Group-Based Financial Institutions for the Rural Poor in Bangladesh

An Institutional- and Household-Level Analysis

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Foreword

It is not difficult to fathom why the simplest form of financial service can make a significant difference to a poor family. Many of the world's poor are microentrepreneurs—farmers, shopkeepers, weavers, small commodity producers, traders, and the like. Like other businesspeople, they require access to simple instruments for obtaining working capital, maintaining assets, or expanding businesses. Lacking these instruments, they remain trapped in a vicious cycle of low financial returns and low incomes.

Financial service is equally important in the management of household consumption, because it provides families with the means to maintain consumption when income fluctuates downward or when essential expenditures such as those relating to health care have to be financed.

In the face of inadequate responses from either the private or the government sector, nongovernment organizations (NGOs) in Bangladesh have spearheaded a worldwide movement to provide affordable financial services to the poor. IFPRI is making lessons from the Bangladeshi experience available to a global audience. In 1988, IFPRI published a research report that examined the Grameen Bank's approach to providing credit services and the manner in which it affected the livelihood of its clients. Other successful models of credit and savings delivery have emerged since then; and this research report by Manfred Zeller, Manohar Sharma, Akhter U. Ahmed, and Shahidur Rashid looks at three institutions that represent three distinct approaches to providing services to households organized in small groups.

The authors report on three major issues. First, they examine the manner in which NGOs place their branches and services in different areas of Bangladesh. They conclude that the tension involved in reaching the poor, maximizing impact, and containing operational costs results in NGOs establishing higher levels of services in locations that have better access to transport and communication infrastructure. The authors then provide policy guidelines on how to reduce this tension so that the poor in disadvantaged locations are better served. Second, recognizing the central importance of group-based transactions, the authors explore how such groups are formed, the activities they pursue, and the ways in which they impact repayment rates of loans. Among other things, they find that the active policy of targeting poor women to join credit groups does not necessarily translate into women receiving higher credit lines than men. Repayment rates, however, are higher for groups that consist mostly of women. They are also higher in relatively poor and isolated areas where alternative banking facilities are less likely to be available.

Third, the authors measure the impact of the access to NGO credit services on various household welfare indicators. Overall, the results point to significant positive impact

in the spheres of income generation, household food security, social attitudes, and the mobility of women. And evidence strongly suggests that the household-income impact of the services provided is larger than the full cost of delivery. Hence, the study concludes that the group-based institutional approach of NGOs seems to be an effective response to state and market failure in the rural financial sector in Bangladesh. Replication of the group-lending techniques elsewhere should, however, proceed with caution, recognizing that differing social, economic, and cultural settings are likely to have bearings on both the scale of benefits as well as the costs.

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Summary

In the past two decades, nongovernmental organizations (NGOs) in Bangladesh have provided millions of poor rural people with savings and credit services at low cost. With these services, they have reduced poverty, improved food security and nutrition, and achieved positive social change as well. These NGOs have different structures, modes of operation, and program goals, and are not legally registered as banks. Unlike formal financial intermediaries, such as nationalized commercial banks, that lend based on collateral—thus effectively excluding the poor—these microfinance institutions (MFIs) provide services to solidarity credit groups that poor community members create. Small groups (5 to 10 members) form larger groups that then procure financial services. The NGOs thus make use of joint liability, peer selection, and experience with repeated financial transactions to overcome the informational constraints in formal financial markets. The MFIs harness some of the strengths of local organizations while also practicing sound business management.

Despite these programs and the increases in per capita income, widespread poverty and malnutrition continue to exist in Bangladesh. In 1997, the country was the eighteenth poorest in the world. The level of extreme poverty has hardly changed over time and the incidence of poverty is greater now in rural areas, where 50 percent of the households are landless and employment opportunities are low. The natural disasters Bangladesh experiences have caused even further setbacks in development.

Given the relative success of the MFIs and the pressing need for further poverty alleviation, Manfred Zeller, Manohar Sharma, Akhter U. Ahmed, and Shahidur Rashid undertook a study to examine four issues: (1) The determinants of the formation and outreach of MFIs; (2) the credit group formation process, the determinants of program eligibility, and the implications of eligibility requirements for the structure, conduct, and performance of the groups; (3) the financial sustainability of the lending institutions; and (4) the effects of participation on household resource allocation, income generation, food and nonfood consumption, and the social attitudes and capacities of their members.

In *Group-Based Financial Institutions for the Rural Poor in Bangladesh: An Institutional- and Household-Level Analysis,* the authors examine these issues by looking at the workings of three different institutions: the Bangladesh Rural Advancement Committee (BRAC), the Association for Social Advancement (ASA), and Rangpur-Dinajpur Rural Services (RDRS). These NGOs represent, respectively, the three types of MFIs in Bangladesh: those that have transformed their financial programs into banks; those that collect savings and make loans, but rely on the wholesale functions of rural banking networks; and those that do not handle funds, but instead facilitate the formation of member groups and their linkage with banks.

