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Abstract

This paper describes two initiatives that have used experimental studies to guide the development of community-based health and family planning programs. In Bangladesh and Ghana, factorial experiments were implemented in stages. An exploratory phase developed a service system for community-based health care; an experimental phase assessed the demographic impact of the system; a replication phase examined the transferability of the experimental program to a non-research setting; and a scaling-up phase facilitated the extension of the new system to the national health care program. All stages were guided by research, with questions, mechanisms, and outcomes shifting as the process developed. Large-scale systems development was achieved in both Bangladesh and Ghana, not because the scaling-up programs were alike, but because similar research approaches informed their strategies, allowing them to adapt to contrasting societal and institutional contexts. Success in Bangladesh and Ghana suggests ways in which evidence-based system development can overcome resource and organizational constraints and foster transitions from limited, passive clinical services to active programs for providing accessible community-based care.

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Change can be a perilous process in any large-scale organization, particularly in settings where change is needed most. Research is often conducted to provide guidance on what must be changed without informing the process of how to achieve something new. Research fielded to improve programs is isolated from the processes of resource allocation, manpower planning, and strategic development. Even in instances when national program reform is instituted, change is more typically guided by fiat than by evidence of what works. The gap between evidence and reform is particularly pronounced in impoverished countries where efficient and effective health and human service organizations are lacking. Resource limitations, communications lapses, manpower limitations, and structural legacies interact in ways that can undermine use of results from even the most carefully researched project.

Awareness of the gap between research and reform spans at least four decades of literature on service innovations in social welfare, health, education, development, and agriculture. Practical demonstrations of large-scale, evidence-based program development are rare, but vitally needed. The list of urgent and emerging health problems is growing, and evidence from pilot and experimental projects often demonstrates promising leads for program improvement. But in most settings, application of these leads for large-scale organizational change and reform either languishes or proceeds in ways that are uninformed by field investigation and trial. This paper presents a comparative review of two programs that have successfully fostered large-scale health program development and organizational change in contrasting cultural and institutional settings: the Matlab and Extension projects in Bangladesh, and the Navrongo and Community-based Health Planning and Services (CHPS) projects in Ghana. In each setting, controlled experiments were fielded to test the hypothesis that service delivery systems can induce and sustain fertility and mortality transitions despite social, cultural, and economic constraints to achieving supply-side success. Both experimental projects have had a profound impact on national health policy, donor priorities, and public health action; both are models of ways to translate evidence into large-scale reform.

The world's poorest countries face a mounting reproductive and child health crisis. In the poorest one-quarter of them, mortality has ceased to decline. Large public-

sector programs for extending health care to communities have failed to achieve their intended results, in part because of worsening poverty and mounting resource constraints, but also because appropriate service delivery systems have not been tested and developed. Low-cost, effective technologies that could substantially reduce childhood mortality, reproductive health morbidity, and unwanted fertility often remain inaccessible to populations in greatest need. Where services are available, lapses in quality often mar even the most basic service regimen. Even low-cost technologies that are targeted at the needs of the relatively poor remain inaccessible and underutilized (Filmer 2002; Gwatkin 2002 and 2003). Health reforms launched to resolve problems often remain focused on the operations of central bureaucracy rather than community needs (Gwatkin 2001). Promising approaches to addressing the health service crisis are sometimes demonstrated by research, pilot, or nongovernmental organization (NGO) initiatives, but the success of special projects often derives from the charisma of project leaders, special resources, or other unique circumstances that detract from the credibility of these models in guiding large-scale program reform.

The two successful community health and family planning projects reviewed in this paper are particularly germane to discussion of the role of research in health reform within the context of institutional resource constraints. Both demonstrated effective means of introducing major reproductive behavioral change under challenging social, cultural, and economic circumstances. Both experiments were conducted in the context of national organizational change that relied on the outcome of research continuously over a considerable period of time.

THE COMMON PARADIGM

The multi-year process of organizational development that characterized the Bangladesh and Ghana programs comprised several research stages, each corresponding to a phase of program change and development. In the paradigm these programs represent, the strategic isolation of experimental studies from large-scale programs requires systematic attention to scaling up results from the outset of research planning. Phases of this program of coordinated research and change are illustrated in Figure 1.

Figure 1 Common features of the Matlab and Navrongo experiments

STAGE	Preliminary	Experimental	Replication	Scaling up
QUESTION	What is appropriate?	Does it work?	Can it be replicated?	Is change progressing?
PARADIGM	Pilot	Factorial trial	Transfer experiment	Organizational change and development
PROJECT	Matlab CDP	Matlab FPHSP	Extension Project	Population and Health - 3
	Navrongo pilot	Navrongo CHFP	Nkwanta replication	CHPS
PROCESS	Adaptive development of service strategies	Sociodemographic research	Operations research	Strategic assessment
MECHANISM	Focus groups	Survey and demographic surveillance	Rapid surveys and qualitative evaluation	Systems analysis & monitoring change
PRODUCT	Candidate system	Success story	Consensus for change	Changed system
ENDPOINT	Socially acceptable strategy	Strategy that reduces mortality and fertility	Credible model for change	Improved reproductive and child health

Note: Shaded cells were implemented in both Bangladesh and Ghana; white cells were implemented only in Ghana.

The preliminary phase

The Bangladesh and Ghana experiments demonstrate the value of constructing generations of questions. The first-generation question is: What type of service or action is appropriate? This question is best addressed through social or anthropological investigation, but can be addressed quickly with focus groups or dialogue with key community stakeholders. In Matlab, a complex and expensive Contraceptive Distribution Project (CDP) was launched in 1975 and was abandoned after two years. Sociodemographic research conducted to explain its failure provided important insights that enabled scientists to launch a new study that would more effectively adapt strategies to the social environment (Bhatia et al. 1980; Stinson et al. 1982). In Navrongo, implementation of pilot services in three communities was conducted in conjunction with social research—

a stage of work that identified the elements of a culturally compatible service system.¹ In that small-scale study, trial and error could be used to configure services that were socially acceptable and administratively feasible without investment in large-scale implementation or research activities. This micro-implementation approach was more efficient than Matlab's premature "CDP" experiment.²

The experimental phase

Once the design of the experiment was developed, an experimental trial was needed to determine whether the proposed strategy would work. As column 2 of Figure 1 shows, the paradigm shifted at this stage from micro-pilot to full-scale factorial trial, involving treatment and comparison areas and demographic evaluation. The output of each experiment was a test of hypotheses. Pending confirmation of substantive hypotheses, results were designated as "success stories" suggesting that the system of care under trial merited replication and scaling up.³

The replication phase

In both Bangladesh and Ghana, results of the experiments were insufficient for catalyzing the scaling-up phase, since questions persisted about the relevance of scientific results to practical needs of districts elsewhere. This reaction to experimental research is commonplace, particularly for organizational studies that require circumstances for research that are alien to the parent bureaucracy. Scientifically rigorous field research requires isolation of experimental conditions so that a controlled environment allows testing of treatment conditions that are insulated from dysfunctional administrative mechanisms, procedures, and structures that the research is intended to improve or replace. Moreover, the internal organizational culture of scientific institutions differs from large-scale organizational culture, in that advancement in a research institution is based more on scientific achievement than on tenure in a bureaucracy or on personnel policies. Protocols and proposals clarify ways that work arrangements must change to suit the needs of hypothesis testing, but this process of clarifying the nature of change establishes guidelines for scientific endeavor that differ from the rules that structure bureaucratic operations. The former clarifies ways to do things that contrast with standard procedures, the

latter prevents deviation from set directives. As a result, staff employed by scientific organizations are more accustomed to operational change than staff engaged by large-scale bureaucracies. Research workers shift activities over limited durations of protocols, and are acclimated to the notion that studies must always work—a climate of work for experimental research that is sometimes referred to as the “Hawthorne Effect.”⁴

Reflecting this dilemma, the institutional climates of the Matlab and Navrongo field stations are more similar to each other than are the scaling-up programs that they fostered (Table 1). In these and other field research stations around the world, institutional features that make research possible ensure scientific rigor in testing hypotheses and assessing outcomes, by protecting operations from the vagaries of large-scale bureaucratic malaise.

