception was negligible (the index of contraception was only 0.93).

The figures in **table 14** show that method effectiveness increased between 1981 and 1985. In 1985, contraception reduced fertility by about 24 per cent in Bangladesh ($C_c = 0.76$). In terms of effect on fertility, the data on contraception suggest that, if couples stopped practising contraception, then fertility would have been 25 per cent higher in 1985. The model TFR (5.0) in 1985 is very close to that observed, 5.6, indicating that the measurement of the proximate determinants is adequate.

Discussion and conclusion

Based on this information and previous research, the question of fertility change proved to be very complex and it is difficult to give an adequate explanation of Bangladesh's fertility transition, owing mainly to the poor

quality and unreliability of data. Total fertility remained stable 'between the 1960s and mid-1970s according to various sources of data. Since 1975, a tendency towards declining fertility has been observed. Total fertility fell by about 12 per cent between 1975 and 1985. The model estimate of the total fertility rate is slightly lower than the observed rate.

According to Bongaart's classification, Bangladesh is in the second phase of transition, during which the use of contraception is modest; the effect of breast-feeding is a dominant factor, however. Analysis of this trend confirmed that most of the decline was due to adoption of modern contraception and partly due to a rising age at marriage (Kabir and Mosleh Uddin, 1987).

Since the quality of data derived from the 1985 survey has not been assessed, the evidence of fertility decline is hazy. Moreover, the analysis has been confined to the variability of reported fertility rates from various sources. Overall, the age at marriage is still quite low and may have only secondary effects on fertility up to the present time, but as there has been a gradual increase in age at marriage since the mid-1970s and it can be reasonably expected that this trend will continue, the marriage variable is likely to have a stronger fertility-inhibiting effect in the future.

There is reason to suspect that some social and economic changes have been taking place and these have caused a greater acceptance of the family norm. Although the cultural setting is not favourable to the acceptance of deliberate fertility regulation and limitation of family size, there is evidence that couples are adopting family planning.

Independent data on contraceptive use suggests that the prevalence rates in 1975 were very low, in the neighbourhood of 8 per cent of currently married women of reproductive age. However, prevalence has risen to over 25 per cent according to the 1985 Contraceptive Prevalence Survey (Mitra and Associates, 1987). Organized efforts to provide modern contraceptive methods, particularly through the Government's national family planning programme, resulted in a massive awareness of the accessibility of various acceptable means of fertility regulation.

In any society, the impact of social and economic change on reproductive behaviour is mediated through the cultural setting. Although Bangladeshi culture is not conducive to the limitation of family size and the adoption of family planning, available information reveals that there is a latent demand for family planning and a desire for spacing births. This suggests that there is scope for further decreases in desired family size, and increase in the practice of contraception and a reduction in fertility. Thus, improved contraceptive practice is the factor that is most likely to bring about great fertility reduction. (See pages 3 -28).

How the preference for low fertility will be translated into actual behaviour is not entirely clear and has not been investigated statistically. However, contraception and, perhaps to a lesser degree, age at marriage will probably be the important mechanisms in future fertility reductions. Whatever the explanation, the three major proximate determinants cannot account completely for the variations in the fertility levels. The influences of other determinants, such as spouse separation, post-partum abstinence, abortion and sterility, cannot be ignored.

Improvements in the measurement of proximate variables will undoubtedly yield useful new insights into their fertility-inhibiting effects. Perhaps an even more important benefit from obtaining more refined data on the proximate variables would be the potential for in-depth analysis of the effects of socioeconomic variables that must operate through the proximate determinants to affect fertility.

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