Reaching the Poor

Overall, the NGOs are highly successful in reaching those rural poor who farm less than 0.5 acre. They tend to place their offices within more developed rural areas with better access to infrastructure and banks, and avoid areas that are at high risk of flooding and other adversities. Within the more developed areas, the NGOs provide poorer villages with their services and, within the villages, reach very poor people, mostly women. But generally the NGOs have not assisted the ultra-poor or the many agricultural smallholders who farm more than 0.5 acre.

Services and Sustainability

The selected NGOs exhibit important differences with respect to target groups and the type of services provided. Whereas ASA mainly finances off-farm enterprises for women, BRAC lends to women and men for both agricultural and nonfarm activities. Households with less than 0.5 acre may join ASA or BRAC groups. The loans usually have a one-year maturity. Because borrowers must repay in weekly installments, many invest in businesses with a continuous cash return. During the 1990s, ASA focused on providing financial services while reducing its nonfinancial ones, such as business management training. It has also begun serving households with more than 0.5 acre of land. BRAC, in contrast, assists in product marketing and operates as an integrated development organization, providing health services and medium-term investments for community improvement, among other activities.

RDRS promotes income generation within agriculture, animal husbandry, and fish-farming. Because many of these enterprises require longer gestation periods, loans with different repayment plans are offered. RDRS also provides nonfinancial services and assists in product marketing. In 1989, RDRS changed the membership eligibility criterion from ownership of less than 1.0 acre to a maximum of 1.5 acres.

The MFIs, unlike the government banks that require heavy subsidies to remain solvent, are financially sustainable and among the most efficient credit organizations worldwide. The MFIs charge interest rates 10–20 percent above the inflation rate yet have achieved repayment rates as high as 98 percent on average. The large Asian MFIs, including ASA and BRAC, have performed their operations on average without any subsidies. Smaller South Asian MFIs, however, spend about $0.17 per dollar lent, of which $0.05 must be covered by subsidies.

Impact on the Poor

The targeted credit programs have had a positive impact on household welfare in a number of ways. The quantity and quality of food consumed, the health of household members, and children's education have improved. The survey on social attitudes and social capacity shows progress in social change, particularly in the areas of intrahousehold decisionmaking and women's coping capacity, physical mobility, and attitudes.

An econometric analysis reveals that credit access has a significant and strong effect on income generation and food and calorie consumption. Each Tk 100 of credit access generates an additional Tk 37 of annual household income to ASA and BRAC members. This compares favorably with the cost of subsidizing this access. With a social cost of Tk 5 in the case of small and medium-sized MFIs, microfinance NGOs in Bangladesh are producing a net social benefit of Tk 32 for every Tk 100 they lend.

Policy Implications

Group-based financial institutions can contribute greatly to poverty reduction in Bangladesh and offer a viable alternative to state and market failures in rural finance. Therefore, continuing public support for the expansion of these MFIs appears warranted. However, the current subsidy figures underestimate the actual costs of the programs. The study did not conduct a full

cost-benefit analysis. The data do not include past subsidies for innovation and expansion phases or unsuccessful MFIs. These costs would need to be considered in determining whether to invest in MFIs or other avenues for rural development. Nevertheless, the subsidy figures appear quite favorable compared with other capital transfers to the poor. Finally, to replicate the MFIs elsewhere, we must consider that their successful implementation necessarily involves adapting the organizational structure and practices to different socioeconomic and agroecological environments.

CHAPTER 1

Introduction

Bangladesh has gained an international reputation for leading the development community with innovations such as the Comilla model of rural development and the Grameen Bank model of a targeted group-based credit program for the poor. Despite these creative programs, widespread poverty and undernutrition continue to be fundamental problems in Bangladesh.

Many credit and savings schemes targeted on the poor have been introduced during the past two decades in Bangladesh, mainly by nongovernmental organizations. The predominant rationale for these schemes is their potential for reducing poverty by improving the ability of the poor to generate more income on or off the farm. These programs are also expected to have beneficial welfare outcomes such as improved food security and nutrition as well as positive social change. With this in view, the International Food Policy Research Institute (IFPRI) designed a study to analyze the institutional performance of selected group-based financial institutions and their household-level impact on selected indicators of welfare and social change. This report provides the findings of the study.

The report is organized into six chapters. Chapter 1 presents major socioeconomic data on Bangladesh, an overview of the rural financial sector, and the research objectives, questionnaire design, and sampling procedure. The second chapter analyzes the geographic location of group-based financial institutions at the county level. The structure, conduct, repayment performance, and financial self-sufficiency of group-based financial institutions are the subject of Chapter 3. Chapter 4 describes the socioeconomic characteristics of households participating in group-based financial institutions compared with different groups of nonparticipants. It further explores the determinants of participation. Chapter 5 contains the household-level analyses of the effects of participation in group-based financial institutions on various outcome variables, such as social change, income, and food consumption. The final chapter presents the major conclusions.