In both Bangladesh and Ghana, explicit attention was addressed to an intrinsic dilemma of experimental research, namely the greater the scientific rigor of experiments, the greater is the need to isolate operations from the larger system.⁵ Sustaining rigor while diminishing strategic isolation required a beyond-the-experiment phase of

Table 1 Common features of the Matlab and Navrongo institutional climates and the national systems that were targeted for change

Institutional climate	Matlab and Navrongo experiments	Public-sector national programs
Organizational culture is...	...influenced by rigorous scientific protocols ...influenced by social institutions at the periphery	...influenced by rules, hierarchy ...designed to be impervious to social influences
Receptiveness to change is...	...flexible: adapted to needs of changing research projects	...rigid: standardized by formal procedures
Primacy of human resources is...	...well developed with a clearly developed achievement-based career ladder	...defined by duration of service or rank rather than achievement
Job security is...	...low and performance related	...high and tenured
Internal communication is...	...omni-directional	...hierarchical, top down
Managerial objectives are...	...performance based	...based on rules, orders, and procedures

action and research. In Ghana and Bangladesh, a replication phase was launched to develop a bridge between the experiment and the large-scale system. This is illustrated in column 3 of Figure 1. Once preliminary experimental results were disseminated, the paradigm shifted experimental hypotheses to new guiding questions and to new project designs and locations, with mechanisms and products designed to build consensus for organizational change. At this stage, the organization of services became the primary focus of research, with the endpoints under investigation focused on developing a model for changing operations. Replication projects were launched in Bangladesh and Ghana to test the transferability of experimental operations to the host system. These projects addressed the next generation of questions about the transferability and sustainability of the new program. In both cases, this stage was crucial to fostering credibility for the scaling-up program as well as identifying problems that would not have been detected in the unique administrative environments of Matlab and Navrongo.

The scaling-up phase

Successful replication generated the tools for training, monitoring, and dissemination for the scaling-up phase. At this stage, research questions shifted to the issue of monitoring change itself, and organizational research provided the guiding paradigm for new national reform programs. Backed by central policy and donor input, these national programs were centrally directed, but they coordinated their activities with the original research team. Dissemination activities were integrated into routine policy development and management decisionmaking. At this stage, research sites were seen less as experimental zones than as demonstration sites where the new system could be observed by program administrators, replicated, and used as a motivating model for the national organizational change.

New projects were launched to coordinate the scaling-up process. Qualitative research assessing reactions to the program and to problems encountered, known as “strategic assessment,” was directed to interviewing community members, frontline workers, supervisors, and management teams. In Ghana, the strategic assessment has been launched in conjunction with monitoring systems for gauging the pace of organizational change, constraints on change, and factors facilitating progress. Research mechanisms

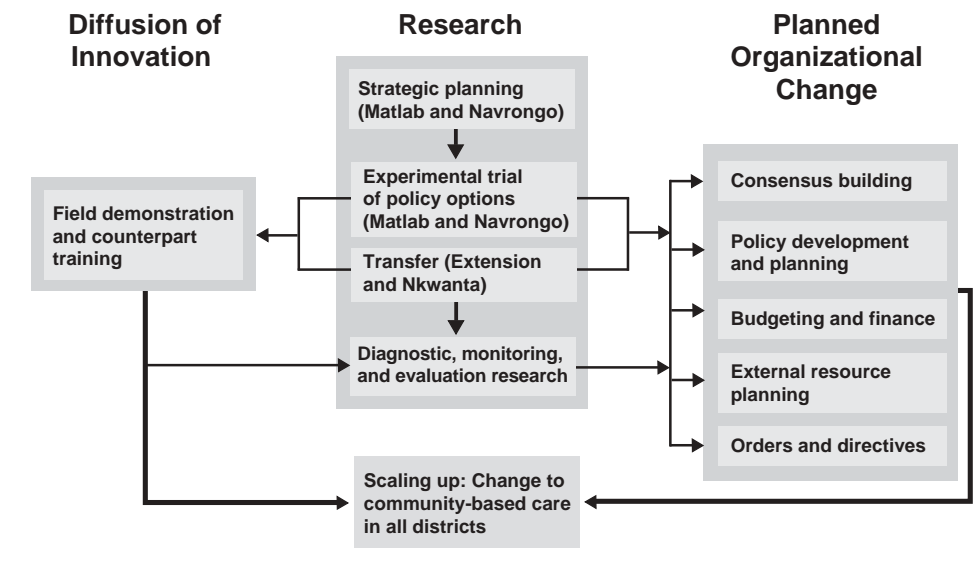
were shifted from district initiatives to a focus on the national process for achieving organizational change. The ultimate endpoint of the process in Bangladesh was national improvement in health status and reduced fertility. In Ghana, the process is still being developed and national demographic impact is unknown.

As each stage of the process unfolded, successive generations of questions and products emerged. As Figure 1 shows, the initial stage produced a candidate system, phase 2 produced a success story, phase 3 produced a process for replicating success through the diffusion of innovation or planned organizational change, and phase 4 produced national organizational change. Products of research at each stage clarified sequentially the elements of the new system, its impact, the sustainability of change, and the pace of change and constraints on scaling up. Throughout this process, the use of research was characterized not by researchers influencing decisionmakers with the dissemination of particular results, but by a dynamic process of reform that incorporated shifting research agendas and phases in an evidence-based decisionmaking system.

The strategic isolation of experimental studies from large-scale programs requires systematic attention to scaling up results from the onset of research planning. Otherwise, isolation becomes an end in itself. To address the problems of institutional isolation and “the Hawthorne Effect,” the experimental studies in Bangladesh and Ghana combined research with two complementary dissemination mechanisms: systems for fostering the diffusion of innovation and planned organizational change (Figure 2). The diffusion arm of the research use system was premised on the notion that ideas and innovations can spread through social networks via mechanisms collectively termed “diffusion.” Social diffusion refers to the process of ideational or behavioral change fostered by social interaction. Organizational diffusion is an analogous process in which change can occur through the communication of ideas or the demonstration of new methods (Mintrom 1997). For the successful extension of these projects, diffusion was fostered by demonstrating the project to site visitors, publishing and disseminating material on replication activities, and training teams in relevant health technology and organizational principles.

Planned organizational change in Bangladesh and Ghana involved formal actions to legitimize the new program, altering policies according to the needs of the scal-

Figure 2 A common model for scaling up Matlab and Navrongo



ing-up program, and mobilizing resources for incremental costs. Project research was involved in these deliberations; policymakers, in turn, were involved in project protocol design and the interpretation of research results. Organizational decisionmaking involved research and policy partnerships designed to transfer ownership of the research process to leaders responsible for large-scale decisions. This two-winged strategy gave impetus to both programs, and avoided strategic dependence on any single set of approaches or particular research outcomes and products.

SCALING-UP INNOVATION IN CONTRASTING SETTINGS

Common features of projects that have informed national policy and program development are well documented.⁶ Less is known, however, about ways in which scaling-up efforts in contrasting settings should differ. Rather than reiterate the axioms of successful scaling up, we examine two similar experimental studies that were fielded with comparable impact on national policies and programs. Objectives of the experi-

ments were similar, and approaches to evidence-based program development were guided by a common body of experience and literature. Yet, the scaling-up strategies of these two programs are radically different. Understanding ways in which similar research approaches generated these scaling-up differences lends clarity to the science of evidence-based organizational change.

The open systems approach

The Bangladesh and Ghana research systems represent an approach for adapting human service operations to social conditions and needs, termed “open systems analysis.” Given that the achievements of a service system are external to organizational boundaries, the goal of research is to find congruence between societal conditions and organizational strategy. Beyond the obvious expedient of designing services to meet local demand, the aim of programs is to foster new reproductive and health-seeking behavior. Achieving behavioral change, in turn, often benefits from strategies that bridge the gap between society and service organization (Phillips and Ross 1992). When successfully applied to developing human services in traditional rural social settings, organizational science dictates that scaling-up programs adapt to the social organizational system. The challenge of social and operations research is to clarify what this means in practical terms. How are communities to be approached? Who should be contacted? How can community leadership be involved? How can community participation be developed, sustained, and used? Once such questions are answered, the social and institutional contexts should also influence the scaling-up approach, which again requires social learning, adaptation, and evidence rather than action based on conjecture or borrowed ideas.⁷ The fact that the Bangladesh and Ghana programs employed similar methods to produce different scaling-up models is no accident. Because research guided both programs, contrasting contexts engendered different strategic designs.

