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WORKER-CLIENT EXCHANGES AND THE  
DYNAMICS OF CONTRACEPTIVE USE IN  
RURAL BANGLADESH

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## ABSTRACT

Theories of the determinants of reproductive behavior widely assume that societal and familial characteristics are major influences on household decision making. Systematic research on a cohort of rural Bangladeshi couples has shown that the quality and quantity of contact between public sector health and family planning workers and rural women also represent a significant determinant of contraceptive decision-making. This finding brings into question theories of reproductive behavior that fail to take account of the critical roles of programs and policies in affecting contraceptive use dynamics in rural traditional societies.

This paper presents an analysis of social and economic characteristics of households as well as discrete systematic service interventions in the public sector health and family planning program in Bangladesh. Data for this paper are based on an experimental policy development project in which the International Centre for Diarrhoeal Research, Bangladesh collaborates with the Ministry of Health and Population Control in Bangladesh in a joint effort to improve program operations.

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## INTRODUCTION

Whether service programs can induce and sustain demographic change in rural traditional societies continues to be the subject of debate despite nearly two decades of discussion of this issue in the population policy literature.(1) This paper addresses an issue relevant to this debate -- whether worker-client exchanges can induce contraceptive use once adjustment is made for the potential role of underlying demand.

Recent findings from pilot projects in rural Bangladesh have generated renewed interest in this issue. Findings from small scale field projects has demonstrated that carefully administered intensive domiciliary service programs can have a dramatic demographic impact in rural Bangladesh.(2) This outcome of field research has not been widely anticipated in the sociological literature on Bangladesh. Relevant theory based on the available social research on fertility determinants in Bangladesh suggests that demand for contraception is not only weak, it is unlikely to spontaneously arise owing to social, economic, and institutional conditions that perpetuate a high fertility norm. (3) Village life is fraught with multiple risks -- to families from economic adversity, to communities from ecological uncertainty, and to society at large from high mortality, political instability and weak social cohesion. This climate of risk sustains traditional fertility motives because children are perceived to be a means of protection against the consequences of economic and environmental adversity.(4) Social diffuseness is exacerbated by poverty and uncertainty and reinforced by geographic and ecological conditions in which communities lack cohesion, and villages lack permanence or boundaries.(5) Traditional institutions for village governance have been correspondingly weak, a historical problem that contemporary political institutions have failed to resolve.(6)

In the fertility determinants literature social diffuseness and extreme poverty are posited to have critical consequences for population policy. Just as social forces often reinforce individual behavior that is at odds with the collective good, individual families derive perceived benefits from high fertility, despite the obvious threat that rapid population growth represents to society at large.(7) Studies demonstrate that children represent a critical economic resource to families, particularly if sons are born early in marriage.(8) The security value of sons serves to reinforce and sustain high fertility despite the obvious long term societal risks imposed by rapid population growth.(9) Evidence is accumulating that demographic pressure is impairing economic progress,(10) and that already adverse conditions may be worsening owing to the distress sale of land,(11) declines in real income,(12) growing illiteracy,(13) and increasing nutritional adversity.(14) Severe

ecological, organizational, and historical constraints to development impair rapid solutions to these problems, which some analysts characterize as a systemic malaise which little short of an upheaval in social institutions can resolve.(15)

Those who are skeptical of the prospects for the success of service supply oriented policies in Bangladesh argue that institutional determinants define the societal context in which service programs succeed or fail. In this view, service programs have no independent causal role, because services aimed at facilitating fertility regulation are at odds with vital familial interests.(16) Policy interventions are therefore more appropriately targeted on the structural barriers to fertility change, whereby communities, not individuals, are the clientele for policy interventions. (17)

While the policy implications of the institutional determinants framework have been the subject of debate,(18) there is a general consensus in the policy literature that contraceptive services can never generate demand, no matter how conveniently or effectively services are supplied, since reproductive norms and preferences are exogenously determined and structured by social forces far too comprehensive to address with service encounters alone.(19) While it is often argued that programs can have effects by meeting latent demand (20), some social theorists argue that the provision of services can only enhance the efficiency of contraception among couples who would otherwise attempt to regulate fertility. In this view service systems substitute one form of contraception for another, and are extraneous to the determinants of reproductive norms and aspirations.(21)

What is motivating the present paper is the accumulation of empirical evidence that the conclusions derived from this literature, while compelling, are probably wrong. Several serious reviews of the social situation in Bangladesh conclude that contraceptive service programs will not work unless sweeping societal change occurs first; yet, several pilot contraceptive services are demonstrating impressive success.(22) Even the Bangladesh national program, while falling short of achieving its ambitious aims, has achieved a notable degree of success when coherent policies have been promulgated and services have been made accessible to rural couples.(23) While research demonstrates that distribution of contraceptive commodities by untrained workers has no lasting demographic impact,(24) it is clear that domiciliary services that provide multiple methods, intensive follow-up, MCH referral services, and ancillary care, the demographic effects can be dramatic and sustained.(25)

Current Bangladesh Government policy seeks to accommodate both the service supply and demand generation schools of opinion with a program comprised of multiple components. While official documents on this program have yet to attempt to specify these components into a unifying framework, it is implicit in official strategy that service programs are viewed as an integral part of the institutional determinants of fertility, reinforcing and sustaining fertility regulation behavior where the motivation to contracept is weak and practice is sporadic in the absence of active program support.(26) Demand generation schemes are also important components of Government of Bangladesh policy.(27) While not explicitly stated in official documents, service delivery is nevertheless viewed as the critical set of endogenous fertility determinants, with the highest priority for program development resources over the next five years. In the forthcoming Third Five Year Plan further development of village outreach services, aimed at providing convenient and comprehensive care to all couples, is a central strategic element.

Despite the official importance consigned to outreach services, and the extensive resources committed to this strategy, virtually no systematic research has examined its potential impact as a net fertility determinant. Moreover, the available literature on institutional determinants typically omits reference to the entire issue of program effort and service supply, except to question the general relevance of household oriented policies in situations such as Bangladesh.(28) This paper neither tests the institutional framework nor challenges the validity of specific determinants posited to explain demographic dynamics in rural Bangladesh. Rather, it examines the hypothesis that worker-client exchanges aimed at making contraceptive care convenient, safe, and effective can constitute a net determinant of reproductive behavior, even where institutional conditions constrain demographic change.

To pursue this test in the present analysis we examine the proximate operational variable through which behavioral effects could arise: exchanges between service workers and rural women. Several distinctions are helpful in delineating the type of worker-client relations analyzed. One essential distinction relates to the initiation of the relationship. Service encounters may be client or worker initiated. Within the specific programmatic context discussed here, however, initiation of contact rests with the field staff. The Government of Bangladesh program is structured to have a major outreach component because service utilization at static clinics is low. We focus on this aspect of service supply because client initiated exchanges reflect user motivation rather than program effort. The encounters analyzed are reported visits recalled by respondents as face-to-face contacts occurring in the home or the neighborhood of the client. Exchanges thus involve clientele who

are passive with respect to receiving services and workers who have only a limited range of services to offer in women's homes.(29)

An additional distinction is the degree of dependence of clients on service providers. Hasenfeld (1978) has argued that "a client is dependent on the service organization 1) in proportion to his need for resources or for the performances the organization provides, and 2) in inverse proportion to the ability of others to provide the same resources or performances." (30) While baseline survey data suggest that knowledge of alternative supply sources is widespread, and that commercial contraception is available through the outlets of the Social Marketing Program, for all practical purposes the Government program is the main source of modern contraceptive methods in study areas. Owing to social restrictions on the mobility of women, most respondents in this study are not free to travel. Moreover, communications systems are poorly developed, travel is expensive, and financial resources are scarce.(31) Thus respondents in this study are largely dependent upon outreach workers for services despite available alternative sources of services.

A further distinction in this analysis concerns the bureaucratic context in which workers deliver services. Outreach can be provided in special non-governmental projects or by workers of the public sector program. To some analysts, the dramatic impact of special projects in Bangladesh arises not only from their capacity to deliver comprehensive services, but also because their intensity, organizational integrity, and comprehensiveness can alter aspirations and perceptions of the outside world in ways that generate demand.(32) Effects are thus not limited to supply effects, but also to the unique capacity of special projects to generate demand. We therefore analyze data from the public sector program derived from panel interviews of respondents who have no prior history of exposure to special service delivery systems and no intrinsic reason for assigning special credibility to the Government workers responsible for outreach services.

A final notable distinction in this analysis is that we are deliberately selecting an unpromising group for establishing that contact might have behavioral effects. All respondents are rural women living under social conditions widely viewed as un conducive to contraceptive practice. We choose only non-contracepting women from a sample longitudinal survey as the study population.

We test the null hypothesis, therefore, that a passive non-contracepting cohort of women will be unresponsive to service exchanges over time. If net behavioral effects arise from services in such a severely constrained test, then the analysis lends support to the view that program effort in providing household level services is an endogenous institutional determinant of fertility regulation behavior. We proceed by specifying the conceptual framework for the analysis, the data and methodology for the estimation of statistical models, the outcome of tests, and the implications of findings for policy.

## CONCEPTUAL FRAMEWORK

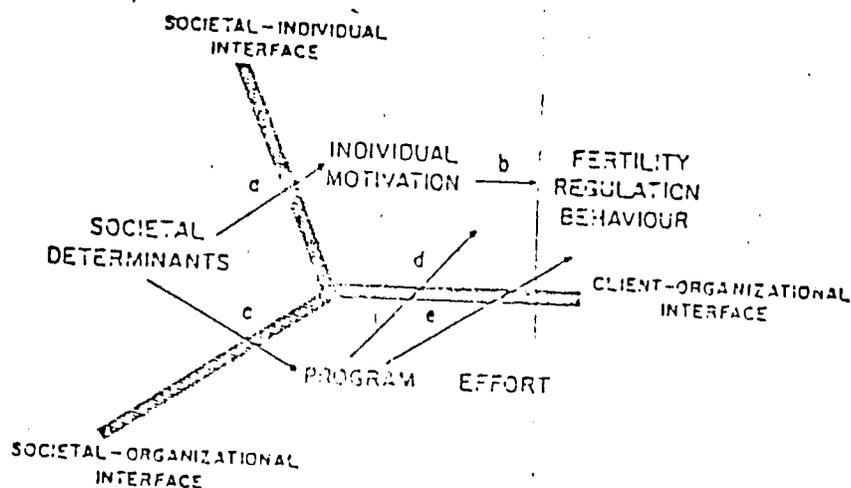
### The Institutional Context of Worker-Client Exchanges

The determinants of fertility regulation are diagrammed in Figure 1 as three sets of determinants, each of which is complex and multidimensional. In the framework depicted, societal determinants affect individual reproductive preferences ("a" in Figure 1) which, in turn, directly effect fertility regulation ("b" in Figure 1). Societal determinants also affect organizing capabilities, program strength, and operational integrity ("c" in Figure 1). Pathway "a" concerns the community, structural, and institutional determinants of fertility.

Much microdemographic research has been directed to achieving an understanding of the determinants in pathway "a". Relatively little systematic study has been addressed researching the organizational and programmatic consequences of these determinants ("c" in Figure 1). We nevertheless consider pathways "a" and "c" as inappropriately examined with statistical methods. They concern institutional issues that are pervasive and invariant in rural Bangladesh, and thus constant across individuals and classes, defining a common context in which the varying effects of program effort and individual motivation can be examined. Systemic determinants represent a constant in the statistical sense, best analyzed in micro-demographic studies or systems analyses.