Poverty, Food Insecurity, and Undernutrition

With per capita gross national product (GNP) of US$270 Bangladesh was the eighteenth-poorest country in the world in 1997 (World Bank 1998). Ten years ago, the country ranked fifth poorest, with per capita GNP of about US$170. Despite this improvement in per capita income in both absolute and relative terms, pervasive poverty persists in Bangladesh. The

most recent poverty estimates of the 1995/96 Household Expenditure Survey (HES), based on the cost-of-basic-needs (CBN) method,[1] suggest that 53.1 percent of the national population were poor (below the upper poverty line) and 35.6 percent were very poor (below the lower poverty line).[2] The incidence of rural poverty was much higher than that of urban poverty. In rural areas, 56.7 percent and 39.8 percent of the rural population were classified as poor and very poor, respectively, whereas in urban areas, 35.0 percent were poor and 14.3 percent were very poor in 1995/96 (BBS 1998).

Although the long-term trends in the incidence of overall poverty show modest improvement, extreme poverty has hardly changed (Rahman 1994, 1995; Sen 1992). Behind this stagnation in the incomes and welfare of the very poor group lies acute pressure on land owing to the increasing population, and a resultant steady growth in landlessness. This highly vulnerable group continues to exist at the margins of human survival.

The most startling consequence of widespread poverty in Bangladesh is that the very poor group (over one-third of the national population in 1995/96) remain seriously underfed because their incomes are too low to buy enough food to satisfy minimum energy requirements. An IFPRI study in Bangladesh by Ahmed (1992) provides poignant evidence of the severity of food insecurity, as portrayed in Box 1.1.

Bangladesh has made considerable progress in food production since independence in 1971. Cereal production increased by about 60 percent over the 20-year period from FY78 to FY98. This achievement, however, has been eroded by a continued high (though declining) rate of population growth. Total population increased by about 50 percent over the two decades. Consequently, the country has not been able to overcome the chronic shortage in domestic food production to meet basic nutritional needs. Bangladesh continues to depend on food aid imports to help meet food deficits.

Bangladesh is highly prone to natural disasters, such as floods, cyclones, and occasional droughts. Crop failures from such disasters cause acute food shortages. A crop failure in 1974, for example, caused a devastating famine. Sudden food shortages disrupt the government's long-run development objectives as resources are diverted to short-term crisis management.

Some groups within poor households are at a greater nutritional risk than others. Nutrition studies in Bangladesh as well as in other low-income countries in general suggest that preschool children and pregnant and lactating women are the groups facing the most acute nutritional risks. The findings of the Child Nutrition Survey conducted by the Bangladesh Bureau of Statistics in FY96 (BBS 1997) suggest that 59.7 percent of children aged 6 to 71 months were malnourished in terms of reduced height-for-age and weight-for-height measurements. An estimated two-thirds of deaths of children under five years of age are related to malnutrition. About 11 percent of all children in Bangladesh die in their first year of life and 19 percent die before their fifth birthday (UNICEF 1991). About 30,000 children go blind every year from vitamin A deficiency and 50 percent of them die within a year of a blinding episode (BNNC 1997). Malnutrition of children can be traced back to the malnutrition of mothers. Underweight and anemia among mothers contributed to low birth weight. About 80 percent of pregnant and lactating women suffer from iron deficiency anemia (BNNC 1997).

Among the poor, urban slum dwellers and the rural landless face the greatest hardships.

[1] The Bangladesh Bureau of Statistics (BBS) first adopted the CBN method for reporting the findings of the 1995/96 HES, and has decided to use this method for future rounds of the HES. For a comprehensive discussion of the CBN method, see Ravallion (1994). Until the 1991/92 HES, BBS used food energy intake (FEI) and direct calorie intake (DCI) for measuring the incidence of poverty.

[2] For an explanation of the upper and lower poverty lines under the CBN method, see Wodon (1996).

Box 1.1 The Agony and Privation of a Poor Family

Abdul Karim, about 35, is the head of a landless household. He lives with his wife, Ayesha, and their three children in Puthimari village of Chilmari Thana, one of the most distressed areas of Bangladesh. Abdul's household is among the many severely poor households in the village that were not covered by any of the government intervention programs. The household was included in the control group of IFPRI's consumption and nutrition survey.

Abdul's one-room house, with walls made of *Kash* (a kind of tall, wild grass) and bamboo, and a straw roof, is too small for his family. It is clear that the household is in extreme poverty. The severity of malnutrition that the family members are suffering from is evident from their skeleton-like features.

IFPRI field investigators Zobair and Farzana interviewed Abdul and Ayesha. "You can see our miserable condition. Yet, we are not included in any of the government programs," Abdul said bitterly. "It is true that most of them who are getting ration are also poor, but none of them are as needy as we are," Abdul asserted.