The Bangladesh projects

Context and the Matlab experiment. The geography of Bangladesh is dominated by its powerful rivers, segmenting the country vertically and laterally into a deltaic plain of temporary land, and rising to form a riverine sea in the monsoon. The risk and uncer-

tainty this environment imposes are exacerbated by pervasive poverty, extremely high population density, and elevated rates of morbidity and childhood mortality. Social theorists attribute much of what is known about Bangladesh's social traditions to this underlying uncertainty. Social fragmentation grounded in human ecology has been exacerbated by three centuries of colonial exploitation from Moghul, British, and Pakistani rule, designed to extract wealth and maintain external power. Social structure, in the form of coherent community leadership or indigenous grassroots political institutions, was never developed and did not emerge naturally. As Arthur and McNicoll (1978) noted:

Our overall impression of rural social organization in Bangladesh...is one of diffuseness. Duties and obligation run in various directions, and functions are split among different kinds of social groupings. Local society is fragmented into groups organized around leading families, which are often at odds with one another. No strong territorial groupings exist to pull community interests into line. This traditional structure is changing slowly, increasingly coming to be based on commercial relations, but this process is still in its early stages. (p. 42)

This lack of structure permeates social systems in Bangladesh. Village life is continuously disrupted by ad hoc efforts to acquire status, security, or wealth. Conflicts that arise from this social turbulence infuse the powerless elements of society with a sense of insecurity; social status, acquired by the privileged few, is synonymous with power, and power is directed to extracting wealth.⁸ To advance in status, the villager must form alliances, join networks, and cement lateral relationships among peers, either to foster individual gain at the expense of others or to protect vital interests from change of any kind. Patronage, in this context, becomes crucial to insuring families against risk. Status is strongly valued; advancement by others is viewed as a zero-sum game—the good things in life are limited, and those who get ahead represent a threat to the rest of the community.⁹

Against this background of social diffuseness are organizational traditions of the colonial governments that were designed to retain power and extract wealth. Perhaps in response to this diffuseness, bureaucracy is highly formalized with pervasive rules, a top-down command structure, and limited mechanisms for consensus building or bottom-up communication.¹⁰ The concept of formal bureaucracy is ancient and ingrained,

imposed by centuries of external rule, but also filling the organizational void that social diffuseness affords.¹¹ Positions in the bureaucracy are coveted sources of prestige, status, and power; resources of the public sector are strained by the tendency to expand the role of official bureaucracy to every sector of human welfare and social order and to extend the reach of bureaucracy to every hamlet.¹²

In 1977, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) launched an experimental project in Matlab Thana to test the impact on health, survival, and fertility of a comprehensive program of doorstep delivery of health and family planning services. This study was launched in response to international debate about the impact of family planning in high-fertility, high-mortality settings. Among researchers, Matlab was considered appropriate for this trial because it was a traditional, rural, and isolated area of Bangladesh where demographic transition had not begun, where social institutions were deemed unfavorable to service delivery success, and where sociodemographic research capacity was well developed.¹³ Since the onset of investment in family planning programs in the 1950s, their demographic impact had been the subject of policy debate.¹⁴ A parallel debate concerned the prospects of reducing childhood mortality in impoverished rural settings. At issue at the time was the practicality of improving survival and reducing fertility with service delivery approaches, in the absence of concomitant economic development and social change.¹⁵ Debate surrounding the Matlab experiment was amplified by the failure of an earlier supply-side experiment that tested the impact of distributing oral contraceptives to women in their homes. Also, evidence from child survival research suggested that benefits that arose from the introduction of a given health technology were offset by competing risks from seemingly unrelated causes of morbidity and mortality. Interpretations suggested that supply-side interventions in the context of severe adversity might have little or no lasting impact in situations where the causes of high fertility and ill health are systemic consequences of underlying economic, ecological, and societal determinants (Koenig and Simmons 1990).

In response to this debate, the Matlab experiment tested the demographic impact of a comprehensive health service approach. The project was staffed by young, educated married women who were trained to provide health and contraceptive services for

families in their homes. Emphasis was placed on developing health workers' technical credibility as well as sensitivity to users' needs.

By 1980, the fertility impact of the Matlab experiment was pronounced; child survival effects were soon evident as well.¹⁶ By 1982, findings led researchers to recommend changes in national health policies and operations so that strategies for primary health care would benefit from the success of the Matlab project. In meetings, scientific papers, and discussions project scientists noted that national goals for health care impact could be achieved with community-based approaches, if a national program of staffing, training, and deployment could be modeled on the Matlab project.

Replicating the Matlab experiment. Results from Matlab shifted the debate from questions about whether supply-side strategies could succeed to questions about whether the Matlab model could be replicated elsewhere. The Matlab project was focused on primary questions about the demographic impact of a controlled experiment; secondary questions of sustainability, transferability, and operational relevance could not be tested in the isolated environment of a field research laboratory. Because the ICDDR,B was a nongovernmental organization with separate management arrangements, funding, and staffing, it could isolate its field operations from the turbulent political events in South Asia in the early 1970s that led to the creation of Bangladesh as a country. The war for independence, subsequent famine, and political upheavals required an element of strategic isolation separating the scientific work systems of the ICDDR,B from the formal health-sector bureaucracy. While the Matlab project represented a test of the optimum strategy for providing care in an unfavorable socioeconomic setting, service operations of the project were radically different from those of the national program, in terms of both staff composition and resources.

Presentation of Matlab findings at a 1981 United Nations–sponsored “tripartite review” involved the ICDDR,B, senior officials of the Ministry of Health and Family Welfare (MOHFW), and the donor to Matlab at the time—the United Nations Population Fund (UNFPA). At this meeting, officials of the MOHFW rejected the proposition that Matlab results could be taken at face value as a service approach that could be applied on a large scale. Instead, they proposed a replication study that would test the transferability of Matlab operations to the government program, wherein the system of

care would rely on the usual staff, resources, and directives of the health-service bureaucracy and the ICDDR,B would focus on counterpart training, organizational development, and operations research (Phillips et al. 1984). Pending the outcome of this MOHFW-directed replication study, further scaling-up operations would be planned and implemented. This replication initiative—the Maternal and Child Health and Family Planning Extension project—was designed to serve as a bridge between the Matlab experiment and national scaling up by answering questions about the sustainability and feasibility of Matlab operations under realistic operational circumstances of an initiative directed by the government of Bangladesh.

Two districts were selected for the Extension project in regions distant from the Matlab field station: Sirajganj Thana, located on the Jamuna River in central Bangladesh; and Abhoynagar Thana in western Bangladesh near the Indian frontier of West Bengal. Matlab primary health care staff and supervisors were assigned to work as counterparts to Extension-area government workers. Work systems, management information systems, and service technology were transferred to Extension areas through direct counterpart support. All workers involved, including senior district-level staff, were also provided with on-the-job orientation to the Matlab project.

Scaling up the Extension project. Initial results of the Extension project showed that staff density and work assignments in Matlab could not be replicated with the existing personnel assigned to service operations in Sirajganj and Abhoynagar.¹⁷ Within six months of the completion of counterpart training, the ICDDR,B study team and MOHFW officials turned to the task of hiring additional workers. This task coincided with MOHFW negotiations with the World Bank on the Third Population and Health Project, a \$251 million loan and cofinanced agreement for five years of support to the health sector. As an initiative that exceeded \$2 per capita in a severely resource-constrained setting, the Bank project represented a crucial mechanism for financing the national implementation of the Matlab approach. Extension project evidence on the nature of constraints to replicating the Matlab experiment became a resource for mobilizing external resources for the program.¹⁸

The Third Project was launched in 1985. Resources were directed to hiring 10,000 additional primary service providers, known as Family Welfare Assistants, who were

responsible for implementing Matlab-like doorstep health and family planning services. Research and action in the Extension project were shifted to studying problems with the scaling-up program, new supervisory and management systems required for its implementation, relevant national orders for guiding the initiative, and research systems for documenting the impact of the initiative. Incremental resources were funded by a \$251 million agreement with the World Bank known as the Third Health and Population Project. Within five years most of this program was implemented nationwide. In all, 22,000 Family Welfare Assistants were recruited, trained, and deployed in rural hamlets throughout the country.¹⁹

The Ghana projects

The social context of the Navrongo experiment. Ancient cultural traditions of Ghana's ethnic groups were institutionalized within powerful traditions of corporate community governance long before the arrival of the British. Many of these traditions of social cohesion and governance resonate powerfully in modern organizations. Colonial bureaucracies carrying out the indirect-rule policies of the British Gold Coast encouraged, rather than uprooted, the maintenance of traditional social structure at the community level. Although the role of kingdoms was weakened during the half-century of British rule that ended in 1957, the practice of indirect rule in British West Africa permitted the maintenance of leadership through traditional chieftaincies.

Contemporary Ghana, an independent republic with a population of approximately 19.8 million, is situated on the west coast of Africa, between Ivory Coast and Togo. Ghanaian citizens collectively speak at least 79 languages and many more dialects. The first president of the country, Kwame Nkrumah, successfully developed institutions of modern education and civil government that make Ghana one of the most cohesive societies in Africa. Yet, the distinct heterogeneity of the population makes characterization of Ghanaians quite difficult. Shared characteristics of the people who comprise this nation state are nonetheless manifest.