That institutional determinants are not incorporated into statistical models in no sense weakens the present analysis. It is against the structure that institutional determinants lend to individual decision-making that we examine the covariation of program effort with fertility regulation behavior. Our specific concern is the combined effects of pathways "d" and "e" and the interface between organizational effort and client behavior as represented by the operational proximate determinant of such effects--worker-client exchanges. The analysis tests whether this aspect of program effort can have net effects on individual reproductive behavior, either through demand generation ("d" in Figure 1) or by addressing unmet demand for services through the

Figure 1: A Conceptual Framework for the Role of Three Key Sets of Fertility Determinants.



Source: Phillips, et al., 1985

convenient supply of contraceptive care ("e" in Figure 1) over and above the exogenous influences of societal factors.

While structural determinants are constant across individuals, individual preferences and background characteristics are variable, and represent possible contaminants of net service supply effects in the analysis. Variables such as age, parity, maternal educational attainment, relative household economic status, and religion are attributes of individuals and households that studies have consistently shown to be related to contraceptive use differentials in Bangladesh.<sup>(33)</sup> The independent effects of household characteristics are therefore introduced as multiple statistical controls in the analysis. We also incorporate parameters for stated intentions to contracept and the stated desire to limit to adjust for individual level variance in demand.

Our analysis is informed by formal organization theory literature on the determinants of effective client relations in human service organizations. Client relations are viewed as a component of a complex nexus of determinants that are both external and internal to service organizations.<sup>(34)</sup> As Simmons, et al., 1985 have noted:

"Socio-economic, political and cultural influences shape the nature of client relations through several causal paths. First, they affect the program itself - the behavior of workers, their orientations toward the job and the client, the type of services offered and worker client ratios. Second, societal influences shape the family

planning policy and management system which directs and controls the worker. Third, societal influences determine the clients' response to the worker's initiatives. What is unique about client worker relations then is that their position at the interface between the program and the client exposes them to societal influences not just from one but from several sources."(34)

What distinguishes this argument from the institutional determinants literature is the view that household oriented policies can make a difference, even in the face of structural obstacles introduced by the broader societal context.(35) While the causal structure of the role of worker-client exchanges is complex; we focus on the two key interrelated elements of exchanges noted by Simmons et al.(36): the quality of exchanges and their quantity.

Our research on the framework in Figure 1 is based on data from The MCH-FP Extension Project. The Extension Project is aimed at inducing organizational change and development in the Bangladesh national population program through a paradigm of collaborative field work and research. The project was launched in 1983 as a field study in the rural subdistricts of Sirajganj in central Bangladesh and Abhoynagar near the western border of Bangladesh with India (See Figure A1). The project is conducted jointly by the Government of Bangladesh and the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). Work was launched in response to a joint MOHPC-ICDDR,B review of the progress of the Family Planning Health Services Project (FPHSP) in Matlab which concluded that comprehensive family planning services can have major demographic effects in rural Bangladesh. This indicated a need to test whether FPHSP strategies could be adapted to the public sector program in order to replicate, to some extent, the Matlab results under the realistic operational constraints of the national program. This new study involved utilizing the existing staff and field resources of the MOHPC in two subdistricts with workers from the ICDDR,B providing training and counterpart support for the transfer process. Research conducted by the ICDDR,B identifies the barriers to transfer, and the prospects for improving the impact of services in the public sector program through organizational change and development.

Data are available from the Sample Registration System (SRS) of the Extension Project which permit analysis of the effects of the quantity and quality of work, as indicated by the effects of treatment indicators. When the effects of work quantity are controlled in analyses, it is the variance in the organizational context of worker-client relations induced by the Extension Project treatments that assesses the net effects of improving work quality on contraceptive practice.

The design of the Extension Project and its relationship to the Matlab experiment have been described elsewhere.(37) A brief synopsis of the project design, nevertheless, appears in Appendix A. Important structural differences distinguish the Matlab project from the Government service system, most notably the Government policy of separating the administration of health services from family planning services, and the practice of assigning field responsibilities for health to male workers, designated Health Assistants (HA), and field responsibilities for family planning to female workers, designated Family Welfare Assistants (FWA).(38) In Matlab a unified management structure is developed, and all domiciliary services are provided by female village workers.(39)

Field activities of the Extension Project are aimed at identifying key problems in the MOHPC system, elements in the Matlab approach that can resolve them, and systematic efforts to change services in limited areas of rural Bangladesh. Activities are comprised of three interventions: a) Joint ICDDR,B-MOHPC committees are constituted at the subdistrict level to address project planning needs.(39) This represents an intervention in the sense that management capabilities have been introduced in the course of this joint work that were not previously in place. b) Training courses were offered by the project which involved two weeks of classroom sessions focused on contraceptive technology, service delivery techniques, and management techniques, collectively termed the "Training Only" cell of the experiment. c) Although training is conducted in all intervention areas of the Extension Project, a "Counterpart Support" condition has been designated which is comprised of limited areas where service workers from the Matlab area are assigned as counterparts for to their Government colleagues to introduce new concepts of service delivery, household communication, and task planning through on the job training.(40) A third area of the Extension Project has no special interventions, and serves as a comparison area for evaluation purposes.

Taken together the interventions of the Extension Project have been described as "organization development," a paradigm for collaborative problem solving, organization diagnosis, and change that has been applied widely to private sector organizations in developed countries but has yet to be widely applied in developing countries.(41) This system of intervention and evaluation has, as a central aim, improving the quantity of care through the intensification of outreach services and a broadening the knowledge and skills of household visitation workers in order to correspondingly broaden the range of services available to rural couples.(42)

Constraints on the project design were deliberately imposed by the Government to enhance the replicability of Extension Project findings in the national program. Unlike Matlab, the ICDDR,B is not providing services or special resources in study areas. Services are to be provided by the usual Government workers in study areas, using existing resources and working within the usual administrative constraints of the public sector bureaucracy. The role of the ICDDR,B is to provide technical assistance in transferring service approaches to the Government through field based training. Efforts to introduce change involve collaborative implementation committees for joint problem solving. Although the conduct of the study in the field is complex, the delineation of training only versus training plus counterpart support permits statistical tests of the effect of direct field involvement of Matlab workers relative to a less intensive intervention.(43) The comparison cell provides a basis for assessing overall project impact through comparison of usual service areas with the two intervention cells.

The objective of field work was to introduce into the MOHPC system, a new system of management, based on the Matlab model, which included field scheduling, record keeping, logistics, and other aspects of system support. The basic management tool of this system is a hand-held register that field workers use to record services provided in the course of household visits, a system of meetings for progress reporting and problem solving based on these registers, and communication of field needs to subdistrict level managers.

The Extension Project constitutes a paradigm for policy development that is more general than the interventions described above.(44) From the client's perspective, however, the interventions of the project, if successful, result in more regular and frequent visits by workers who have better interpersonal communication skills and a wider range of services to offer than such workers previously possessed. These changes in worker capabilities, in turn, are posited to have direct effects on their credibility, and ultimately, some effect on contraceptive behavior.

#### THE STATISTICAL MODEL

Our test of the hypothesis that services have net effects is based on an analysis of the behavior of individuals over time as a policy response to worker initiated household visits. Let  $p$  represent the 90 day probability that a woman will be using a modern contraceptive method at time  $t$ , among a cohort of 6822 women observed over 18 ordinal months since April, 1984. The mean of  $p$  defines the prevalence of contraceptive use at time  $t$  among initial non-users at time  $t=0$ .

Demand for contraceptive services is represented by three components: The first,  $\Delta_0(t)$ , is a component common to all individuals which adjusts for unspecified determinants of fertility regulation that affect the time trend in use among women at large. This function is introduced into the model in recognition of the fact that prevalence is increasing in Bangladesh, and that the determinants are likely to be demand related and must be adjusted for at all stages of the analysis. Experimentation with alternative functions fitted to the time trend in the quarterly probability of use demonstrated that a simple linear time trend was appropriate for the SRS sample. Two additional components of demand are incorporated into the model: i) variables that define the effects of household level variation in background characteristics-- demographic, characteristics, maternal educational attainment, religion and relative economic status which indirectly affect reproductive motives, and ii) measures of objective demand-- stated intentions to contracept and stated reproductive preferences.

We consider two service supply variables and their interactions: worker-client exchanges and Extension Project treatment effects. Taken together these components define an underlying adoption process and four sets of relative effects, given by:

$$\begin{aligned} \text{logit } P_{ijkl}(t) = & \lambda + \Delta_0(t) + \sum_{i=1}^I \delta_i Z_i + \sum_{j=1}^J \delta_j^* U_j \\ & + \sum_{k=1}^K \beta_k X_k + \sum_{\ell=1}^L \gamma_{\ell} W_{\ell} + \sum_{k=1}^K \sum_{\ell=1}^L \eta_{k\ell} X_k W_{\ell} \end{aligned} \quad (1)$$

where,  $p$  is the 90 day probability that a baseline non user will be a user of contraception at time  $t$ , given the effects of demand characteristics, and attributes of the supply system defined by

$\Delta_0(t)$  which is a function for the time trajectory in use of modern contraception among baseline non-contracepting women,

$t$  is the elapsed time from the onset of observation,

$Z_i$  is the  $i$ th exogenous characteristic of individuals and households posited to affect demand for contraception,

$U_j$  is the  $j$ th stated reproductive preference variable defining objective demand,

and where

$X_k$  is a set of three dummy variables denoting whether or not a client was visited one or more times by a worker, where  $k=1$  defines female visits,  $k=2$  female visits, and  $k=3$  joint effects of visits by both male and female workers in a 90 day period;

$W_l$  is a set of two dummy variables defining the effect of training workers ( $j=1$ ) or providing counterpart support to workers ( $j=2$ ) where effects are zero in the preintervention period and the comparison area represents the omitted class in a three celled design.

Unknown parameters to be estimated by maximum likelihood are

$\lambda$  an intercept,

$\delta$  and  $\delta^*$  are unknown parameters defining the effects of background characteristics and stated preferences, respectively, and

$\theta$  and  $\gamma$  define the effects of worker-client exchanges and treatment, respectively.

In the estimation of (1) the following considerations arise: (a) Adoption patterns may be seasonal so that effects can be time conditional. For example, the effect of outreach may be conditional on season since the mobility of government service workers and the receptiveness of clients are affected by monsoon harvest or other seasonal conditions. We have estimated models separately by SRS round and examined the changes in coefficients with respect to time. Staff contact, interaction effects and male worker effects are seasonal and time conditional. These effects are modest, however, and are of little substantive importance. These time conditional effects are ignored in the analysis. (b) Longitudinal data are censored in that women observed in one round may or may not be observed subsequently. We adjust for censoring by excluding from the analysis person rounds subsequent to the time of censoring. (45) (c) Effects of independent variables can be viewed as predetermined or time conditional, depending upon the type of effect to be estimated. For example, reproductive preferences in the baseline period can be viewed as determinants which underly the adoption process as a constant effect with time. Other effects, such as treatment

interventions or worker contact, are occurrences which may have behavioral consequences but are appropriately estimated from time conditional indicators. For this reason the sample for the analysis is the number of person-rounds of observation over an 18 month period rather than the sample of individuals. This design permits estimation of intervening variable effects. (d) Effects common to an individual over time are appropriately distinguished from effects arising between individuals. This is the problem of estimating "fixed effects" in panel data. Unknown coefficients in equation (1) are estimated by maximum likelihood using the procedure of Walker and Duncan (1967) and software developed for this purpose by Leon (1985). Owing to the fixed effects problem standard errors in this analysis may be underestimated.(46) Results are therefore preliminary and subject to revision.