"Two days ago, I worked on a neighbor's land, weeding his radish field. He gave me five taka, and a meal of rice and *dal* for the whole day's work. Abdul continued, "Yesterday, I went to him again, but he offered me only three taka and a meal. I accepted and worked from morning till evening."

The day we visited them, nobody in the family could find any work. Abdul spent his eight taka in buying about a kilogram of wheat. Ayesha was frying the wheat in an earthen pot. "I soaked the wheat in salt-mixed water before frying. The wheat becomes hard and brittle after frying. This fried wheat is all we have for today's meal. From this, I have to save some for tomorrow also," Ayesha said. Farzana asked her why they didn't crush the wheat to make *atta* (whole wheat flour). "With *atta* from this wheat I could make only a few *rooti,* which the children would eat in no time because they are so hungry. Instead, we can chew the fried wheat for a long time," Ayesha explained. "I know that I am cheating my own children," she sobbed, "But what can I do? We don't have money to buy more wheat or rice. Nobody wants to hire me or my husband for work because we are so weak. But if we can't find work, then we can't eat, and without eating we will become weaker."

Abdul nodded, "She is right, *Aswin* and *Kartik* (the lean season) are the most difficult months. Many children in this area die during this time. They are so weak that even simple diseases kill them," he said, looking at his own children. "But things will improve after a month during *Aman* rice harvest. Everybody will get work. Ayesha will parboil paddy and husk rice in farmers' houses," Abdul tried to console himself.

"But what will happen to us next? The river will probably take away our house next year," Ayesha expressed her anxiety, and then maintained, "We were not this poor when we got married. We had some land, and we produced enough rice for our small family during that time. But one night, there was a big land erosion and the *rakkushi* (a legendary animal, like a dragon) river swallowed our land. Except this house, we have nothing left now. Last month, I sold my gold nose pin to a neighbor for one-fourth the price my husband paid for it. With that money we bought some rice and wheat."

Abdul sold a mango tree early that month for only 100 taka. "The tree could easily fetch 500 taka. Big and sweet mangoes used to grow on that tree. But the man who bought the tree, cut it for firewood, because it could go into the river during the next flood. You see, the river is the cause of all our misery," Abdul concluded.

The interview was over, and we were about to leave Abdul's house. At that time, Biplab, Abdul's eight-year old son, came running with a large and beautiful water hyacinth flower in his hand. He gave the flower to Farzana and said to her shyly, "Please come again." Farzana had managed to hold her tears during the interview. She could not hold them any longer.

Source: Ahmed (1992).

The rural landless, constituting about 50 percent of rural households, depend mainly on agriculture for wage employment. Since the demand for labor in agricultural production is seasonal, the landless remain underemployed during the slack season. Moreover, natural disasters and the resulting crop failures cause acute deprivation among the landless. High food prices and unemployment caused by crop failure often mean starvation for the rural landless.

A study by Chowdhury (1992) found regional differences in food intake of as much as 70 percent. Such disparity arises because of wide regional differences in both income and prices. Employment opportunities, the

incidence of natural calamities, agricultural technology, infrastructural development, disease, sanitation, and food prices all vary substantially across regions. Flood-prone rural areas—particularly zones affected by land erosion along the major river banks—appear to be the most nutritionally distressed areas of the country.

In Bangladesh, food intake varies by 10 to 20 percent from the lean to the plentiful months (Chowdhury 1992). Fluctuations in both food prices and incomes drive this seasonal variation. Food prices peak in March–April and in September–October. Absence of employment before the *Aman* (winter rice) harvest makes the September–October period especially acute, particularly for the rural landless, who depend on wage labor for their income. Poor water quality emerges as a problem in March and April, just before the monsoon rains begin. This aggravates the incidence of diarrhea at that time. The prevalence of diarrhea peaks again in September and October. The coincidence of all these forces yields two principal lean seasons in Bangladesh, one in March–April and a more severe one in September–October (Chen 1983; Clay 1989; Chowdhury 1992). Nutritional stress reaches its peak in these months.

Freedom from hunger and malnutrition is a basic human right. Malnutrition is both a cause and a consequence of underdevelopment. A malnourished population contributes less effectively to economic development than a properly fed, physically strong, and active population does. Bangladesh is very likely paying a high price for its widespread malnutrition and the resulting low productivity of its labor force. Efforts to ensure food security and eradicate malnutrition in Bangladesh are key investments in human capital, contributing effectively to poverty alleviation. Targeted credit and savings programs for the rural poor have been increasingly promoted in Bangladesh for improving the income and food security of the poor and thereby enhancing human, social, and economic development.