The Akan are the largest and most predominant ethnic group, and their traditions have diffused into other major ethnic groups, such as the Ewe and Ga. Among most ethnic groups, social organization is derived from affiliation with a kindred group, clan, or com-

munity, and social roles are defined by gender, age, and relationship with social networks, leaders such as the chief, or elders. The social units recognized by most Ghanaians are the extended family, lineage, community, and subdivision (chiefdom).²⁰ Society can be viewed as a matrix in which lateral links are defined by peer networks for organizing economic activity, market vending, harvesting, and household construction; and vertical structure is defined by hierarchical relations among heads of extended family compounds, lineages (elders), communities (chiefs), and groups of kindred communities (clans). The highest level of authority within the clan is the paramount chief or king (Busia 1968). Corporate values of subordinating personal views, preferences, and needs to community interests characterize the concept of the family in the Ghanaian tradition. This tradition makes volunteer service a national resource that is often mobilized in political campaigns or other activities that reach rural communities. As a social scientist has noted:

It is as if [the family] is first and foremost a corporation, whose actions and responsibilities were collective, and the individual had no place in society save as a member of such a group through which alone he acquired rights and duties. (Priestly 1969: 17)

Such cultural values stand in stark contrast to social order in Bangladesh, where lateral networks are formed, dissolved, and reformed for personal gain with lines of accountability to peers and patrons in a manner that insulates individuals from the influence of formal organizational structure.

In Ghana great cultural value is placed on consensus building and group decisionmaking. This focus is a derivative of West African cultural traditions that prioritize corporate values. The chief, as the traditional authority of the clan, is responsible for the consensus-building process. This cultural tradition of consensus building reverberates strongly in the implementation of policy in contemporary Ghana. Even in modern urban offices, far removed from village life, consensus and open discussion are highly valued. In keeping with this value, national implementation strategies must emphasize consensus-building activities, such as national forums and conferences that permit open discussion among stakeholders. Rule by fiat is resisted; corporate consensus is the key to success.

The cultural emphasis on collective gain and communal values fosters active community participation in Ghana. This again contrasts with the Bangladeshi context, where individual gain and action are granted paramount importance. In the West African setting, community participation and support are important resources that must be marshaled by innovative public-sector programs. The Navrongo experiment and the Community-based Health and Planning Services (CHPS) initiative embrace this logic.

The Navrongo project and CHPS. Poor access to primary health care services explains much of the excess mortality in Africa; Ghana is no exception to this generalization. In Ghana, over 70 percent of the population resides more than 8 kilometers from the nearest health facility. Rural childhood mortality is some 40 percent higher than urban mortality, largely because low-cost primary health care services never reach the rural poor. Family planning services are confined to district headquarters and subdistrict clinics, and women in need of services must travel to distant locations that are often remote from roads or public transportation.

In 1992, the Republic of Ghana Ministry of Health established a research center in Kassena Nankana District of the Upper East Region to investigate prevalent causes of morbidity and mortality, and to advise the Ministry of feasible means of improving the health and well-being of northern Ghanaians. Known as the Navrongo Health Research Centre (NHRC), it has developed scientific capacity in epidemiology, demography, social science, and computer science.²¹

A study conducted by the Navrongo Centre, known as the Community Health and Family Planning project (CHFP), was launched in Ghana's poorest and most remote region to test feasible means of addressing health inequity by improving access to health services. Navrongo was selected as a site for research because it is a remote, impoverished, and traditional area where social norms sustain high fertility and ecological conditions are associated with great adversity. Experimental program success in such an unfavorable setting would be indicative of strategies that could work in others (Adongo et al. 1997). Initially conducted as a pilot project in 1994 and subsequently as an experimental study in 1996, this project has identified innovative ways of involving communities in planning, managing, and sustaining primary health care.²² Community leaders are approached by health management staff and are encouraged to provide housing and

workspace for Ministry of Health paramedics. “Community health compounds” are constructed and maintained by volunteer laborers. Upon completion of the community health compounds, the paramedics, known as community health officers, are introduced to the community, relocated to the compounds, and equipped with a motorbike, basic drugs, and supplies for primary health services. This system of care provides comprehensive vaccination coverage for all children, treatment of common ailments (including malaria, acute respiratory infections, and diarrheal diseases), and provision of comprehensive reproductive health and family planning services.

The Navrongo project demonstrated that institutions of chieftaincy, lineage, and social networks can be mobilized to supervise and support primary health care. Moreover, it established the feasibility of relocating nurses to community health compounds. Community-based paramedical workers greatly increased the volume of services, improved immunization coverage, and expanded the range and quality of reproductive health and ambulatory health care. Demographic results of the initiative have been impressive. Health services provided by a single community health officer often exceeded the caseloads of entire subdistrict health centers. By 1999, late childhood mortality was reduced by 38 percent and total fertility declined on average by one birth per woman relative to comparison area levels.

The success of the child survival component of the program is important; the fertility impact of the Navrongo project is surprising.²³ Baseline research showed that vibrant social institutions sustain high fertility in this setting (Adongo et al. 1997). Bridewealth customs instill the notion that marriage ensures progeny for the lineage and that women are property acquired for this purpose. Gender roles are highly stratified, and women’s access to education and economic resources is constrained. Achieving rapid change in reproductive behavior required a comprehensive program of male involvement mobilizing community leaders to support the program and using traditional communication mechanisms for promoting concepts of reproductive change.

In 1998, a series of national health conferences and meetings were conducted for the Navrongo Health Research Centre to present its findings to the health community.²⁴ Consensus-building activities of the Ministry of Health led to the adoption of the Navrongo service model as national policy for all ten regions and 110 districts of Ghana. Navrongo

field visits were arranged for on-site deliberations on the practical value of research findings. Senior officials of the Ministry of Health and the President of Ghana visited the NHRC, calling attention to its work and supporting the use and application of its research.

Navrongo alone, however, would have been an insufficient basis for national consensus building. The Volta Regional Health Administration and district directors from the Volta Region were among the first visitors to the project. In 1998, the District Health Management Team from Nkwanta District visited the NHRC and completed a six-week field orientation covering all aspects of implementing and managing the project. A replication project was launched in the Nkwanta District of the Volta Region, where the Nkwanta team converted fixed-location health delivery into community-based outreach services in two communities, using resources of the district and the communities to be served. Discussion with Nkwanta communities led to a different strategic design of the program, but the broad outlines of community-based care were implemented on the Navrongo model. Experience with this replication effort was carefully documented and presented at Ministry of Health senior staff meetings and national District Director of Health Services conferences. Discussion shifted from the demographic impact of Navrongo to the feasibility and sustainability of mobilizing community action to replicate Navrongo-like services in a rural impoverished district in southeastern Ghana.

The Nkwanta replication lent credibility to the notion that a policy calling for application of the Navrongo system could work.²⁵ It also established the precedent of decentralized planning and adaptation of the scheme to local conditions. By 1999, conferences convened to interpret the continuing research outcomes of Navrongo and the operational success of Nkwanta led to a decision to create a national program, known as the Community-based Health and Planning Services initiative, for fostering the rapid dissemination of the Navrongo system throughout Ghana. The policy initially focused on the need for “lead districts” in each of the ten regions, where Navrongo-like services could be adapted to local circumstances and requirements and could be used to guide development of community-based care in neighboring districts. Thus, the initial policy of using the Navrongo experiment took account of the need for diffusion of innovation, demonstration, and peer leadership at the periphery. Attention was focused on the need for sustaining district-level CHPS implementation rather than developing a central plan with national orders.

It is crucial to note that the use of experimental results was continuous rather than focused on end-of-project dissemination activities. Various strategies of the Navrongo project were designed to foster this process. Unlike the Matlab project, Navrongo has had a focus on scaling up from the onset of project planning activities in 1993. To ensure Ministry of Health direction of the project, its protocol was developed by the Navrongo Centre in close collaboration with senior officials of the Ministry, and details were agreed upon prior to donor involvement. The Navrongo Centre has autonomous control over its operations in a manner that is similar to a free-standing NGO, but it is also a unit of the Ministry of Health reporting to the Health Research Unit in Accra, which in turn reports to the Policy Planning, Monitoring and Evaluation Division of the Ghana Health Service. This link with the policy system assured that routine Ghana Health Service internal communication, conferences, and meetings could be employed as Navrongo project dissemination mechanisms. To support the Community-based Health and Planning Services initiative, Navrongo has launched a counterpart training program that informs all District Health Management Teams in Ghana about project activities and outcomes. A dissemination unit of the Navrongo Centre circulates a newsletter to health officers in Ghana about practical lessons that emerge from field work.²⁶

Taken together, the Navrongo and Community-based Health and Planning Services projects are a success story, not only for demonstrating that high fertility and mortality can be reduced in a challenging environment, but also for demonstrating feasible ways to use research findings for policy and program development. By December 2002, this program of changing the national health care system to the Navrongo model had been launched in 100 of Ghana's 110 districts. While full implementation of the program is confined to about 20 districts, evidence suggests that a rapid transformation of services is underway that will eventually establish community-based health care in all districts of Ghana.²⁷

In summary, the contexts for scaling up experimental studies in Bangladesh and Ghana could not be more different (Table 2). While the two countries are predominantly agrarian and share similar levels of economic development, the two settings are distinguished by contrasting social organization, social structure, and land tenure customs. Bangladesh is a peasant society; Ghana is historically a tribal society in which land is

Table 2 The societal context for scaling up in Bangladesh and Ghana

Social legacy	Bangladesh	Ghana
Social organization	Diffuse: community identity defined by geography	Structured: community defined by tradition, lineage, and ethnicity
Social structure	Feudal, patriarchal	Tribal, patriarchal or matrilineal
Land tenure relationships	Feudal, hierarchical	Communal, egalitarian
Traditional leadership system	Power-based and fragile: linked to land ownership, economic status, patronage, or political connections	Secure, traditional, and defined: inherited or elected among royal lineage heads
Religious traditions	Dogmatic, monotheistic	Nondogmatic, polytheistic
Ethnic composition	Simple	Complex
Linguistic composition	Monolingual	Multilingual

communally owned. Traditional leadership is well defined in Ghana and the structure of social organization is typically unambiguous. In contrast, Bangladesh is structured less by kindred traditions than by formal organization.