Coefficients are expressed in the unfamiliar metric of exponentiated odds. Where relevant, findings are also presented as transformed effects and contrasts in the familiar metric of the net quarterly effect of a parameter on the prevalence rate. To undertake this simplification, we estimate all requisite effects in terms of the predicted prevalence rate under specified conditions, holding constant other, possibly confounding effects, and express the effect in question as the net quarterly change in the predicted prevalence rate associated with a specified effect.

## THE DATA

The data for the analysis are extracted from the Sample Registration System (SRS), a longitudinal data base which was implemented in October, 1982 for evaluating the MCH-FP Extension Project. Each "round" of the SRS consists of visits of teams of ICDDR,B male and female interviewers to approximately 19 percent of the households in 13 Unions. A round is completed in 90 days during which approximately 6800 households are visited. Data collection and processing are designed to ensure linkage of current records with previously collected information providing an integrated data base. While all aspects of the database are not yet fully developed, it is readily possible to tabulate linked and edited longitudinal data on demographic dynamics, indicators of contact between workers and clientele, and intermediate variables on contraceptive use dynamics with cross-sectional data on the characteristics of the social and economic status of households and the reproductive preferences of members.(47)

Table 1 presents baseline characteristics for the SRS respondents who were interviewed in SRS rounds one and two (October, 1982 to March, 1983) and subsequently in round 7. Round 7 corresponds to the completion of service interventions and to the beginning of the longitudinal monitoring of service activities for SRS households. Table 1 shows the characteristics of

currently married women of reproductive age among users of modern contraception and non-users. Sample characteristics do not differ appreciably from studies elsewhere in Bangladesh. The sample is comprised of young high parity women who have an average of 1.2 years of schooling. Illiteracy is high and the economy is dominated by farming, handicrafts, and trading. The proportion of Hindus in the population is similar to the national average. Surprisingly, over 70 percent of the baseline respondents wanted no more children although only 17 percent were contracepting. Of the non-contracepting women, 55 percent stated that they intended to use a method in the future. Knowledge of methods is nearly universal and most respondents are aware of sources of supplies and services (86 percent). Of the respondents half were contacted by a male worker and nearly two fifths by a female worker in the 90 days prior to the baseline survey. Baseline data thus suggest significant household services were being provided by MOHPC staff prior to the onset of Extension Project activities. Subsequent work on developing research techniques suggests that baseline data may seriously over-estimate contact rates owing to reference period errors the recall of dates of visits whereby any recent visit is included in the 90 day reference period. Longitudinal data are less subject to such biases because respondents can be referred to the most recent visit.

Table 1: Baseline characteristics of users and non-users in the SRS sample

Variable	Users		Non-users		All women	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<u>Continuous Variables:</u>						
Age	30.5	7.5	28.8	9.6	29.1	9.3
Education	2.1	3.0	1.0	2.1	1.2	2.3
Children Ever Born	4.6	2.6	4.0	3.2	4.1	3.1
<u>Categorical Variables:</u>						
Religion						
Muslim	76.7		89.1		87.0	
Others	23.3		10.9		13.0	
Want more children?						
Yes	16.2		29.1		27.0	
No	83.8		70.9		73.0	
Intend to contracept?						
Yes	100.0		45.1		54.4	
No	0		54.9		45.6	
Know source of supply or services?						
Yes	95.8		83.3		85.5	
No	4.2		16.7		14.5	
Contacted by male worker past 90 days?						
Yes	56.5		48.4		49.7	
No	43.5		51.6		50.3	
Contacted by female worker past 90 days?						
Yes	48.5		37.0		38.9	
No	51.5		63.0		61.1	
Total sample:	1153		5669		6822	

Source: Phillips, et al. 1985e

## RESULTS

Table 2 reports the mean contact rates for visitation from male or female workers with estimated coefficients for main effects and the joint effects of independent contacts by both male and female workers. In a round statistical tests on coefficients and the significant likelihood ratio statistics support the hypothesis that worker client exchanges are associated with higher rates of use than would prevail in the absence of contacts. The means indicate that about the same rates of contact are reported for male and female workers in the SRS sample.

The relative magnitude of effects suggests that FWA encounters have more pronounced effects than client exchanges with male workers. That exchanges between clients and female workers has a stronger effect on use than male workers is expected, since women are unlikely to discuss family planning with men. That male workers have any effect at all is surprising since it is well established that male workers rarely discuss family planning with female clientele and hardly ever provide supplies or services. Their orientation is solely toward the provision of health services and routinized tasks such as household registration which contribute nothing of consequence to family planning knowledge or practice. The transformed effects show that a 7.2 percent increase in use among non-contracepting women is expected if a woman is contacted by a female worker in 90 days. The corresponding rate for male worker contacts is 4.9 percent.

The interaction term in Table 2 for the joint effects from FWA and HA contacts in a 90 day period shows that the joint effects are modest, but significantly negative. This represents a puzzle that can only be resolved with careful field investigation, but it is possible that this may be explained by the climate of work in the MOHPC program. Joint effects arise, not from joint field work, but from the chance that a respondent will encounter both types of workers as the product of the independent probabilities of encountering either separately. Since HA and FWA initiated encounters address different themes, often involve different individuals in the household, and occur at different points of time, it is possible that their effect is somehow dissonant. Participant observation studies indicate that FWA and HA only rarely cooperate in their work and often work at cross purposes (Simmons et al., 1984). HA only rarely discuss family planning and when they do so, they understandably focus on male methods, most prominently vasectomy. While it is still a matter of conjecture, it seems possible that disjointed visits by workers with differing priorities and themes could crystalize intrafamilial conflict about family planning that would not otherwise occur.

Table 2 : The effects of worker contact on contraceptive use in a cohort of baseline non-contracepting women, MCH-FP Extension Project

Independent Variables:	Mean Contact Rate	Coefficient (Standard error)	Adjusted Quarterly Effect
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TYPE OF CONTACT:			
Male Worker	0.396	+0.541 (0.063) **	+4.89
Female Worker	0.377	+0.771 (0.062) **	+7.22
Male and Female <sup>a</sup>	0.173	-0.188* (0.088) **	-1.53
DURATION		+0.155 (0.013) **	
CONSTANT		-4.194 (0.134) **	
-----			
SUMMARY STATISTICS:			
Log likelihood	:	-7410.986	
Likelihood ratio statistic	:	541.144 (4 d.f)**	
Number of observations	:	23002	
Fitted grand mean	:	0.095	
* p < 0.05			
** p < 0.01			

The strongly positive slope for "duration" in this and all subsequent tables suggests that other unspecified factors also contribute to the contraceptive use trend in the SRS cohort. The analysis in Table 2, moreover, may be confounded by characteristics of respondents or by other service activities in progress in Extension areas. We consider first the effects of contact variables when treatment effects are controlled, and subsequently the role of underlying demand for services.

Table 3 examines types of contact as dependent variables with treatment conditions as predictors. All primary workers in experimental areas were trained along with their supervisors. A new system of work was introduced in the course of this experimental project which could explain, in part, the effects of worker - client exchanges. The parameters and corresponding standard errors for this set of regressions suggest that the Extension Project has had substantial effects on worker-client contact rates: All parameters for all three models are strongly positive and statistically significant. Treatment effects were more pronounced for female than male workers. Treatment differentials were not pronounced for male workers, with training having the same effect as the more intensive intervention involving counterparts from Matlab. That effects are so pronounced among female workers in counterpart areas suggests that early in the intervention period. This effect arose because introducing the work system involved setting up field procedures that had not previously existed. That effects were so pronounced among female workers in the counterpart support areas suggests that introducing the elements of the new system requires practical field demonstration, and is not adequately conveyed by classroom instruction alone. The regressions indicate, nevertheless, that project interventions had a pronounced effect on the contact rates. We therefore turn next consideration of treatment-worker contact joint effects on contraceptive use.

Table 4 shows the main effects and the joint effects of treatment and worker contact on contraceptive use. The main effects model, in column 1 of Table 4, demonstrates that treatment effects were substantial. The regression presented in column 2 of Table 4, however, demonstrates that by adjusting for the effects of worker contact, net treatment main effects are greatly diminished: the experimental interventions contributed to increased contraceptive use but this impact is mediated mainly by project activities that contributed to increased worker contact rates. Once worker contact effects are controlled, the residual effect of treatment shows the work quality effects of treatment, net of contact effects. No net main effects arose from treatment related improvements in work quality. This is demonstrated by the non-significant main effects in column 2 of Table 4 for the Training Only and Counterpart Support treatment conditions. Interaction effects show that the effects of male worker contacts

are conditional on the presence of treatment conditions. Worker contact effects are pronounced, however, mainly for female workers. Thus effects of the Extension Project interventions on the quality of work appear to have been significant among male workers; whereas project intervention effects on female worker performance are related to the successful introduction of management techniques for improving the quantity of FWA contacts.

Table 3 : The effects of two types of project interventions on worker visitation, MCH-EP Extension Project

INDEPENDENT VARIABLES: <sup>a</sup>	DEPENDENT VARIABLES:					
	Male Worker- Client exchanges		Female Worker- Client exchanges		Male and Female Worker-Client exchanges	
	Coefficient (Standard error)	Adjusted quarterly effect	Coefficient (Standard error)	Adjusted quarterly effect	Coefficient (Standard error)	Adjusted quarterly effect
Training only	+0.102 (0.032)	+7.26	+0.201 (0.031)	+4.73	+0.147 (0.044)	+4.99
Counterpart - Support	+0.323 (0.037)	+7.82	+0.828 (0.037)	+19.92	+0.832 (0.047)	+13.24
DURATION	+0.041 (0.008)		-0.008 (0.008)		-0.036** (0.011)	
CONSTANT	-1.016 (0.077)		-0.740 (0.078)		-1.611 (0.100)	
SUMMARY STATISTICS:						
Log likelihood	: -15358.833		-14947.785		-10441.958	
Likelihood ratio statistic	: 170.123 (3 d.f.)**		578.800 (3 d.f.)**		320.604 (3 d.f.)**	
Number of observations	: 23002		23002		23002	
Grand means	: 0.395		0.374		0.169	

\*\* p < .01

Table 4 : The effects of experimental treatments and net effects of types of contact with relevant interactions.

INDEPENDENT VARIABLES:	Treatment Effects Model	Treatment-Worker Contact Joint Effects Model
	Coefficient (Standard error)	Coefficient (Standard error)
WORKER CLIENT EXCHANGE VARIABLES:		
Male Worker	-	+0.253** (0.096)
Female Worker	-	+0.750** (0.093)
Male and Female	-	-0.199* (0.090)
TREATMENT VARIABLES :		
Training Only	+0.334 (a)** (0.054)	+0.062 (0.088)
Counterpart Support with Training	+0.402 (b)** (0.059)	+0.091 (0.101)
WORKER CLIENT EXCHANGE-TREATMENT INTERACTIONS :		
Male x Training	-	+0.441** (0.111)
Male x Counterpart Support	-	+0.284* (0.119)
Female x Training	-	-0.012 (0.111)
Female x Counterpart Support	-	+0.046 (0.119)
DURATION	+0.140** (0.013)	+0.138** (0.014)
CONSTANT	-3.759** (0.130)	-4.074** (0.144)
SUMMARY STATISTICS :		
Log Likelihood :	-7570.703	-7790.886
Likelihood ratio statistics :	221.710 (3 d.f.)**	581.345 (10 d.f.)**
Number of observations:	23002	23002

\* p < 0.05  
\*\* p < 0.01

(a) Adjusted quarterly effect = + 3.10 percent. (b) Adjusted quarterly effect = + 3.92 percent.