The Rural Financial Sector in Bangladesh: Review of Policy and Performance

The structure of the rural financial market in Bangladesh is typically dualistic, consisting of formal/semiformal and informal financial intermediaries. The formal and semiformal intermediaries are subject to central bank or at least some government regulations, whereas the informal financial sector operates essentially outside of these controls, although it may be indirectly influenced by them.

Various types of formal intermediaries service the rural financial market in Bangladesh. These include the public sector banks (especially two agricultural banks, the Rajshahi Krishi Unnayan Bank and the Bangladesh Krishi Bank), the rural branches of three nationalized commercial banks (Sonali, Janata, and Agrani Bank), and credit cooperatives supported by the Bangladesh Rural Development Board (BRDB). Private banks play a negligible role in the rural market. During the past two decades, credit and savings programs administered by national or international nongovernmental organizations (NGOs) have gained increasingly in importance, mainly as semiformal group-based financial institutions that are not registered as legal entities under banking law. Yet the NGO movement led to the establishment of two rural poverty-focused banks, the Grameen Bank in 1983 and the bank of the Bangladesh Rural Advancement Committee (BRAC) in 1998.

A range of informal lenders operate outside the regulatory framework for the financial sector. These informal institutions include local moneylenders, traders in agricultural inputs and outputs markets, shopkeepers, landlords, friends, and relatives (Murshid and Rahman 1990; Rahman 1992).

A Brief Historical Perspective

Until 1982, all formal financial institutions in Bangladesh were government owned. Some efforts aimed at liberalizing the financial sector were initiated during the mid-1980s. Two banks were denationalized in 1984 and, in

1986, a few private banks were allowed to start operations. However, the role of private banking institutions in rural areas was still negligible, and the government continued to intervene in the financial system through a network of nationalized commercial banks (NCBs). Interest rates were strictly regulated and funds were allocated to sectors and for uses that received government priority. Favored sectors, which received the lion's share of funds, were state enterprises, agriculture, and, increasingly, private manufacturing.

The pervasive bureaucratic and political control of financial institutions led to the undermining of basic principles of sound banking. Noneconomic considerations in routine lending decisions and the lack of an enforcement mechanism eroded financial discipline among borrowers. This resulted in low rates of loan recovery and greatly weakened financial institutions.

Rural Branches of NCBs. During the 1970s as well as in the 1980s, a basic assumption driving government policy seemed to be that replicating the traditional urban-based banking structure in rural areas, and fortifying it through a package of banking legislation and subsidized capital, would be sufficient to kick-start a viable financial sector in the rural areas. In 1977, for example, the replication effort took the form of the so-called "two-for-one" banking policy. This required commercial banks, which were all government owned, to open two rural branches for every urban branch (Khalily and Meyer 1993). This period also saw the establishment of a second specialized agricultural development bank, the Rajshahi Krishi Unnayan Bank (RAKUB), with a specific mandate to deliver agricultural credit in addition to the Bangladesh Krishi Bank (BKB), which had been founded in 1972.

Implicit in this latter decision was the realization that some change in banks' organizational structure was indeed necessary to make the carryover to the rural sector. However, in reality, the basic principles of banking remained more or less unchanged: loans continued to be strictly collateral based, and structures within banks did not provide sufficient incentives for managers to screen borrowers for creditworthiness or to enforce contract compliance adequately. In addition, the ready availability of cheap funds from the central bank, combined with the oligopolistic power of public sector banks in the rural financial market, encouraged inefficiency and impeded innovation at the institutional level.

Table 1.1 Recovery rate on rural loans, by state-owned commercial banks, 1980/81 to 1988/89 (%)

Year	Recovery rate[a]
1980/81	51.6
1981/82	50.6
1982/83	42.1
1983/84	42.8
1984/85	42.3
1985/86	26.5
1986/87	42.3
1987/88	24.3
1988/89	18.8

Source: Khalily and Meyer (1993).

[a] The recovery rate is defined as the percentage of target loans recovered relative to total target loans, including principal and interest.

As a result, recovery rates on rural sector loans made by nationalized commercial banks (Table 1.1) were not only low to begin with, but steadily declining during the 1980s—from about 51 percent in 1981/82 to under 19 percent in 1988/89 (Khalily and Meyer 1993). More recent data show that repayment rates for agricultural loans by the two specialized agricultural banks, BKB and RAKUB, also hovered around 20 percent during 1991/92 to 1995/96. Moreover, data from the Central Bank of Bangladesh show that the repayment rate of total agricultural credit, whether advanced by the NCBs or by the specialized agricultural banks, ranged between 19.7 percent and 32.7 percent from 1981/82 to 1995/96.