Religious differences tend to amplify contrasting characteristics of the social environment. Ancestor worship in traditional West Africa is an extension of lineal customs. Belief in the communal spirit of ancestors symbolizes ingrained values for kindred fealty, community cooperation, and volunteerism. The pursuit of religious practices is left to individual interpretation of symbols and rites (Adongo et al. 1998; Owoahene-Acheampong 1998). While traditional religion is no longer practiced by a majority of Ghanaians, the religious context is complex and dynamic. Religion in Bangladesh is predominantly Muslim and defined by a common monotheistic dogma. Individuals who comply with established dogma have little individual role in shaping rites or establishing belief systems. While religious customs only subtly relate to organizational behavior, they define the parameters of acceptable social interaction, tending to reinforce customs that formalize interchange among Bangladeshis and that instill the value of consensus and collective purpose among Ghanaians.

The institutional contexts of public-sector organizations in Bangladesh and Ghana are also markedly different (Table 3). In Bangladesh, external rule was administered through direct control of the civil bureaucracy. Even in the post-Raj Pakistan era, the

Table 3 The institutional context for scaling up in Bangladesh and Ghana

Institutional legacy	Bangladesh	Ghana
Colonial history	Ancient Long duration Direct rule	Recent Short duration Indirect rule
Political history	Political parties grounded in independence or other national movements	Nascent political diversity; parties grounded in ethnic or regional loyalties
Bureaucratic traditions	Historic Vibrant Top down Ubiquitous	Recent Weak Consensus oriented Sparse
Decisionmaking customs	Hierarchical and autocratically oriented	Corporate, consensus oriented
Organizational communication customs	Constrained, formal, stratified	Open, informal, affiliative
Resource environment	Constrained, external-assistance dependent	Constrained, self-reliant

public bureaucracy was externally controlled. By contrast, bureaucracy has little history in Ghana, where external rule was indirect. British colonial officials allowed traditional authorities to exercise many customary powers under their jurisdiction (Owaoahene-Acheampong 1998), de-emphasizing the authority of the central bureaucracy by maintaining order through traditional governance of communities. Thus, while a Bangladeshi villager routinely witnesses interaction with representatives from ministries responsible for agriculture, education, health, and public order, a villager in Ghana turns to a “native court” or a chieftaincy council, led by a traditional authority figure, to resolve minor disputes and grievances or launch community dialogue about all matters of collective interest. In this manner, local traditional communication and governance systems were sustained by colonial authorities—a system for sustaining civil order that persists today.

A COMMON MODEL WITH CONTRASTING OUTCOMES

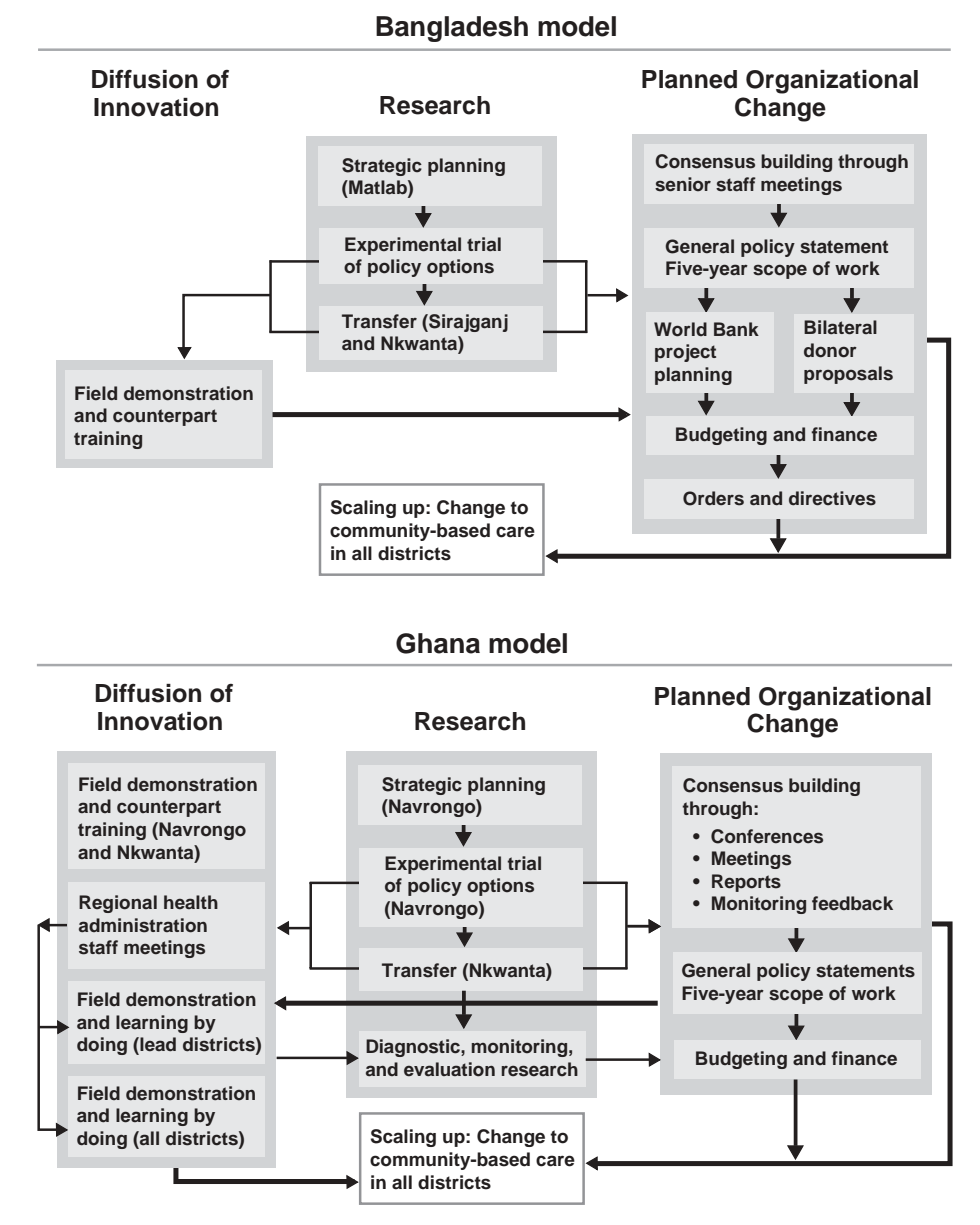
That the scaling-up effort in Bangladesh and Ghana differed was the consequence of applying a similar research model to contrasting contexts. This perspective on the role of open systems theory in scaling-up strategies is illustrated by the societal and institutional differences between the two countries.

The implications of societal context for scaling-up strategies

Social organization is diffuse in Bangladesh but highly structured in Ghana. Community organizational context is therefore a resource to be developed in Bangladesh, and a resource to be tapped in Ghana. Sustaining change in Bangladesh depends upon commitment of external, top-down bureaucratic processes that are more appropriately instituted in Ghana as lateral networks for spreading consensus through the diffusion of social support for innovation. In Bangladesh, volunteerism is less likely to be sustainable than in Ghana, where corporate community values are ingrained and vibrant and where accountability to community leaders has social grounding. Leadership in Bangladesh is more likely to emerge from formal organizations than from community institutions; in Ghana, leadership for organizational change depends upon grassroots partnerships between traditional leaders, politicians, and health professionals. While leadership in the African setting is therefore relatively diffuse, it is sustainable with minimal external investment. In contrast, instilling leadership and sustaining change in Bangladesh are dependent upon external resources. While religion has little direct bearing on either scaling-up program, organizational culture is affected in subtle ways by social norms and religious values. For example, in Bangladesh the value placed on formal rules and orders is shaped by the value placed on religious dogma. In Ghana, however, dogma and hierarchy have less bearing on formal organizational behavior than affiliative values and peer relations. Scaling up in Ghana will spread more by demonstration and teamwork than by order and fiat. Moreover, in the multi-cultural context of Ghana, adapting strategies to local conditions is more important than in Bangladesh, where national models are likely to have more relevance than locally developed service delivery strategies. Therefore, in Ghana, strategies for decentralization must be a prominent feature of the scaling-up design; whereas, in Bangladesh, a national program is likely to advance faster than a series of local initiatives.