In summary, results of analyses in Tables 2 and 4 demonstrate pronounced differences between the effectiveness of FWA and HA worker-client interchanges is to be expected. First, the job orientation of HA is primarily oriented to health care activities. Only rarely is family planning discussed.(48) That the project interventions had relatively little effect on male initiated contact rates is also not difficult to interpret. The economic roles of men differ markedly from women in rural Bangladesh and gender roles affect work orientation. A male worker who is unsupervised will engage in economic activities external to his formal job. Such a worker, confronted with the task of accompanying a Matlab counterpart into the field for routine work, is faced with possible economic adversity. Formerly free to earn an income from non-job related activities, the Health Assistants were obligated by the rules of the study to cooperate with their counterpart, an unprecedented form of pressure on them to do their jobs. This interpretation of the role of male workers in the project is further supported by the stronger effects estimated for the role of male workers in the training only areas than corresponding effects in counterpart areas.

A female village worker has strong obligations to her family which can detract from her commitment to work, but competing economic opportunities for women are rare. While counterpart support was not always enthusiastically welcomed, the project at least did not pose a threat to family income. On the whole, the concept of counterpart support was well received by female workers.

Adjusted means for the Table 4 coefficients are presented in Table 5. Mean contact rates, presented in Table 2, suggest that less than 40 percent of the respondents receive visits from an HA or FWA in a 90 day period. Table 5 addresses the question of what would happen to prevalence if workers were to contact all clients quarterly. We address this question for male and female workers separately and jointly. Thus Table 5 is a fitted contingency table in which all effects not relevant to a cell are zero, with coefficients accumulated when relevant and the duration effect set at its mean for all computed effects. Coefficients used for preparing Table 5 are the main effects and interactions presented in Table 4 and transformed from the logit into the probability metric.(49)

Table 5 presents data which illustrate the predicted prevalence change implications of the logit coefficients in column 2 of Table 4. Estimated effects are transformed into quarterly effects of treatment and worker exchanges among baseline non-users. The data are exactly the same as the Table 4 data, but the metric has been changed and omitted classes included so that effects presented represent expected quarterly

changes in the prevalence rate, over and above what is expected from general trends. The effects in Table 5 are expressed as deviations from a mean probability of use for the entire sample.

To facilitate the interpretation of Table 5, it is helpful to compare all presented effects to the condition corresponding to expected prevalence change when program effort is absent: The comparison area visit contingency, which is -3.53. When program effort is absent, the expected prevalence decline is -3.5 percentage points per quarter, relative to the trend in the SRS sample population as a whole. All but one of the coefficients are greater than -3.53 suggesting that all conditions defining effort have some effect, with the notable exception of visits by both types of workers in non-intervention areas.

Rows of Table 5 show contact effects by worker gender. As the data in the bottom row of the table show, when there was no visit net effects were consistently below the grand mean. Some modest residual treatment effect may exist, however, even in the absence of contact, as shown by the slightly smaller negative effects of non-contact in the treatment areas relative to comparison areas. By comparing the bottom row of Table 5 with the corresponding cells in the top two rows, the implication of the results is clear: Contact has an effect on contraceptive use.

Treatment effects are demonstrated by relative effects across columns. Effects evince marked interactions, however, so that interpretation of treatment effects is only possible by examining the conditional effects of contact by worker gender. Consider first the effect of male worker visitation. As health division staff, who do not cooperate with their family planning division colleagues, we expect effects to be additive -- that is, any exchange between a client and a male worker is expected to have an independent effect that is augmented by the effects of female worker contact, but not conditional upon FWA contacts. That effects are, in fact conditional, however, represents an unresolved puzzle that is the subject of current field observational work.

Consider next the row of effects labeled for female worker client exchanges. As in the case of the male worker row of the table, the effects represent the predicted outcome of an encounter, in terms of net quarterly effects on prevalence. Far greater effects arise from client - female worker exchanges in the absence of interventions than is the case for male workers. Moreover, training alone has no appreciable net incremental effect relative to no intervention. Contact is important even in the absence of interventions, but net treatment effects are pronounced only where counterparts were introduced. An expected 3.78 points are added to prevalence rate per quarter if one or more FWA-client encounters occurs in areas where counterparts were assigned.

Consider finally the effect of a male worker and a female worker visiting a household in the same round. The "both" row in Table 5 brings into account the additive effects of male and female visits and the joint effects of both visits occurring at least once in 90 days. Only rarely are such visits joint encounters involving pairs of workers: nearly all refer to the chance that independent worker effort will result in coverage of the same sample household by two or more workers within a 90 day period. Effects arising from both workers visiting are negative relative to no visit from anyone, most prominently where Extension Project management interventions were not introduced.

Research has yet to explain how treatment effects reduced the dysfunctional effects of visits from both FWA and HA. This is demonstrated by the fact that the strong negative effect in comparison areas (-3.35) is dissipated by training activities (-0.32) and is diminished in counterpart support areas (-1.02). It is possible that HA may have acquired lessons from training that improved their family planning performance, improved worker cohesion, and dissipated interdivisional conflicts. These hypotheses bear further investigation, however. It is possible that the introduction of joint FWA and HA training may have dissipated some of the dysfunctional effects of disjointed field work.

Effects presented in Table 5 attest to the importance of FWA-client exchanges, even in the absence of special efforts to improve the management system. Effects also show that the quality of encounters can be improved. What remains unresolved from this presentation is whether these effects merely substitute for demand or represent a distinct set of determinants. We therefore proceed to estimate four nested hazard models adding in sequence the sets of determinants discussed in our presentation of equation (1). Table 6 presents the outcome of these estimations. Table 4 is to be interpreted as the estimation of gross supply effects, with demand determinants ignored, Table 6 presents the incremental addition of two sets of service supply variables to model which examine demand.

The most important finding from Tables 4 and 5 concerns the magnitude of the predicted effects: Female workers in counterpart support areas, if left to conduct their work without the countervailing effects of male workers, would add about 3.7 percent to the prevalence rate quarterly. Such effects are not altogether different from the effects of the Matlab project in its first year. Matlab, with its far greater density of female field workers and more rational staffing pattern, achieved about this level of impact in the course of its first year.

The analysis of gross effects of service operations suggests that program effort has effects. What remains unclear from this analysis is whether these effects arise from service supply, which has independent effects, or whether demand determines whether service activities succeed. This issue is explored in a series of four regressions which are presented in Table 6.

Model 1 in Table 6 estimates the effects of background characteristics. All estimated effects are statistically significant. As the Table shows, Hindus are more likely to contracept than Muslims. Other effects follow expected patterns: Parity effects are more pronounced than age effects. Once the effect of parity is controlled, young women are more likely to contracept, reflecting perhaps the motivational effects of achieving high parity at a young age. The estimated parameters for two socioeconomic status scales are presented, of which the second has stronger predictive effects. The second scale reflects ascribed economic status, the first more prominently reflects relative inherited wealth and land holding. Model 1 effects remain largely unchanged when supply factors are added to models, as shown by the similarities in the coefficients for background characteristics across the column of Table 6.

Table 5: Gross effects of service supply variables expressed as net quarterly increases in prevalence among baseline non-users.

Type of Worker making visit :	Type of Treatment		
	Training	Training with Counterparts	No intervention
Male	+2.36	+1.09	-1.96
Female	+2.82	+3.78	+2.29
Both	-1.68	-2.17	-4.54
No visit	-3.17	-3.00	-3.53

Table 6 A logit regression analysis of the effects of background characteristics, reproductive preferences, and worker contact on contraceptive use among a cohort of baseline non-contracepting women.

INDEPENDENT VARIABLES :	Coefficients and corresponding Standard errors for...			
	Model (1) : Background Characteristics Only	Model (2) : Reproductive Preferences + Model 1 predictors	Model (3) : Worker Visitation + Model 2 predictors	Model (4) : Treatment Effects + Model 3 predictors
	Coefficient (Standard error)	Coefficient (Standard error)	Coefficient (Standard error)	Coefficient (Standard error)
<b>BASELINE RESPONDENT CHARACTERISTICS :</b>				
Age	-0.064** (0.006)	-0.063** (0.006)	-0.062** (0.006)	-0.063** (0.006)
Education	+0.071** (0.010)	+0.064** (0.010)	+0.064** (0.010)	+0.065** (0.010)
Religion	-0.515** (0.061)	-0.534** (0.062)	-0.470** (0.062)	-0.462** (0.063)
Parity	+0.171** (0.014)	+0.135** (0.015)	+0.139** (0.015)	+0.139** (0.015)
Economics Status(1)	+0.144** (0.024)	+0.166** (0.024)	+0.139** (0.025)	+0.128** (0.025)
Economics Status(2)	+0.126** (0.022)	+0.212** (0.022)	+0.185** (0.022)	+0.186** (0.022)
<b>REPRODUCTIVE PREFERENCES :</b>				
Desire additional Child		-0.773** (0.060)	-0.774** (0.061)	-0.776** (0.061)
Intention to contracept		-0.993** (0.051)	+0.963** (0.051)	+0.964** (0.051)
<b>OPERATIONAL VARIABLES :</b>				
Male Worker Contact			+0.404** (0.065)	+0.065 (0.099)
Female Worker Contact			+0.698** (0.063)	+0.676** (0.095)
Male and Female			-0.166 (0.090)	-0.182* (0.072)
Counterpart Support				+0.012 (0.103)
Training				-0.017 (0.090)
<b>OPERATIONAL VARIABLE INTERACTIONS :</b>				
Male * Training				+0.533** (0.114)
Male * Counterpart Support				+0.347** (0.122)
Female Training				+0.003 (0.114)
Female * Counterpart Support				+0.060 (0.122)
DURATION	+0.166** (0.013)	+0.169** (0.013)	+0.164** (0.013)	+0.150** (0.014)
CONSTANT	-2.356** (0.178)	-2.247** (0.188)	-2.738** (0.194)	-2.596** (0.202)
<b>SUMMARY STATISTICS :</b>				
Log Likelihood :	-7346.461	-7104.631	-6977.785	-6958.088
Likelihood Ratio :	670.194(7 d.f.)**	1153.854(9 d.f.)**	1407.546(12 d.f.)**	1446.941(18 d.f.)**
Observations :	23002	23002	23002	23002
** p < 0.01				

Model 2 in Table 6 demonstrates the predictive power of preference variables. The likelihood ratio nearly doubles, demonstrating that combined effects of stated intentions and preferences about equal the effects of the six background characteristics. These effects are consistent and pronounced across the columns of Table 6. The substantial likelihood ratio statistic and the large coefficients for variables added in Model 2 indicate that the few variables available are strongly predictive of behavior and represent a useful set of indicators of prior demand for contraception.

Model 3 addresses the question of whether worker client exchanges have a net incremental effect, apart from the pronounced effects of demand demonstrated in the estimation of Model 2. If estimated supply effects on adoption and use of contraception substantially decline when demand factors are considered, then worker client exchange effects discussed in relation to Tables 2-5 would be shown to substitute for baseline demand in Model 3. Worker contact effects would thus be subsumed by demand indicators. Indeed, if supply effects from Table 2 are compared with Table 4 coefficients for all effects decline, and the extent of the decline is not trivial. Quite clearly, a key role of the program has been to provide services to women who have a prior recognized need for services, and would arguably opt for services supplied elsewhere or would adopt traditional contraceptive methods in the absence of domiciliary services. More striking, however, than the diminished effects in Model 3, is the finding that strong net effects of contact remain, despite multiple controls for baseline demand characteristics. The combined effect of contact variables dramatically improves the predictive power of the model, as indicated by the marked increase in the likelihood ratio statistic ( $1407.5 - 1153.8 = 253.7$ , chi square distributed, 3 d.f.). Results thus support the hypothesis that client worker exchanges have a pronounced net behavioral effect in rural Bangladesh, particularly if exchanges are initiated by the FWA in the course of routine rounds.