Other factors exogenous to the banking system also contributed to this environment

of lax credit discipline. First, legal recourse to the foreclosure and liquidation of collateral was, in practice, nearly impossible (World Bank 1994), especially in the agricultural sector. This greatly encouraged strategic default while giving the banks a false sense of safe, collateralized lending. Second, confusing signals created by frequent announcements of loan amnesties and interest remission programs—the results of direct political interference (Khalily and Meyer 1993)—increased the incentives to default, even among creditworthy borrowers. Indeed, rural financial institutions were used to providing political favors, especially before elections, through a policy of "give and forgive." Third, non-economic considerations in routine lending decisions coupled with high transaction costs for clients made formal banks less attractive long-term partners for most small and marginal farmers. This perceived short-term association provided further incentives for strategic default. For these reasons, by the end of the 1980s rural branches of the state-owned banks were utterly failing to carry out their mandates. Instead, the entire network of branches had metamorphosed into a structure that was no longer sustainable.

Moreover, the public sector banks (PSBs) also demonstrated weak outreach to the poorer segments of the population. A survey by the World Bank (1996) indicates that PSBs granted loans to 19 percent of landless borrowers and to 49 percent of small and marginal farmers (0.5–2.5 acres). Across occupational groups, the bulk of PSB loans went to large farmers, to larger off-farm enterprises and businesses, and to salaried households. This regressive pattern of credit allocation occurred despite the declared objectives of the public banks to alleviate poverty. Almost half of the total loan portfolio from 1991/92 to 1995/96 was supposed to be for special loans for poverty alleviation, with most of the remainder being given for crop loans, less for livestock, and the balance for irrigation and agricultural equipment.

The performance of public banks was also dismal in terms of savings mobilization in rural areas. The total (rural and urban) nominal value of deposits in PSBs increased three times (from Tk 103.9 billion to Tk 309 billion) between 1986 and 1994. Of this, 10 percent originated in the "agriculture and fisheries" sector (World Bank 1996). Data obtained by the World Bank show that the agricultural banks experienced a fourfold increase in deposits (from Tk 4.3 billion to Tk 17.1 billion) between 1986 and 1994. In comparison, member deposits in the Grameen Bank increased 47 times over the same period.

Financial Sector Reforms

In view of the obvious failures in the state-controlled financial sector, the government took a series of actions to liberalize and reform the financial sector, in particular under the Financial Sector Reform Project (FSRP) initiated in 1989 (Ali and Murtaza 1993; Ahmed and Khan 1994; Cookson and Alamgir 1993; Cookson and Zaman 1994). The FSRP included several major reforms:

- Exchange rate decontrol. A number of exchange rate controls were relaxed or withdrawn and taka convertibility on current account transactions has been introduced.

- Interest rate deregulation. The earlier practice of fixing interest rates through administrative fiat has been discontinued. Initially, the banks were given the freedom to fix interest rates within a certain band. Since 1992, however, except for operations such as agriculture and certain export and small-scale industrial activities, interest rates on lending activities have been completely liberalized. The band for agricultural lending was 11–15 percent per year in 1994. Real interest rates were positive because the inflation rate hovered around 2 percent in 1994 (World Bank 1997). As far as interest rates on deposits are concerned, complete regulation has given way to the specification only of minimum rates on deposits.

- Reforms on credit control. Direct credit control by the government has been replaced by the use of indirect monetary instruments such as a cash reserve requirements, open market operations, and the fixing of bank rates.

- Strengthening the financial position of banks. New rules have been introduced for assessing loan quality and making provision for bad debt so that banks' accounting systems accurately reflect their financial state. Capital adequacy rules were also introduced to protect depositors.

- Reforms in the legal framework. In order to increase the rate of loan recovery, special financial loan courts were established to arbitrate default cases; reforms of commercial laws relating to negotiable instruments and bankruptcy were also initiated.

Despite these reforms, the nationalized commercial banks continue to dominate the financial sector. In 1993, NCBs accounted for 63 percent of bank deposits and 53 percent of loans. Their oligopolistic power over the market is thus still significant and state control still pervasive.

Rural Financial Institutions Promoted by NGOs

Since the early 1980s, yet another type of savings and lending institution operating in the rural sector has experienced phenomenal growth. Group-based institutions, engineered and propagated by various NGOs, differ from other formal financial institutions in two fundamental ways. First, unlike institutions that lend primarily on the basis of physical collateral, financial institutions operated by NGOs lend to groups and make use of joint liability, peer selection, and investments in repeated financial transactions to overcome the informational constraints in financial markets (Zeller et al. 1997). Second, these institutions do not depend solely on the government for loanable funds, nor have they been subjected to interest rate and other controls imposed by the central bank.[3] Therefore, right from the beginning, the group-based financial institutions, unlike the NCBs, were unimpeded in their pursuit of sound banking principles. In practice, however, most NGOs depend on grants as well as loans from the state or donors. These loans are often at concessionary interest rates. The concessionary funds are often linked with certain restrictions, such as interest rate ceilings or the establishment of new branches in disadvantaged areas.