The most prominent difference between the Bangladesh and Ghana case studies is manifested by the impact of context on the relative importance of the diffusion of innovation versus planned organizational change (Figure 3). In Bangladesh, where social order is diffuse and bureaucratic traditions are relatively developed, planned organizational change has played a more important role than the diffusion of innovation. This is illustrated by the

Figure 3 The relative roles of strategies for catalyzing diffusion versus strategies for achieving planned organizational change for scaling up programs in Bangladesh and Ghana



more articulated mechanisms for planned change in Bangladesh. In Bangladesh, demonstration of the Matlab system in two replication sites was followed by high-level commitment to applying the service model, by donor commitment of external resources, and by national plans for large-scale change. World Bank funding permitted the rapid expansion of hiring, construction, and worker training. Training was focused on technical issues rather than consensus building. Community work was essential to the Bangladesh program, and doorstep services were crucial to its success, but instituting change to that end was less a grassroots program than a top-down bureaucratic initiative financed from afar. Lacking elegance and efficiency, the Bangladesh scaling-up program nonetheless worked.

In Ghana, where decisions are made by consensus and bureaucratic authority is relatively nascent, the role of planned organizational change and central direction of scaling up has been less important than leadership at the periphery. The most successful strategy for scaling up the Community-based Health and Planning Services program has been diffusion of innovation through field demonstration.²⁸ Teams of workers were trained to implement the program by exposing district-level implementation teams to the Navrongo system. Each team comprised two or more community health nurses, their subdistrict supervisor, the district public health nurse, and the district director of medical services; training involved assigning each trainee to Navrongo counterparts for day-to-day exposure to community-based services. Implementation teams were subsequently redeployed to their home districts to develop community-based planning activities in one or two pilot zones. After trial and strategic planning, each CHPS team scaled up operations within their district, according to the availability of staffing and resources.

Where CHPS has worked well, it has succeeded mainly by developing locally tailored and indigenously funded adaptations of the Navrongo service system. Rather than providing a boilerplate, Navrongo and Nkwanta provide guidelines for changing operations. Consensus building is crucial to the process; diffusion through exchange is the means by which change is introduced. Policies play a role, and central legitimacy for the program has been crucial; but where CHPS has worked, it has succeeded through initiative and leadership at the periphery. Transferring the process of team building, community interaction, bottom-up communication, and planning has been more important than national policy or fiat.

The impact of institutional context on scaling-up strategies

In Bangladesh, hierarchical models for achieving change are more appropriate than less formal African models that derive change from social interaction. Organizational cultures in Bangladesh and Ghana reflect contrasting patterns of social networking and exchange that have had an impact on strategies of communicating, sustaining, and scaling up the change process.

Despite similar colonial legacies and levels of external donor involvement, the organizational environments for the Bangladesh and Ghana scaling-up efforts differ sharply. In Bangladesh, the World Bank finances the health and population sector with five-year agreements that provide both loan and assistance funding for the program. Agreements governing Bank loans cover the gamut of health and population activities. Incorporating Matlab innovations in national policy led to a series of clauses in two sequential agreements, earmarking funds for hiring, training, equipping, and deploying staff. This effort was augmented by large bilateral programs funded by American and European foreign aid. Thus, NGO effort was layered on top of the public-sector program (White 1999). Taken in sum, Bangladesh had one of the world's largest commitments to assisting the health sector, employing over 25,000 externally funded staff at its peak. Scaling up in this context was a matter of implementing a program that others were funding.

In Ghana, external assistance for health is merged with Government of Ghana revenue through policies that are collectively termed the sector-wide approach. World Bank and European funding is extensive, but revenue for the health sector is planned as a common fund. Scaling up in this context has no independent budget line or external backing. American foreign assistance has been provided in the form of technical support for the Community-based Health and Planning Services initiative rather than revenue for the implementation process. Thus, CHPS depends upon financing and priority setting that are integrated into the general administrative processes of the Ghana Health Service; external support for the current overall budget is about half the level of funding that was provided to Bangladesh in the 1980s and 1990s. Not only is Ghana better endowed with social and institutional resources for scaling up than Bangladesh, it has been forced by circumstances to sustain its program with less external backing.

The impact of the social and institutional contexts on research

The social and institutional contexts for scaling up have implications for the role of research in that process. First, as we have noted, research for scaling up should change with the stage in the process. Information for adapting strategies to circumstances in Bangladesh and Ghana involved a system of multi-disciplinary research. Initially, the role of social scientists was crucial to developing a sense of the needs of communities, diagnosis of cultural constraints on action, and appraisal of cultural resources for the program. Demographers and epidemiologists were critical to the assessment of experimental program impact, and social research was directed to assessing community reactions to the services under trial.

With the onset of scaling up, the direction of research shifted to the policy community, and the tools of research came from the organizational sciences. Social research played a role at the scaling-up phase, but the focus shifted from research on social systems to research on organizational systems. For this reason, the Bangladesh and Ghana projects used research to gauge the reactions of government workers and, during the scaling-up phase, to gauge reactions of participants in the program and seek advice on programmatic and policy needs (Simmons, Phillips, and Rahman 1984; Nyongator et al. 2002a and b). While social research has also had a critical contribution in both settings,²⁹ the social research agenda is less complex in Bangladesh than in Ghana, where findings in one region of the country are not necessarily relevant to the scaling-up program in another region.³⁰ In Ghana, the strategy and research agenda have been decentralized, just as the scaling-up program must be tailored to local conditions. Findings from systems analysis and strategic assessment are useful for consensus-building activities. In Bangladesh, however, systems research was more appropriately used for establishing bottom-up communication, providing mechanisms for senior managers to learn about problems or the reactions of frontline workers to their responsibilities. Research for this purpose has been highly formal, with findings from strategic assessments held in strict confidence and intended solely for the use of senior managers. In Ghana, on the other hand, systems research has been openly disseminated, and operational problems that are identified are the subject of open discussion in conferences, papers, and staff meetings. In Bangladesh, research guides high-level decisionmaking; in Ghana, research provides information for building consensus and collective action.

CONCLUSION

Programs intended to change operations in large-scale bureaucracies are often met with resistance, inertia, or even hostility. Research highlighting ways to improve such circumstances can catalyze these reactions rather than foster the desired change. Investigators presenting results from experimental studies often demonstrate a model that could improve programs without demonstrating how large-scale change can be achieved. The programs reviewed in this paper are relevant to the organizational development needs of health programs in the world's poorest regions. The experience of these programs indicates that such problems can be surmounted and that large public programs can be changed by research, even in resource-constrained settings, if research is combined with programs for reform, organizational change, and development.³¹

The "open systems approach" reviewed above is particularly relevant to reproductive health initiatives, since human behavior intended to be influenced by programs is external to organizational boundaries. In this perspective, social institutions that govern reproductive behavior are organizational resources that can be marshaled for managing programs. Since evidence is essential to the process of adapting organizations to social environment, research will lead programs in contrasting directions. In South Asia, vertical programs are likely to be more successful than similarly designed programs in West Africa. Organizational change that is instituted through government orders and directives is likely to be a more promising approach to achieving large-scale change in South Asia than in West Africa, where bureaucracies lack historic grounding and the policies of nation-states are less important to daily life than social institutions derived from extended families, kindred groups, clans, or ethnic identity. In West Africa, the intricate corporate community institutions that have organized village life should be viewed as the engines of programmatic development. In South Asia, reliance on decentralized initiatives would lead to paralysis and inaction.

The Bangladesh and Ghana examples thus demonstrate that adapting programs to local needs and organizing capabilities can have profound implications for the character of the programs that are ultimately developed. The Navrongo experiment, for example, was originally funded as a response to international initiatives arising out of population debates in Mexico City and Cairo, as well as the goals of Health for All

(from Alma Ata) and ideas about sustainable ways of implementing Health for All promoted by the Bamako Initiative. But the view from Navrongo was different from perspectives emerging from Mexico City, Cairo, Alma Ata, or Bamako. When villagers were confronted with the task of planning a health program that addressed their priorities, they focused first on child survival, then on adult health, and lastly (if at all) on family planning. Men and adolescents were more concerned about livelihood issues than health. Gender and reproductive health issues were placed on the agenda by program organizers, but were rarely spontaneously raised. In response to these perspectives, the content and organizational structure of the program were dramatically changed at the pilot stage.