We consider one final model which adds the effects of treatment and interactions to Model 3 parameters. As in the case of Model 3, Model 4 assesses whether treatment effects are significant net contributors to contraceptive use, when demand is controlled. While effects are less than the net effects of contact, treatment effects are nevertheless significant. The change in the likelihood ratio from Model 3 to Model 4 is significant, suggesting that organizational development efforts of the project have had net behavioral effects, over and above project effects on the rate of worker client exchanges and net of the independent effects of baseline indicators of demand.

To illustrate the implications of Model 4 in Table 6 we repeat the simulation presented in Table 5 with controls introduced for baseline demand. Computed effects address the question of what range and magnitude of effects can be attributed to the provisions of services, apart from effects that would be expected to arise spontaneously in rural Bangladesh. As the data in Table 7 show, effects are diminished from the effects presented in Table 5, but fundamental conclusions remain. Service delivery, and most specifically, worker client exchanges, have net additive effects. Changes from the Table 5 effects are most pronounced for male workers, suggesting that effects attributed to HA in our discussion of Table 2 are largely client generated. HA may therefore target their activities on households most likely to adopt rather than households at large. Female worker effects are relatively robust to the introduction of demand parameters into the model. Estimated effects suggest that contacts add about 3.2 points to the prevalence rate per quarter per round, net of the influences of client characteristics. This effect, together with the treatment effect, explains the dramatic Extension Project impact on the prevalence rate in its first year of operation.(50)

Results, in summary, are consistent with the hypothesis that program effort makes a difference. Effects are conditional on contact rates, and the gender of the worker providing services. Effects are also related to the managerial context in which services are provided. But most importantly, the estimated effects are not mere artifacts of the demand climate in which services are provided. They are, to a significant degree, independent of prior demand for services.

Table 7: Net effects of service supply variables, expressed as quarterly changes in prevalence among baseline non-users, adjusting for baseline indicators of demand.

Type of Worker making visit :	Type of Treatment		
	Training	Training with Counterparts	No intervention
Male	+1.63	+0.32	-2.08
Female	+2.36	+3.20	+2.50
Both	-0.32	-1.02	-3.35
No visit	-2.53	-2.38	-2.44

## IMPLICATIONS

The literature on fertility determinants in Bangladesh has assigned central significance to institutional determinants, bringing into question the prospects of success for any policy that is focused on households; and, at times, highlighting the fundamental naivete of focusing so much attention and resources on establishing the bureaucratic machinery for the provision of contraceptive services to a rural population that is not motivated to contracept. Indeed, field research has shown that services provided by indifferent, ill-trained, workers with a limited range of service options to offer rural women, face little prospect of success. That exchanges between Government field workers and rural women has an impact on contraceptive practice, however, will not surprise policy planners in Bangladesh. For a decade national policy has placed high priority on developing the human resources required to make outreach services a central component of the national program. This analysis has demonstrated that the basic assumption underlying Bangladesh policy--the assumption that household oriented services work--is fundamentally sound.

What is needed at this point, therefore, is not further criticism of the Bangladesh program and its operational goals, but a broader international understanding that the objectives and initial priorities of the program have been sound; and that continued, and even expanded, support for that effort is warranted. The female staff for outreach work should be expanded, their skills upgraded and overall systems support should be improved. Organization development efforts to that end should be pursued because research shows that if women in the villages receive frequent visits from trained, sympathetic, and committed village workers who have a broad range of services to provide together with backing from nearby paramedical clinics -- then very substantial effects can be achieved. Much of the impact of service programs arise because many rural women will use temporary methods for spacing future births if convenient services for a wide range of methods are available to them in their homes. Nearly all the impact of the Extension Project has been achieved through increases in the use of reversible contraception. Research suggests that contact with Government workers not only increases use rates, it broadens the range of methods available and distributes choice over a wide range of options (51).

Our research has shown that rural women respond to the reproductive freedom that domiciliary services can provide. By building rapport, offering a broad range of MCH and family planning services, and responding to perceived user needs, domiciliary care can provide social support for contraception that other social institutions fail to provide. Indeed, successful

field workers often address the themes of the institutional determinants framework in the course of their work--that services and the program are a form of insurance against risk; that contraception represents a way of gaining control over one's life and protecting children and family from adversity; that immediate economic needs of the family are threatened by high fertility. Having established that such themes and convenient services have a net effect on reproductive decision-making, the bureaucratic challenge is one of ensuring that a full range of credible services actually exist, and that a responsive client has undertaken a wise and rational departure from the traditional reluctance of Bangladeshi couples to assume personal control over their reproductive behavior.

It would be naive, however, to view domiciliary services as the sole solution to the Bangladesh population problem. Very substantial rates of population growth will continue in rural Bangladesh even under optimal service conditions. The institutional determinants of fertility will ensure that rural couples will typically have two or three children at an early age and often four or more children if sons are not born early in marriage. Replacement fertility on a mass scale is a distant goal. Our appeal, therefore is not for social theorists to discard what has been said about fertility determinants in rural Bangladesh, but to enrich demographic theory with formal organization theory. Developing service dynamics are not merely a matter of providing people, resources, and things. Organization development must be guided by a carefully articulated theory that is informed by the institutional constraints to bureaucratic change. Nor can service programs be viewed as somehow separate from the nexus of factors that influence human fertility. Programs are an integral component of the broader institutional and social context in which reproductive decisions are made.

#### FOOTNOTES

1) Some demographic theorists note that demographic change in Europe antedated the modern contraceptive revolution, and conclude that if motivation to regulate fertility exists, contraceptive practice will be widespread, even in the absence of modern contraceptive technology. (See, for example, Davis, 1969; Hernandez, 1981). Others have argued that contraceptive service programs can initiate and sustain demographic change. This argument is based on the observation that surveys often show that respondents intend to limit fertility even though they are not doing so. The gap between intentions and behavior is interpreted as demonstrating "latent demand" (See, for example, Bogue and Tsui, 1978). This latent demand hypothesis is controversial, however (See, for example, the commentary by Demeny, 1979). Although surveys typically report a discrepancy between stated

reproductive preferences and contraceptive use, the survey research paradigm can be dismissed as providing an inappropriate basis for understanding the institutional framework for reproductive decision-making, since critical causal pathways are systemic rather than stochastic.

The view that the supply of services can have net effects was first tested in the early 1970's in a series of studies (Taylor and Berelson, 1971 and Taylor and Lapham, 1974) which produced equivocal results. However, a series of important studies of national level statistics on the relationship between program inputs and national demographic trends suggests that formal organized commitment to population programs, as measured by policy pronouncements as well as indicators of implementation effort, has had a significant and consistent effect on demographic trends in third world countries. See, for example, analyses by Lapham and Mauldin, 1984, Mauldin and Berelson, 1978, and Freedman and Berelson, 1976 which suggest that the extent to which public sector resources and administrative commitment are developed explains areal variance in national level data on contraceptive prevalence.

Areal analyses, however elegantly formulated, are weakened by the possibility that ecological biases could confound the assessment of program effort effects since unmeasured institutional codeterminants of program effort and reproductive motives can be spuriously subsumed in the scaling of program capabilities. More robust assessments base inference on models of the determinants of components of individual decision making -- adoption, method choice, switching, discontinuation and readoption, with the analysis of areal program effects controlled by individual and household characteristics widely accepted to be determinants of reproductive behavior: preferences, social and economic characteristics, and demographic characteristics.

2) Several rural service projects in Bangladesh have apparently had demographic effects. See, for example the evaluation of the Gono Unnayan Prochesta project by Timm et al., 1980, the discussion of the Gono Shasthya Kendro project in Coombs, 1980 and a recent review of the impact of five non-governmental agency directed projects in Alauddin and Khan, 1983. Of the projects reviewed, the most extensively researched is the Matlab Family Planning Health Services Project (FPHSP). The design of the FPHSP is discussed by Bhatia, et al., 1980 and its impact is presented in Phillips et al., 1982 and Chowdhury et al., 1984).

3) See Arthur and McNicoll, 1978.

4) See Cain, 1981 and 1983.

5) See Arthur and McNicoll, 1978, Op.Cit.

- 6) See the discussion of village settlement patterns in Bangladesh in N. Ahmad (1956). Rahman (1962) presents a useful discussion of problems with local government that applies to contemporary Bangladesh.
- 7) See, for example, Hartman and Boyce, 1983.
- 8) A careful study of the economic value of children by Cain, 1977 has shown that children represent net contributors to family income at an early age. While this view is widely accepted, it has been disputed by some analysts, who argue that the net economic contribution of children to families is negative, and that other socio-economic forces act to perpetuate high fertility (A. Ahmad, 1984).
- 9) See Cain, 1981 and 1983, Op.Cit.
- 10) Bangladesh is widely viewed as having the one of the world's most pressing development problems. Useful summaries of the effect of rapid population growth on economic development appear in status reports of the World Bank (1984) and in specific sectoral analyses. See, for example, the comprehensive analysis of constraints to development in the agricultural sector by Wennergren, 1983. The deterioration in the local economy has led to a growing dependence on foreign aid for the support of basic social services (Sobhan, 1982).
- 11) See Wennergren, 1983, Op.Cit.
- 12) See the study of Islam, 1981 which shows that income distribution is becoming increasingly skewed and the report of the World Bank (1981) which documents the recent decline in real income. Analysts attribute these trends to growing landlessness induced by population pressure on land resources (C.f. Abdullah, 1976 and Khan, 1976).
- 13) Overall illiteracy rates are increasing slightly, although modest declines in female illiteracy were reported in the Census of Bangladesh in 1981. Female literacy changed from 12.2 percent of the population to 13.2 percent over the 1974 to 1981 period (Bangladesh Bureau of Statistics, 1985).
- 14) Caloric consumption has declined markedly in the past two decades and nutritional balance is deteriorating (Institute of Nutrition and Food Science, 1978).
- 15) See, for example, Arthur and McNicoll, 1978 Op.Cit.
- 16) C.f. McNicoll, 1975 and Demeny, 1975.
- 17) McNicoll, 1975, Op.Cit.

18) Cain and Leiberman (1983) have proposed a public employment scheme as a means of generating social security that would indirectly impinge upon reproductive motives. Robinson (1983) has criticized this proposal by bringing into question the empirical basis of a major policy focus on risk as a fertility determinant and the feasibility, in any case, of launching such a scheme.

19) See, for example the discussion of Bogue and Tsui, 1978 by Demeny 1979 Op. Cit.

20) Ravenholt and Chao (1974), in their review of contraceptive prevalence survey data, interpreted the often demonstrated gap between reproductive preferences and contraceptive use literally, and argued that if family planning services are made freely available, fertility will decline rapidly in developing countries. However, a comprehensive analysis of data from 21 countries has failed to demonstrate a clear relationship between availability and use (Jones, 1984). Moreover, formal tests of this hypothesis in rural Bangladesh have not supported the hypothesis that availability alone brings about behavioral change. A study conducted in Matlab produced initially promising results (see Huber and Khan, 1979), but long term demographic effects were minimal (Stinson et al., 1982). Analysts of the project concluded that, for services to succeed, the system had to comprise a more comprehensive support system for contraceptive practise than the provision of supplies alone (See Rahman, et al., 1980). The CDP approach was abandoned and replaced by a more rigorous support system which included multiple methods provided to women in their homes, regular follow-up, clinical back up, and intensive service information (Bhatia et al., 1980). Results of these studies appear to suggest services will not have effects if outreach is simply for the distribution of commodities, but rather comprises a carefully developed social support system for meeting a broad range of user needs (see Zeidenstein, 1979).