All NGO institutions are nonprofit institutions that are guided by special mandates to assist the poor. In rural areas, they therefore typically target rural households with less than half an acre of land. These institutions have on the whole shown that providing financial services to the rural poor in Bangladesh not only is feasible, but can achieve high repayment and savings rates combined with a rapid growth of clients.

By and large, however, the majority of poor rural households in Bangladesh continue to be served by a vast number of informal lenders who, because of their superior information and low transaction costs, are able to provide a range of financial services especially tailored to their clients (Zeller and Sharma 1998).

Research Questions

A myriad of credit and savings programs for the rural poor are implemented by government and nongovernmental organizations in Bangladesh. Some of the organizations were established in the late 1970s and early 1980s, such as the Grameen Bank, the Association for Social Advancement (ASA), and the Bangladesh Rural Advancement Committee

[3] Since 1991, a government-owned institution called the Palli Karma Sahayak Foundation (PKSF) has been providing loans to microfinance NGOs. PKSF limits the interest rates that can be charged to their clients by the borrowing member-based financial institutions. The Association for Social Advancement became a partner of PKSF in 1995 and the Bangladesh Rural Advancement Committee in 1997.

(BRAC). These three institutions, in particular, have gained an international reputation for obtaining high repayment rates from millions of very poor borrowers who were previously thought of as unbankable.

Yet relatively little research has been conducted on various aspects of the institutional performance of group-based financial institutions. In particular, the determinants of the geographic placement of group-based financial institutions and the repayment performance of credit groups as well as their implications for poverty outreach and financial sustainability have not sufficiently been explored. Most studies focus on the household and intrahousehold level, and rarely go beyond case-study approaches or purely descriptive analysis. One of the few in-depth econometric studies to investigate the effects of these group-based financial institutions on household welfare is by Pitt and Khandker (1996), who analyze the impact of the Grameen Bank, BRAC, and the Bangladesh Rural Development Board. This study finds significant and relatively large effects on a number of welfare outcome variables, notably food expenditure, education, fertility, labor supply, and asset accumulation. More specifically, the marginal return to weekly consumption expenditure per capita due to female borrowing from the Grameen Bank is 19 percent. Based on this result, Khandker (1996) calculates that the average female Grameen Bank borrower would require nine years of membership to move out of poverty. However, using the same data as Pitt and Khandker (1996), Morduch (1998b) applies an alternative econometric model and finds no significant impact on the level of consumption expenditure due to participation with the Grameen Bank.

The main objectives of this study are to analyze

1. the determinants of the formation and outreach of group-based rural financial institutions;

2. the process of group formation and the determinants of program eligibility and their implications for the structure, conduct, and performance of savings and credit groups; and

3. the effects of participation in group-based credit and savings programs on household resource allocation, income generation, and food and nonfood consumption.[4]

Data for this study were collected by IFPRI in a comprehensive survey in Bangladesh in 1994. A community-level survey in 120 villages obtained data related to objective (1), complemented by secondary data at the county level. Data to address objectives (2) and (3) were obtained from a random sample of 128 credit groups and a three-round survey of 350 households, respectively. Appendix A describes the survey modules, the sampling frame, and the location of the survey areas.

The Selection of Credit and Savings Schemes

Three group-based financial institutions were selected for this study:

- the Association for Social Advancement (ASA),

- the Bangladesh Rural Advancement Committee (BRAC), and

- Rangpur-Dinajpur Rural Services (RDRS).

The reasons for selecting these programs are as follows. In the past, the Grameen Bank has been the subject of many studies (see, for example, Hossain 1988; Wahid 1993; Khandker, Khalily, and Khan 1995; Todd

[4] This report does not address intrahousehold aspects of welfare impact. On this issue, see, for example, the research by Pitt and Khandker (1998), Hashemi, Schuler, and Riley (1996), and Goetz and Sen Gupta (1996).

1996; Matin 1997; Pitt and Khandker 1998), whereas the three selected programs—with the exception of BRAC—have not previously been comprehensively analyzed.

More importantly, the three selected programs represent different approaches to financial intermediation in Bangladesh. The group-based NGO movement in microfinance in Bangladesh can be broadly classified into three categories:

1. NGOs that have transformed into banks. Examples are the Grameen Bank and, more recently, BRAC.

2. NGOs that have not registered as banks, but collect savings and make loans through their own local branch network. Most microfinance NGOs fall into this bracket (among the larger ones are, for example, UDDIPAN and Proshika) (Jahangir and Zeller 1995). ASA is the largest of them, and grew the fastest during the 1990s in terms of absolute numbers of new members.

3. NGOs following the linkage approach. These NGOs promote the formation of credit and savings groups, but they do not provide savings and credit services through agents. Rather they facilitate a linkage between the groups and branches of rural state-owned banks. Examples of this category are Swanirvar and RDRS.