While the Cairo reproductive health agenda remained a priority of donors for the Navrongo program, the approach to providing such services was embedded in community health priorities and organized through traditional institutions. While women were willing to walk to facilities for services, child health care was provided at their doorstep, as if child health were not in demand. Male volunteers were openly involved in the promotion of family planning among men; women were provided with services in the particular context of child health services. Authority for the program was turned on end, with the community providing program governance and ensuring accountability, and the formal system providing technical support. The organizing strategy that was tested in the experimental phase had no facile international label; the approach, instead, relied on traditional communication systems and on ways to use chieftaincy, lineage, and social network systems for improving supervision and supporting service operations.

The Bangladesh and Ghana approaches to scaling up successful programs thus demonstrate both the value of international initiatives—that of motivating commitment to national program reform and funding large-scale action—and the potential pitfalls of overly internationalizing program strategy. The research paradigm and program development process can follow international models and goals, but the content, change process, and scaled-up program that are developed must be an outcome of research and adaptation rather than importation and conformity.

More examples of evidence-based health-system reforms are urgently needed. Research in developing countries has shown that treatment of disease and access to

health care technology are concentrated among urban and affluent households with ready access to clinical services. The rapidly expanding HIV/AIDS epidemic is generating a plethora of promising pilot projects that remain bottled up in small-scale applications (DeJong 2002; Watts and Kumaranayake 1999). Family planning use, in particular, is often concentrated in urban areas among the educated and the better-off. Addressing these inequities requires strategies that mobilize community participation in service systems; yet, changing programs from passive health service approaches to community-based social mobilization movements requires organizational change that can be challenging to introduce. New health technologies are sometimes proposed as the answer to such problems, when in fact poverty and service system failures deprive families of access to technologies of all kinds. Reforms promoted to remedy such problems entail complex organizational changes that are typically untested at the periphery. When trials are conducted, research remains focused on epidemiological and demographic outcomes rather than on the full range of organizational reforms that are needed to guide strategic decisions.

By successfully addressing these challenges, the projects in Bangladesh and Ghana demonstrate an approach to organizational development that is relevant to the needs of community health and family planning programs elsewhere in the developing world. Although no single scaling-up strategy emerges from these projects that will work everywhere, the common evidence-based approach that they demonstrate could be used to adapt program strategies to diverse needs and circumstances. Their success in evidence-based systems development demonstrates that large-scale organizational change in reproductive and child health programs is neither impossible nor unaffordable in resource-constrained settings.

NOTES

- 1 In the case of Matlab, social research was directed to understanding the causes of the failure of the Contraceptive Distribution Project and to providing guidance on the elements of a program that would address these problems and serve community needs and perspectives (Stinson et al. 1982; Bhatia et al. 1980). In the Navrongo experiment, costs of this phase were greatly reduced by conducting a

micro-trial of the experiment in conjunction with social research designed to gauge community reactions and seek community advice (see Nazzar et al. 1995).

- 2 This phase has acquired several labels in the organizational research literature: “strategic assessment” (Simmons, Brown, and Diaz 2003; Simmons et al. 1997; Sory 2003), “the learning process approach” (Korten 1980a and b; Korten and Klauss 1984), the “participatory learning approach” (Binswanger 2000; Paul 1982), and “open systems analysis” (Katz and Kahn 1966). Results from this phase in Navrongo appear in Nazzar et al. 1995. In each instance, the term refers to micro-social research, often involving focus groups or in-depth interviewing about perceptions and needs among potential clients or community leaders. Then, based on the outcome of investigation, micro-services are implemented. Focus groups are reconvened to gauge community reaction, and program strategies are altered in concert with community advice. In the case of Navrongo, the pilot project was run, with trial and error, over a period of 18 months. Once a program was developed that reflected community opinion and preferences, the approach was scaled up to a factorial experiment (Binka, Nazzar, and Phillips 1995). Systems analysis, in this perspective, involves examining organizational structure, communication, and operation in a manner that includes clients and their social organizational structure in the investigation (Nyonator et al. 2002b).
- 3 If either experiment had confirmed null hypotheses, a new experiment would have been configured, introducing an additional phase in the research process.
- 4 The relevance of field experiments to policies and programs is sometimes questioned on the grounds of the “Hawthorne Effect,” a reference to a study by Roethlisberger and Dickson (1939) that showed that improved factory worker performance in an incentive study was related to the fact that workers were observed rather than to the incentive itself. The term “Hawthorne Effect” refers to the more general hypothesis that field experiments generate management, organizational, psychological, and resource circumstances that differ from the institutional context of large-scale systems that results are intended to influence. The

replication and scaling-up phases of the Bangladesh and Ghana case studies address this criticism of experimental research. Addressing the Hawthorne hypotheses requires unobtrusive and low-cost research on the replicability of experimental findings and the sustainability of the scaling-up process (Phillips et al. 1984; Phillips 1988 and 1990; Awoonor-Williams et al. 2003; Nyongator et al. 2002a and 2002b).

- 5 Technology contributing to advanced scientific capabilities is complex and expensive to manage. Both Matlab and Navrongo have longitudinal demographic surveillance systems that support research protocols in health and demography (Aziz and Mosley 1997; Menken and Phillips 1990; Binka et al. 1999). Surveillance systems are often employed for experimental studies requiring causal inference.
- 6 Useful reviews of the scaling-up literature appear in Simmons, Brown, and Diaz (2003). The tendency for scaling up to occur as a natural process that can be stimulated by social interaction and legitimation of change is referred to as the “diffusion of innovation” (Rogers 1995; Walker 1969). Other commentators view scaling up as a problem in fostering research use (Davis and Howden-Chapman 1996; Cernada 1982; Bertrand and Marin 2001; Solo et al. 1998; Havelock 1978) or a process of planned organizational change (Glaser, Abelson, and Garrison 1983; Glaser and Taylor 1973).
- 7 Various terms have been used to describe research that develops human service strategies on the basis of social research. “Open systems” is a term for the general theory of human service organizational change and development (Katz and Kahn 1966). In this perspective, the achievements of a human service organization are determined by the extent to which operations have been effectively adapted to social institutions that govern the behavior of interest. Research applications have been termed “strategic planning” (Paul 1982), “strategic assessment” (Simmons et al. 1997; Simmons, Brown, and Diaz 2003; Nyongator et al. 2002b), the “learning process approach” (Korten 1980a and b), and the “participatory planning approach” (Nazzar et al. 1995).

- 8 See, for example, Westergaard 1983; Bangladesh Rural Action Committee 1983a and b; Cain 1981.
- 9 Foster (1967) attributes this perspective to land tenure relationships in peasant societies. Traditionally, land ownership was crucial to acquiring social status and economic security. However, land ownership has diminished in importance because population growth and increasing population density have progressively fragmented land holdings. New forms of wealth and power are based on commercial relationships, on wealth and power derived from occupations in the public bureaucracy, or on some combination of resources derived from bureaucratic or commercial roles. The growth of the commercial sector and the decline of agrarian pursuits have produced an increasingly complex occupational livelihood structure. Men, in particular, may engage in multiple economic activities, occupying a civil service position for the wealth and security that job tenure affords, yet working in the commercial sector where activities augment meager public-sector salaries. By shifting the basis for wealth and power away from the agrarian economy, economic growth in Bangladesh has eroded the integrity of the civil bureaucracy.
- 10 Notable exceptions are the Bangladesh Rural Action Committee (BRAC), which organizes social action, health, micro-lending, and development activities (Lovell and Abed 1993); and the Grameen Bank, which organizes community-based micro-lending programs for impoverished women. In both cases, however, actual leadership of community-based programs is formalized. Community cooperation is a major focus of organizational activity rather than a resource that these NGOs tap for programmatic management (Howe and Sattar 1992). In Africa, the Tanzania Essential Health Intervention Project (TEHIP) is an evidence-based program for developing the national primary health care system (Guest 2002). TEHIP is an experimental trial of the health impact of implementing the resource allocation and decentralization recommendations of the 1993 *World Development Report* (World Bank 1993).
- 11 Blair (1985) argues that the inability of successive governments to undertake meaningful change in the public sector can be explained by “a weak state” oper-

ating in a “strong society.” We take a contrasting view, arguing that the civil bureaucracy was impervious to change introduced by a weak political system. The rigid public bureaucracy is also incapable of responding to public demand for improved services. Bureaucratic rigidity has undermined the accountability of the bureaucracy to the public and the political system, resulting in inefficiency and ineffectiveness (Edwards and Hulme 1992; Hulme and Edwards 1997).