21) See Blake and DasGupta, 1975.

22) Alauddin and Khan, 1983; Op.Cit.

23) The introduction of sterilization services at rural health centres is an example of a positive public response to a new service program. Rates of sterilization increased from virtually nil to 6.8 percent of the eligible couples by 1983 (see Mitra and Kamal, 1985 and Measham, et al., 1982). National contraceptive prevalence surveys show modest, but sustained increases in prevalence in recent years (Mitra and Kamal, 1985). The recent success of the Social Marketing Program also appears to demonstrate that considerable demand for commodities exists in the urban and semi-urban areas of Bangladesh (see Schellstede and Ciszewski, 1984).

24) See Maklishur Rahman, et al., 1980, Op.Cit. and Stinson et al., Op.Cit.

25) See the recent progress report by Phillips et al., 1985d which reports the current status of demographic dynamics in Matlab. A careful study of contraceptive use prevalence in the early period of the project's impact has shown that variation in worker competence and effort was a key determinant of areal variation in Matlab contraceptive use prevalence.

26) Strategic plans of the national population program in Bangladesh are documented in the Second Five Year Plan (Ministry of Planning, 1983 and in the Documents of the Ministry of Health and Population Control, 1977a, 1977b, 1985)

27) Among the demand generation policies that are discussed are development schemes that induce changes in economic relationships that alter the labor value of children; changes in village governance that supplant the patronage and lineage systems which weaken social cohesion; implementation of women's cooperatives that aim to alter traditional gender roles of women; implementation of public employment schemes that dissipate the climate of risk and the insurance value of children. A useful review of the status of projects and their demographic effects appears in the report of the Government of Bangladesh unit responsible for planning and research on issues related to the demographic impact of development schemes (Population and Development Planning Unit, 1985).

28) See McNicoll, 1975 Op.Cit. Some proponents of demand generating policies argue that policies directed to altering institutional determinants of fertility do not obviate the need for family planning programs. Cain and Leiberman for example, conclude a recent review of the rationale for public employment schemes as a means of insurance against risk by noting that

"The premise of this paper is that in order for a timely fertility transition in Bangladesh to occur, the desire for smaller families and a matching demand for the means of fertility reduction must be stimulated and sustained through public policy measures. We recognize the enduring importance of a vigorous family planning program and other social welfare programs, and, indeed, the recommendations that we put forward are based on the assumption that such programs will continue to operate and improve in the future. Our objective was to review government development policy more broadly and, as far as possible, indicate which development measures other than the provision of family planning information and services, hold the promise, either currently or

potentially, of significantly altering the demand for contraceptives." (Cain and Leiberman, 1983).

29) The design of the operations research component of the SRS is documented in Mozumder, et al. 1986 and a preliminary report on contact data is in Clark et al., 1986.

Note that contact for the present analysis is the crude visit rate. A more detailed analysis is in progress on the dynamics of visitation over time, the contents of exchanges, and their behavioral outcomes (Koblinsky, 1986, personal communication).

30) See Hasenfeld, 1978 and Simmons et al. 1985.

31) One carefully conducted study of health care practices showed that half of rural women strongly believe in modern medical care for their husbands, but only 13.5 percent thought that such care was necessary for themselves (Islam, 1980). Travel for medical care is rare for rural women (Tuckwell, 1983) and this basic barrier to seeking services transfers to family planning.

32) See, for example, the comments of participants from the Government of Bangladesh on a recent conference where findings from the Matlab project were reviewed (Population and Development Planning Unit, 1984).

33) See the extensive literature review of available studies of fertility and contraceptive use differentials in Bangladesh by Alauddin, 1980.

34) See Simmons et al., 1985 and Simmons et al., 1983.

35) See the paper by Phillips et al. 1985 on the institutional constraints to program development. Figure 1 is adapted from frameworks for the role of program operations in the prediction of contraceptive adoption that appear in Phillips et al., 1984. See also Simmons et al., 1983 and 1985.

36) Simmons et al., 1985 Op.Cit. See also the framework proposed by Rahman (1984, Op.Cit.) for the analysis of determinants of areal variation in contraceptive use in Matlab.

37) The design of the Extension Project is described in Phillips et al. 1984 and in Phillips et al., 1985a and 1985b. This project is a collaborative venture involving the Government of Bangladesh and the ICDDR,B. The study areas are Sirajganj subdistrict in central Bangladesh, an area bordering the Jamuna river, and Abhoinagar subdistrict in western Bangladesh located near the border with India's West Bengal State, approximately 80 miles south and east of Calcutta. Comparison areas are located in separate subdistricts of contiguous districts. Two unions of

Tangail district and two unions of Khulna district with a combined population of about 100,000 serve as comparison areas. The study area subdistricts had 1981 census populations of 176,562 and 340,147 in Abhoynagar and Sirajganj, respectively. (Bangladesh Bureau of Statistics, 1984)

38) Divisonal rivalries and structural problems associated with the integration issue seriously impair cooperation of field workers over such basic issues as task planning (Khan, 1985).

39) See Yunus, et al., 1984.

40) See Koblinsky et al., 1984 and the paper by Phillips et al., 1984 on the paradigm for translating research into official policy.

41) See the review of the organization development paradigm in French and Bell, 1978. A forthcoming review of literature on organization development and the interventions of the Extension Project notes that the project represents a special adaptation of the organization development techniques. Extension Project approaches differ in many respects from the approaches used in private sector organization development efforts in developed countries. Adaptations require dealing with the institutional and social constraints to introduction organizational change in settings such as Bangladesh (See Koblinsky, et al., 1984 and Yunus, et al., 1984).

42) Of the service components added in the course of training, only one represented a distinct departure from usual MOHPC policy: Since about half of the prevalence of contraception in Matlab arises from the provision of household injectable services, the MOHPC requested the Project to introduce that strategy to Government workers in the two study subdistricts. This represents an important addition to the modalities available to rural women in Extension areas, since only pills and condoms were provided in homes and neither are long acting methods. The popularity of injectables in Matlab, their intrinsic efficacy, and the added convenience implied by extending household services for this method by trained village workers, suggested that adding DMPA to the village service regimen would contribute to program impact. Operational constraints, however, have hampered introduction of domiciliary DMPA services. Implementation requires a system of frequent revisits, which is not possible with the existing density of FWA (See Hogue, et al., 1984).

43) The "counterpart support" treatment is not considered to be replicable, in a strict sense, because counterparts cannot be assigned to all field staff in Bangladesh. Rather, it is aimed at introducing the notion of a change agent into the MOHPC system -- a group of workers who are assigned at all levels of the hierarchy to stimulate change and observe the outcome of

intervention. This intervention was aimed at ascertaining the field requirements of establishing the Matlab system of work and the impact of that system in the MOHPC programmatic context. The counterpart support activity was nevertheless a limited intervention, comprised of joint field work for a single cycle of household visitation. Limited ICDDR,B field staff involvement was intended to preserve the principal of MOHPC ownership of field interventions and project outcomes.

44) Phillips et al., 1985 present an overview of the project paradigm and impact.

45) Refinements to this procedure were considered which would more precisely measure the observation period by summing person days of observation among censored cases for use as weights to be introduced as exponents in the likelihood function (See Phillips, 1982). Refinements of this sort are appropriate if censoring is severe and time units for the observation set are broad. The 90 day interval observation interval could arguably represent a case for such refinements if censoring covaries with intervening variables. Such refinements have not been tested in the present analysis because censoring is not extensive.

46) Models estimated for each round separately demonstrate whether coefficients values change with time, and the sum of the log likelihoods of the series of models minus the log likelihood from the reduced form with time omitted, provides an asymptotically chi squared statistic for testing whether time-covariate interactions are needed. See Haberman (1979).

In the model estimated, such effects were estimated and found to be significant owing principally to time conditional effects of operational variables. This indicates that time and covariate time interactions are appropriately incorporated into model (1). Effects concern the unique impact of male visitation at the time of the year that HA conduct household registration. Effects were not substantively relevant to our presentation and have not been incorporated into models.

The fixed effects problem has not been systematically investigated for the present analysis. Software for this purpose is not available, and results will therefore be subject to possible revision. Sample sizes for the analysis are large and tests are typically strongly significant and are therefore likely to be robust to potential limitations of the Walker and Duncan procedure for the present problem (See the software package for the IBM Personal Computer developed by Greene, 1985).

47) An overview of the SRS design appears in Phillips and Mozumder, 1984 and in Mozumder et al, 1986b. Cross-sectional data are collected in modules which differ from round to round, but accumulate to provide an increasingly comprehensive database

on household attributes. An important SRS component studies was a baseline survey of socio-demographic characteristics covering all sample households prior to study interventions. This survey replicates several features of the World Fertility Survey: interviews elicited fertility histories and child mortality histories, reproductive preferences, and current contraceptive use intentions and practice and others issues. This study provides important baseline information on demand for contraception and services accessibility.

A second component SRS study provides useful background information on relative economic status. We have used factor analysis to extract two orthogonal scales defining relative economic status based upon 20 indicators of household wealth. The two scales used in the present analysis, account for nearly 50 percent of the common variance in the 20 economic status indicators. As orthogonal factors, the two scores are uncorrelated with means of zero and standard deviations of one. The loadings on the first score most prominently weight attributes of economic status that are typically inherited in early adulthood (landholding, household construction type and floor space and sources of income directly related to land. The second scale is weighted primarily by activities or occupations unrelated to landholding (trading, occupational type and possession of consumer durables). The second scale identifies a growing nonagricultural elite engaged primarily in trading and service occupations. Educational attainment was excluded from the scale because it has a substantive importance apart from its contribution to economic status. We therefore incorporate maternal educational attainment into the analysis as a separate independent variable (See Hossain and Phillips, 1984).

48) See the discussion of the field activities and job orientation of health and family planning workers in Simmons et al., 1984.

49) The logistic function is sigmoid in the probability metric. This means that logit additive effects can produce marked interactions when they are accumulated and transformed to probabilities even if effects are estimated without interaction terms. Thus the small main effects, such as the male worker contact effects produce small interactions because the transformed probability is on the tail of the logistic distribution. Large main effects, such as those observed for female worker contact produce even greater effects when transformed from the logit to the probability metric. This explains the seemingly different results that arise in the course of comparisons of Table 4 coefficients with Table 5 transformed effects.

50) See Phillips and Koblinsky, 1984 and Phillips et al, 1985.

## BIBLIOGRAPHY

- Abdullah, A.  
1976 "Land reform and agrarian change," Bangladesh Development Studies, 4(1): 67-114.
- Arthur, W. Brian and Geoffrey McNicoll  
1978 "Population and Development in Bangladesh," Population and Development Review, 4:23-80.
- Ahmad, Alia  
1984 Agricultural Stagnation Under Population Pressure: The Case of Bangladesh, Dhaka: University Press Limited.
- Ahmad, Nafis  
1956 "The pattern of rural settlement in East Pakistan," Geographical Review, 46(3):388-398.
- Alauddin, Mohammed  
1980 "Socio-economic determinants of fertility in Bangladesh: A review," Dhaka: Institute of Social Welfare and Research, University of Dhaka (mimeographed).
- Alauddin, Mohammad and M. Yahia Khan  
1983 "A study of Five NGOs in population activities in Bangladesh," A consultancy report to the Ministry of Health and Population Control and the United Nations Fund for Population Activities, Dhaka: Institute of Social Welfare and Research, University of Dhaka (mimeographed, May).
- Bangladesh Bureau of Statistics  
1984 Population Census of Bangladesh, 1981 National Volume, Dhaka: Ministry of Planning.
- Bangladesh Bureau of Statistics  
1985 Bangladesh Education in Statistics, Dhaka: Ministry of Planning, People's Republic of Bangladesh.
- Bhatia, S.; M.H. Mosley, A.S.G. Farugue, and J. Chakroborty  
1980 "The Matlab Family Planning Health Services Project," Studies in Family Planning, 11(G): 202-212.
- Blake, J. and P. Das Gupta  
1975 "Reproductive Motivation versus Contraceptive Technology: Is Recent American Experience on Exception?" Population and Development Review, 1(2): 229-251.

- Bogue, D.J. and A. Ong Tsui  
1978 "Declining world fertility: Trends, causes, implications," Population Bulletin, 33:1-56.
- Cain, Mead T.  
1978 "The Household Life Cycle and Economic Mobility in Rural Bangladesh." Population and Development Review, 4(3): 421-438.
- Cain, Mead  
1981 "Risk and Insurance: Perspectives on Fertility and Inequality in Rural India and Bangladesh." Population and Development Review, 7(3): 434-474.
- Cain, Mead  
1983 "Fertility as an adjustment to risk," Population and Development Review, 9(4): 688-702.
- Cain, Mead T.  
1977 "The economic activities of children in a village in Bangladesh," Population and Development Review, 3(3): 201-228.
- Cain, Mead T.; S.R. Khanam, and S. Nahar  
1979 "Class, patriarchy, and women's work in Bangladesh". Population Development Review, 5(3):405-438.
- Cain, Mead and S.S. Lieberman  
1983 "Development policy and projects for fertility decline in Bangladesh," The Bangladesh Development Studies, 11(3): 1-38.
- Chen, L.C.; Makhlisur Rahman, S.D'Souza, J. Chakraborty, A.M. Sardar, Md. Yunus  
1983 "Mortality impact of an MCH-FP program in Matlab, Bangladesh," Studies in Family Planning, 14:199-209.
- Chowdhury, A.I.; J.F. Phillips and J. Chakraborty  
1984a "Recent trends in contraceptive use prevalence and fertility in Matlab: Possible implications of recent demographic dynamics for policy," Paper prepared for presentation at the Ninth Annual Contributor's Conference of the Bangladesh Fertility Research Programme.
- Chowdhury, A.I. J.F. Phillips, A.K. Shaik  
1984b "Trends in neonatal, infant, and child mortality over the baseline and project periods of the Matlab Family Planning Health Services Project," Paper presented at the Annual Meeting of the Bangladesh Population Association, Dhaka August 22-24.

- Clark, S. ; M.B. Hossain, Chandan Shah, Y. Hassan  
 1986 "First report on visits, topics discussed, and services received from government health and family planning workers by eligible women in two upazilas and two comparison areas from April, 1984 to March, 1985," Dhaka: MCH-FP Extension Project Operations Research Paper 45, mimeographed, January.
- Coombs, P.H.  
 1980 Meeting the Basic Needs of the Rural Poor, New York: Pergamon Press.
- Davis, K.A.  
 1969 "Population policy: Will current programs succeed?" Science, 158:130-739.
- Demeny, P.  
 1975 "Observations on population policy and population program in Bangladesh," Population and Development Review, 1(2): 307-322.
- Demeny, P.  
 1979 "On the end of the population explosion," Population and Development Review, 5:141-162.
- Freedman, R.; and B. Berelson  
 1976 "The record of family planning programs" Studies in Family Planning, 7(1):1-40.
- French, W.L.; and L.H. Bell  
 1978 Organization Development - Behavioral Science Interventions for Organization Improvement, New York: Prentice - Hall International Second Edition.
- Greene, W.H.  
 1985 LIMDEP, (TM) Department of Economics, New York: Graduate School of Business Administration, New York, University.
- Haberman, S.J.  
 1979 Analysis of Qualitative Data, Volumes 1 and 2, New York: Academic Press.
- Hartman, B. and J. Boyce  
 1983 A Quiet Violence, London: Zed Press.
- Hasenfeld, Y.  
 1978 "Client-organization relations: A systems perspective," in R.C. Sari and Y. Hasenfeld (eds.) The Management of Human Services, New York: Columbia University Press, pp 184-206.

Hernandez, D.J.

1981 "The impact of family planning programs on fertility in developing countries: A critical evaluation," Journal of Social Research 10:32-66.

Hossain, M.B. and J.F. Phillips

1984 "A factor analysis of economic status indicators from four rural thanas of Bangladesh," Paper presented at the annual meeting of the Bangladesh Population Association in Dhaka (August).

Huber, D.H. and A.R. Khan

1979 "Contraceptive distribution in Bangladesh villages: The initial impact," Studies in Family Planning 10:246-253.

Huque, A.A.Z.; M.A. Koblinsky and J.F. Phillips

1984 "Operational barriers to implementing a domiciliary injectable contraceptive programme in rural Bangladesh," Paper presented at the Annual Conference of the Bangladesh Population Association, Dhaka (August).

Institute of Nutrition and Food Science

1978 Nutrition Survey of Rural Bangladesh, 1975-76, Dhaka: Dhaka University (December, mimeographed).

Islam, Mahmuda

1980 Folk Medicine and Rural Women in Bangladesh: Dacca, Women for Women.

Islam, Rizwanul

1981 "Trends in rural income distribution in Bangladesh, in Center for Administrative Studies: Developmental Issues in an Agrarian Economy, Dhaka: Dhaka University (mimeographed).

Jones, E.F.

1984 "The availability of contraceptive services," Comparative Studies Series Paper Number 37, London: The World Fertility Survey.

Khan, A.R.

1976 "Poverty and inequality in rural Bangladesh," Geneva: International Labour Organization, unpublished working paper.

Khan, M.R.

1985 "Population control, family planning and maternal and child health" Dhaka: Bangladesh Institute for Development Studies (mimeographed).

- Koblinsky, M.A.  
1985 Personal communication.
- Koblinshy, M.; J.F. Phillips, Md. Yunus, and R. Simmons  
1984 "Barriers to implementing an effective national MCH-FP Programme," Paper presented at the Annual Meeting of the National Council for International Health, Washington, D.C. (June 10-13).
- Lapham, R.J. and W.P. Mauldin  
1984 "Family planning program effort and birthrate decline in developing countries," International Family Planning Perspectives 10(4): 109-118.
- Leon, David  
1985 "Logit regression analysis for personal computers," (Unpublished manuscript, August).
- Mauldin, W.B. and B. Berelson  
1978 "Conditions of fertility decline in developing countries," Studies in Family Planning, 9:89-147.
- McNicoll, Geoffrey  
1975 "Community-level population policy: an exploration," Population and Development Review, 1(1): 1-22.
- Measham, A.R., A.R. Khan, M.J. Rosenberg, S. Jabeen, J. Akbar, H. Banu, and J.F. Phillips  
1982 "The demographic impact of tubectomy in Bangladesh," International Family Planning Perspectives 8(1): 18-32.
- Ministry of Health and Population Control  
1977a Country Health Programming Bangladesh: Programme Proposal, Dacca: Ministry of Health and Population Control and the World Health Organization.  
1977b Country Health Programming Bangladesh: The Information Document, Dacca: Ministry of Health and Population Control and the World Health Organization.  
1985 Population Control Programme in Bangladesh: Past, Present and Future, Dhaka: Population Control Wing, Ministry of Health and Population Control.
- Ministry of Planning of the People's Republic of Bangladesh  
1983 Five Year Plan: 1980, Dacca: Ministry of Planning.
- Misra, B.D., Ali Ashraf, R. Simmons, G. B. Simmons  
1982 Organization for Change - A Systems Analysis of Family Planning in Rural India, New Delhi: Radiant Publishers.

- Mitra, S.N. and G.M. Kamal  
 1985 Bangladesh Contraceptive Prevalence Survey 1983, A Final Report Submitted to the Ministry of Health and Population Control Dhaka: Mitra and Associates.
- Mozumder, A.B.M. Khorshed Alam; J.F. Phillips, D. Leon, M.B. Hossain  
 1986 "The Sample Registration System: A microcomputer system for monitoring demographic dynamics and health and family planning service operations in rural Bangladesh," Paper presented at the Annual Meeting of the Population Association of America, San Francisco (April 3-5).
- Phillips, J.F.  
 1982 "A logit regression method for the multivariate analysis of contraceptive attrition," in A.I. Hermalin and B. Entwistle (eds.): The Role of Surveys in the Analysis of Family Planning Programs, Liege, Belgium: Ordina Editions.
- Phillips, J. F. and M.A. Koblinsky  
 1984 "MCH-FP research for programme development: A briefing paper prepared by the International Centre for Diarrhoeal Disease Research for the Bangladesh Ministry of Health and Population Control," (unpublished, mimeographed).
- Phillips, J.F.; W. Stinson, S. Bhatia, M. Rahman, and J. Chakraborty  
 1982 "The demographic impact of the Family Planning Health Services Project in Matlab, Bangladesh," Studies in Family Planning, 13(5): 131-140.
- Phillips, J.F.; R. Simmons, G. Simmons and Md. Yunus  
 1984a "Transferring health and family planning service innovations to the public sector: An experiment in organization development in Bangladesh," Studies in Family Planning, 15(2) 62-73.
- Phillips, J.F.; M.A. Koblinsky, and A.A.Z. Huque  
 1985a "Researching the utilization of research for health policy development: A case study in Bangladesh," Paper presented at the Workshop on Community Epidemiology held in Makabalipuram, Tamil Nadu, India (March 25-29).
- Phillips, J.F.; R.S. Simmons and M.A. Koblinsky  
 1985b "Bureaucratic transition: A paradigm for policy development in Bangladesh," Paper prepared for the Seminar on Societal Influences on Family Planning Program Performance, International Union for the Scientific Study of Population, Jamaica: April 10-13.

- Phillips, J.F., R. Simmons, A.A. Zahidul Huque, M.A. Koblinsky,  
M.A. Koenig  
1985c "Implementation based policy development: A progress  
report on the MCH-FP Extension Project paradigm, field  
strategy and impact," A Briefing Paper of the  
International Centre for Diarrhoeal Disease Research,  
Bangladesh submitted to the Ministry of Health and  
Population Control (mimeographed, December).
- Phillips, J.F., M.A. Koenig and J. Chakraborty  
1985d "The Matlab Family Planning Health Services Project  
Impact on Family Planning Fertility and Child Survival:  
A Summary of Key Findings and Their Policy Implications  
for the Bangladesh Ministry of Health and Population  
Control," Final Report submitted by the International  
Centre for Diarrhoeal Disease Research, Bangladesh to  
the United Nations Fund for Population Activities  
(mimeographed, December).
- Phillips, J.F.; Mian Bazle Hossain, and M.A. Koblinsky  
1985e "The effect of an organization development strategy on  
contraceptive choice in two Bangladesh subdistricts: A  
multivariate analysis of censored contraceptive use  
histories of a sample rural of women," Paper presented  
at the Seminar of the East West Population Institute on  
the Determinants of Contraceptive Method Choice,  
Honolulu (August 26-29).
- Population and Development Planning Unit  
1984 Recent Trends in Fertility and Mortality in Bangladesh:  
Proceedings of a National Seminar Dhaka: Planning  
Commission.
- 1985 The Fertility Impact of Development Programmes in  
Bangladesh, Dhaka: Planning Commission, Ministry of  
Planning.
- Rahman, A.  
1962 "Basic democracies at the grass roots," Comilla, East  
Pakistan: Pakistan Academy for Village Development.
- Rahman, M.; W.H. Mosley, A.R. Khan, A.I. Chowdhury, and J.  
Chakraborty  
1980 "Contraceptive distribution in Bangladesh: Some  
lessons learned," Studies in Family Planning.  
11:191-201.
- Rahman, M.  
1984 Determinants of Areal Variation in Contraceptive  
Practice in Bangladesh, A thesis for the degree of  
Doctor of Philosophy, The Research School of Social  
Sciences, Canberra: The Australian National University.