- 12 We do not imply that the pervasive reach of the Bangladesh public bureaucracy has led to efficient provision of health services or democracy in the planning process. Indeed, most international reviews of public administration in Bangladesh focus on the determinants and consequences of bureaucratic malaise, and on the fundamental complexity of achieving large-scale change and reform in a constrained institutional setting (Shiffman and Wu 2003). Rather than providing a framework for nurturing local direction of health service planning and development, international support for improving programs has extracted ownership rather than having built indigenous control of the reform process (Buse 1999; Buse and Gwin 1998). However, research-guided program development can provide mechanisms that permit public opinion to shape strategic planning and provide a framework for fostering local direction, while addressing international concern about program efficiency and effectiveness.
- 13 Matlab has a well-known and highly accurate system for monitoring demographic dynamics in a large population. Developed initially for research on vaccines against cholera, the Matlab Demographic Surveillance System has since been used for a wide range of social, demographic, and epidemiological investigations (see, e.g., Menken and Phillips 1990; Aziz and Mosley 1997).
- 14 The international population debate and the policy role of Matlab are discussed in Bhatia et al. 1980; Phillips et al. 1982 and 1988; Cleland et al. 1994.
- 15 At the time of the launching of the Matlab experiment, the locality had been subjected to cataclysmic events of the 1969 cyclone, the 1970–71 independence war, and the 1976 famine (see, e.g., Curlin et al. 1976; Menken and Phillips 1990; Phillips 1994).

- 16 The fertility impact of the Matlab project is described in Phillips et al. 1982 and 1988. Mortality effects are assessed in LeGrand and Phillips 1996.
- 17 Discussions of the role of household outreach and staff density in the Matlab project are found in Simmons, Koblinsky, and Phillips 1986; Simmons et al. 1988.
- 18 The design of the Extension project is described in Yunus et al. 1984; Phillips et al. 1984; Phillips, Koblinsky, and Haque 1987; Phillips 1988 and 1990; Haaga and Maru 1996; Barkat-e-Khuda, Kane, and Phillips 1997.
- 19 The proliferation of family planning services that was financed under successive World Bank Health and Population Projects is likely to have had an impact on the pace of reproductive change in Bangladesh. Prior to 1980, primary health care service delivery was restricted to fixed-location facilities in district headquarters or subdistrict health centers that were inaccessible to most remote rural communities. Beginning with the launching of the national family planning program in the early 1980s, and extending throughout the 1990s, the pace of fertility decline in Bangladesh was one of the most rapid transformations of fertility ever recorded (Cleland et al. 1994). While a direct causal role in the decline cannot be ascertained, it is likely that the large and pervasive World Bank–financed program contributed to both health improvements and fertility decline in this period. Research on strategies funded by this program produced consistent evidence of impact (see, e.g., Hossain and Phillips 1996; Koenig et al. 1990 and 1991).
- 20 In northern Ghana there was no traditional concept of chieftaincy at the time of the arrival of the British, although similar functions were invested in spiritual leaders responsible for allocating rights to land (see Forde 1954; Goody 1990).
- 21 The Navrongo Health Research Centre has capabilities that resemble those of the Matlab station in Bangladesh. A surveillance system monitors demographic dynamics in an entire district (Binka, Nazzar, and Phillips 1995). Related research systems permit studies of disease, health technologies, and reproductive health. Laboratories have been developed to support health research. Links with

the health service system permit research that involves altering routine Ministry of Health operations.

- 22 The Navrongo experiment is a four-cell quasi-experimental study that assesses the impact of mobilizing two sets of health care resources. (1) Traditional society in Africa is structured by the institutions of chieftaincy and lineal and extended family units. Health programs have typically ignored this resource for organizing health care. The Navrongo project demonstrated ways of mobilizing various social mechanisms for health and family planning promotion. The volunteerism developed in this arm of the experiment is similar to strategies proposed by the UNICEF-sponsored “Bamako Initiative” (Knippenberg et al. 1990). (2) The formal bureaucracy of the Ministry of Health has staff resources that are poorly utilized. Subdistrict health centers, which are inaccessible to most rural residents, command most of the primary health care budget. An arm of the experiment was directed to relocating nurses from subdistrict clinics to more accessible community locations. Taken together, the two dimensions of the experiment imply a four-cell design, since each dimension could be implemented independently, jointly, or not at all (Binka, Nazzar, and Phillips 1995).
- 23 Caldwell and Caldwell (1987, 1988, 1990) note that African customs of marriage and family building sustain traditional practices of child spacing while ensuring that high fertility will be sustained. Rapid fertility transition, on the Asian model, is unlikely to occur, even if fertility begins to decline. When African fertility regimes change, the process of decline is dominated by the motivation to space rather than limit childbearing. Achieving rapid fertility decline in Navrongo has been possible because of an increase in the practice of child spacing, an effect that extends with equal force to all ages. Evidence suggests that reproductive motives have changed in response to program outreach. Thus, behavioral change introduced by the program is associated with a fundamental revision of the way that couples think about childbearing (Debuur et al. 2002). Navrongo results suggest that social mobilization strategies can introduce behavioral change, a finding with possible relevance to HIV/AIDS prevention efforts (see Caldwell and Caldwell 2000).

- 24 Just as the Matlab experiment was informed by findings from earlier studies, deliberations on the design of the Navrongo experiment were informed by a previous study. This experimental study, known as the Danfa project, was a multi-year collaborative study of family planning introduction. While it was successful in demonstrating the feasibility of family planning introduction in a southern Ghanaian community, Danfa was less successful in scaling up its strategies. Nonetheless, findings from Danfa have influenced the formulation of population policy in Ghana for nearly three decades (University of Ghana 1979).
- 25 The role that Nkwanta has played in the CHPS initiative is analogous to the role of the Sirajganj and Abhoynagar field sites in the Bangladesh Extension project. Establishing that the experimental study results could be transferred to the public-sector system required an intermediate stage of experimentation with the transfer process (see the discussion of the Extension project in Haaga and Maru 1996 and the review of the role of Nkwanta in Awoonor-Williams et al. 2003).
- 26 In 1993, a grant from the Finnish International Development Agency to the Population Council supported an exchange between the Ghana Ministry of Health, the International Centre for Diarrhoeal Disease Research, Bangladesh, and the Bangladesh Ministry of Health and Family Planning. The Navrongo protocol development team and the Matlab and Extension project teams met in Bangladesh to discuss the challenges of operating experimental programs and applying results.
- 27 A monitoring system for the CHPS program reports changes in the coverage of the program by district and component of the implementation process. Reports are disseminated on the internet at <http://www.ghana-chps.org>.
- 28 Evidence of the diffusion effect suggests ways in which the Ghana program could be more successful in the future. Government and external investment should focus on activities that foster diffusion: grants to leading districts for disseminating innovation to other districts; funds for pilot trials with training designed to implement as many district pilots as possible; and consensus-building activities designed to develop internal direction of the program. Communication activities

should be directed to peer-to-peer exchanges about what works and what does not, removing the implementation barrier that separates districts and isolates progress. Donor investment in diffusion-related activities will have far greater impact than donor resources for components of the program that hold little prospect for diffusion effects.

- 29 In Bangladesh and Ghana, research has gauged the social impact of service delivery activities (Simmons et al. 1988; Simmons, Koblinsky and Phillips 1986; Bawah et al. 1999; Adongo et al. 1997; Nyonator et al. 2002b). Findings demonstrate unanticipated program benefits as well as unintended effects on social discord.
- 30 Strategic research was conducted in Bangladesh on the Matlab program (see Simmons, Phillips, and Rahman 1984) and on the Extension project (Simmons, Koblinsky, and Phillips 1986). In Ghana, strategic research was initially focused on assessing societal constraints to success and on the operational design of an experiment. In the scaling-up program, strategic research shifted to studies of workers, their views of the program, and constraints to organizational change (Nyonator et al. 2002a and 2002b; Sory et al. 2003).
- 31 In particular, HIV/AIDS initiatives in Africa and Asia are producing insights into what might work on a large scale, but innovation typically remains bottled up in small-scale operations that fail to influence large-scale programs (see World Health Organization 2001; World Bank 1999). The approach used for health system development in Bangladesh and Ghana addressed this problem. An experimental phase demonstrated that behavior could be changed through appropriate programmatic action, despite substantial social, economic, and cultural constraints to success. Scaling-up phases involved assessing the feasibility of transferring experimental operations to replicable institutional environments, followed by national programs of applying the program to the goal of health care reform. Demonstrating ways to develop national programs for achieving fundamental reproductive behavioral change is analogous to the challenges facing HIV/AIDS programs.

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