- Ravenholt, R.T. and John Chao  
 1974 "Availability of family planning services - The key to rapid fertility reduction," Family Planning Perspectives 6(4): 217-223.
- Robinson, W.C.  
 1983 "Public policy, risk and fertility in Bangladesh: A comment," The Bangladesh Development Studies 11(3): 39-58.
- Schellstede, W.P. and R.L. Ciszewski  
 1984 "Social marketing of contraceptives in Bangladesh," Studies in Family Planning, 15(1):30-39.
- Simmons, R.; G. Ness and G. Simmons  
 1983 "On the institutional analysis of population programs," Population and Development Review 9 (3):457-474.
- Simmons, R.; J.F. Phillips, and Mizanaur Rahman  
 1984 "Strengthening government health and Family planning programs: Findings from an action research project in rural Bangladesh," Studies in Family Planning, 15(5):212-221.
- Simmons, R.; M.A. Koblinsky and J.F. Phillips  
 1985 "Client relations in South Asia: Their programmatic and societal determinants," Paper presented at the Seminar on Societal Influences on Family Planning Program Performance of the International Union for the Scientific Study of Population, Jamaica, April 10-13, 1985.
- Sobhan, Rehman  
 1982 The Crisis of External Dependence: The Political Economy of Foreign Aid to Bangladesh, Dhaka: University Press, Ltd.
- Stinson, W.S.; J.F. Phillips; M. Rahman; J. Chakraborty  
 1982 "The demographic impact of the Contraceptive Distribution Project in Matlab, Bangladesh." Studies in Family Planning 13(5):141-148.
- Taylor, H. C., Jr. and B. Berelson  
 1971 "Comprehensive FP based on maternal and child health services: A feasibility study for a world program," Studies in Family Planning, 2(2):21-54.
- Taylor, H. and R.J. Lapham  
 1974 "A program for family planning based on maternal/child health services," Studies in Family Planning 5:71-82.

- Timm, R.W.; Atiqur Rahman Khan, C. McCord  
 -----1980 "An Evaluation Report on Gono Unnayan Proechesta,"  
 Rajoir, Madaripur, Bangladesh: Gono Unnayan Prochesta  
 (People's Development Efforts, mimeographed).
- Tuckwell, S.  
 1983 "Some aspects of mental health of women in Bangladesh,"  
 in Jahanara Huq, Khaleda Salahuddin, Hamida A. Begum,  
 and S.R. Qadir (eds.) Women in Bangladesh: Some  
Socio-Economic Issues, Dhaka: Women for Women.
- Walker, S.H. and D.B. Duncan  
 1967 "Estimation of the probability of an event as a  
 function of several independent variables," Biometrika  
 54(1): 167-178.
- Wennergren, E.B.  
 1983 An assessment of the agricultural sector in  
 Bangladesh," a consultancy report submitted to the  
 United States Agency for International Development  
 (mimeographed, August).
- World Bank  
 1981 "Trends in real wages," Bangladesh: Current Economic  
Situation and Review of the Second Plan. Washington:  
The World Bank (Report 3309-BD, September) pp69-82.
- 1984 World Development Report. New York: Oxford University  
 Press.
- Yunus, Md.; J.F. Phillips, M. Koblinsky, R. Simmons  
 1984 "Strategies for implementing change in a rural health  
 and family planning programme in Bangladesh," paper  
 read at the Annual Meeting of the National Council on  
 International Health, Washington, D.C. (June 10-13).
- Zeidenstein, George  
 1979 "An Evolutionary Step in Contraceptive Service  
 Programs: The User Perspective," An address given at  
 Harvard University, February 8, 1979 (unpublished).

## APPENDIX A

### THE MATLAB FAMILY PLANNING HEALTH SERVICES PROJECT AND THE MCH-FP EXTENSION PROJECT: A SYNOPSIS OF STUDY AIMS

In 1977 the ICDDR,B fielded a project in Matlab to test the hypothesis that health and family planning services can succeed in rural Bangladesh. Despite the difficult work conditions and fundamental conservatism of the population in the Matlab area, family planning use prevalence rose dramatically in the early stages of the project and fertility declined (see Phillips, et al. 1982). The contraceptive prevalence that was reached was sustained at about 33 percent of the eligible couples until 1982, at which time prevalence rose gradually to nearly 50 percent. By the end of 1985 prevalence had remained at this level for some 12 months (Phillips, et al., 1985).

Recent evidence suggests that the project has also had pronounced infant and child mortality effects. MCH services were developed in stages so that the initial clinical focus of the project was shifted sequentially to a domiciliary program for oral rehydration, antenatal care, delivery practice training, and nutrition education services. All women of child bearing ages are immunized against tetanus and all children are immunized against measles. Declines in neonatal, post neonatal, and child mortality antedate the impact of immunization services and covary with the fertility decline, indicating that much of the mortality effect of the Matlab project has been achieved through the child survival effects of child spacing (See Phillips, et al., 1985; Chowdhury et al., 1984b; Chen, et al., 1983).

The Matlab experiment has both organizational and technical characteristics that set it apart from the national program, but have contributed to its overall success. The apparent success of the Matlab the Government of Bangladesh to request the ICDDR,B to undertake a second project in other areas of Bangladesh, to test the transferability of elements of the Matlab service system to the government service system without introducing the special resources and special operational structure of the Matlab project. This project, known as the MCH-FP Extension Project, was launched in late 1982 and program interventions were initiated in 1983. The project functions in two areas: the Sirajganj Subdistrict of central Bangladesh and Abhoynagar Subdistrict near the western border of Bangladesh with India. These areas were selected by the Government of Bangladesh. Matched adjacent subdistricts have been selected as comparison areas (See Figure A1).

~~=====~~To understand the structure and design of the Extension Project it is helpful to review the design of the national program, its work system, and the nature of client exchanges in the public sector program. The structural design of the MOHPC system segments health from family planning functions. Recent efforts have been made to integrate the program into a health and family planning system through the standardization of job descriptions, and alterations in lines of authority at the subdistrict level, but these changes have met resistance at all levels. The MOHPC, while officially embracing the policy of integration of health and family planning, has separate wings for each set of functions for all staff below the level of Minister.

The Health Division is responsible for hospital services, preventive medicine, and outreach services related to malaria control, sanitation, immunization, diarrheal disease control, and other health services. The Health Wing is staffed primarily by male workers. At the field level, domiciliary services are delivered by a cadre of male Health Assistants (HA) who were originally hired in the 1970s to undertake surveillance activities for the Smallpox Eradication Program and subsequently for the Malaria Eradication Program. Their traditional role in the program has been to participate in special single purpose campaigns which involve canvassing the population in three or four month rounds, and conducting an annual registration of all households monitored in the process.

The Population Control Wing of the ministry is responsible for family planning service delivery, clinical services related to family planning, the delivery of clinical MCH services at the union level. The union is the primary unit of government in rural Bangladesh, typically serving from 20 to 25 villages and a population of 25-30,000. At the subdistrict level peripheral support services are provided for training, communication, and logistics support. A structure for services exists, which is largely parallel to the Health Wing structure. At the field level are Family Welfare Assistants (FWA), assigned at a ratio of one to 6 to 7000 population who were hired in the late 1970s to conduct family planning motivational work. At the union level are female parmedics, Family Welfare Visitors, who are trained to provide basic family planning back-up functions, IUD insertions, and a limited range of MCH care.

The Matlab FPNSP provides the operational model for changes that the Extension Project seeks to introduce in the MOHPC system. FPNSP services are delivered primarily by young, married, literate, and contracepting village women, known as Community Health Workers (CHW). CHW were hired from the villages where they were assigned to work, and are posted in a ratio of one worker to 1200 population. CHW were trained and equipped to visit households in Matlab on a fortnightly basis, and

instructed to ascertain contraceptive preferences and encourage couples to adopt. Pills, condoms, and depot-medroxy progesterone acetate (DMPA) injections are provided by these village workers to clientele on request in the course of household visits. Copper T services are provided to women in their homes by trained paramedics who visit women designated by CHW as clientele requesting services. Referral services for sterilization are available in a nearby clinic in Matlab.

Differences between the program support provided under the Matlab administrative system and the Government program are extensive. The principal distinction between the Matlab system and the MOHPC system is the relatively high density of female workers in Matlab. Matlab has six times the density of female workers as the Government program, which permits more rigorous standards of care and follow-up to be enforced than is possible in the Government system.

A second key distinction is the absence of separate functional divisions in Matlab. All domiciliary services, whether health or family planning related, are CHW provided and services at all levels follow a unified management design.

An additional distinction is the FPHSP management system which emphasizes operational goals and meeting client needs rather than demographic targets. To achieve this orientation in Matlab, record keeping and field management systems monitor worker activities, contraceptive use dynamics, and MCH services provided to all households. Fortnightly meetings of all staff permit review of progress and a flexible approach to goal setting.

Finally, supervisory support in Matlab is well developed. Supervisors are expected to respond to worker's needs and provide community liaison support as needed. In contrast to the FPHSP system, weak programmatic support in the MOHPC system prevents even the most dedicated field worker from delivering comprehensive care. Administrative links between village workers and paramedical clinic workers are weak. In the MOHPC system "Union" level services are provided by 3 to 4 male health workers and 3 female family planning workers, but no unified supervisory system exists that fosters clinical backup for the outreach program or cooperation among male and female field staff. As a consequence, field work is typically sporadic, and system support services do not function well. Work nevertheless takes place, but deficiencies in the technical knowledge of workers and back-up services prevent the delivery of a broad range of family planning and MCH services.

Despite operational constraints to transfer of the FPHSP model to the MOHPC system, the project has achieved considerable success in implementing key strategies in the two subdistricts, and in transferring approaches developed in the course of field

work into national policy (See Phillips and Koblinsky, 1984b). The forthcoming population plan of Bangladesh has incorporated a major expansion of the female work force in the program, based in part, on evidence presented in this paper on the potential effects of increasing the frequency and quality of FWA-client exchanges.

Implementation of the counterpart support strategy was carried out by assigning Matlab village workers and their supervisors to participate in a two week technical training course as trainees along with Government workers with similar duties in the MOHPC service system. After completion of training courses, Matlab workers were assigned to Government counterparts for a 90 day period in half of the intervention area and instructed to work with Government counterparts on the introduction of lessons from the training course into the regular work regimen of domiciliary staff. This area where work routines were introduced by collaborative ICDDR,B-MOHPC teams is termed the "Counterpart Support" area. Where training was offered, but counterparts were not assigned, represents the "Training Only" cell of the experiment. The design of the experiment is described in detail in the report by Phillips, et al., 1984a.

Figure A1: Map of Bangladesh Showing the Matlab and Extension Project Study Areas