ASA, BRAC, and RDRS have been selected to represent these three categories of group-based financial institutions. BRAC is an NGO that developed its group-based credit and savings program into a registered rural bank (like Grameen Bank), and operates this bank as a subsidiary holding company separated from its nonfinancial services. ASA represents the mainstream of NGO-based credit schemes in Bangladesh that continue to rely on the rural banking network for the wholesale functions of rural finance. Within this type, ASA is at present the largest in Bangladesh, and has made major progress in becoming financially self-sufficient, increasingly diversifying and disentangling its credit, savings, and insurance products in response to client demands and fiercer competition. RDRS is situated at the other extreme of the institutional spectrum; it merely facilitates the formation of self-help groups and their linkage with the rural banking sector. Thus, RDRS serves as a promoter, whereas ASA and BRAC are providers, as distinguished by Rutherford (2000).

The selected NGOs exhibit other important differences with respect to target groups and the type of services provided. These differences are highlighted in the following. Whereas ASA mainly finances off-farm enterprises for women only, BRAC lends to women and men for both agricultural and nonfarm activities. The two credit programs provide loans to individuals who are members of a group. The loans usually have a maturity of one year. Households are eligible to join ASA or BRAC groups if they possess less than 0.5 acres of land. The loans have to be repaid in weekly installments. Many borrowers therefore invest in businesses with a continuous cash return (such as trading or short-cycle production activities). In the early years, ASA offered a range of nonfinancial services, such as business management training and social awareness classes. During the 1990s, ASA increasingly focused on providing a diverse range of savings, credit, and insurance products while reducing its nonfinancial services and aiming to become financially self-sufficient. ASA has in recent years also ventured into providing financial services to the moderately poor, that is, households possessing more than 0.5 acres (Healey 1999). BRAC, in contrast, not only offers financial services but also assists members in the marketing of their products and, in some cases, promotes housing loans and medium-term group investments, such as tubewells for irrigation. Thus, whereas ASA seems to be streamlining its business and concentrate on financial services only, BRAC continues to operate as a multi-input integrated development organization. As such, BRAC also provides health

services and invests in community schools for its members.

The RDRS program emphasizes the promotion of income generation within agriculture, animal husbandry, and fish-farming. Many of these enterprises require longer gestation periods. Two types of loans with a maturity of one year are offered. The first type is meant for trading, service, and production activities with a short gestation period for generating cash. This loan has to be repaid in bimonthly installments. The second type of credit has to be repaid in a single installment (RDRS 1995).

Like BRAC, the RDRS program conducts training in social awareness and business management and provides assistance in the marketing of products. A major distinction between RDRS and BRAC/ASA is that RDRS forms and trains groups but does not handle any savings deposits, loan repayments, or loan disbursement. Group members transact directly with rural banks at going market interest rates. Thus, the RDRS program can be characterized as a "linkage program" (Kropp 1990). Earlier examples of linkage programs in Bangladesh include the Dheki loan program and the Swanirvar Bangladesh program. Linkage programs are also increasingly promoted in other countries, in particular India. Households owning less than 1.0 acre of land are eligible for membership in RDRS groups. Since 1989, with the implementation of the banking component within the MSFSCIP[5] project, the eligibility criteria have been increased to a maximum of 1.5 acres of land.

ASA's community officers directly handle all the monetary transactions and maintain savings accounts in the name of ASA group members. BRAC officers, too, collect savings and credit payments (at weekly meetings), but they deposit this money in BRAC's banking network. Thus, BRAC (like the Grameen Bank) operates as a bank and assumes all banking functions, whereas ASA performs banking functions only at the retail level. The staff of RDRS, on the other hand, do not deal with monetary transactions at all; their sole function is to form and train the groups and to facilitate the initial contact between the group and the bank.

In summary, the main differences among the three programs are the degree of involvement by the NGOs in the provision of financial services and their dependence on the rural banking institutions, the gender of the target group, the range of financial and nonfinancial services offered by the NGOs, and the eligibility criteria for membership.

[5] MSFSCIP stands for Marginal and Small Farms Systems Crop Intensification Project in the Kurigram District (MSFSCIP 1995). This project has been supported by the International Fund for Agricultural Development (for small farmers owning more than 1.5 acres of land) and by the German Agency for Technical Cooperation (GTZ) (for marginal farmers owning less than 1.5 acres of land). Since 1989, the GTZ and the Department of Agricultural Extension have promoted direct linkages between groups being formed by the RDRS and commercial banks in the Kurigram District.

CHAPTER 2

Determinants of the Placement and Outreach of Group-Based Financial Institutions: A County-Level Analysis

Participation in financial institutions varies considerably across counties and communities in Bangladesh. Secondary data from the Bangladesh Bureau of Statistics and information gathered from the major nongovernmental organizations (NGOs) for 391 out of the total of 486 *thanas* (counties) of Bangladesh show that, whereas some *thanas* have almost a third of their population as members of some group-based financial institution, others have not a single such person (Table 2.1). What makes for this difference in institutional density? Khandker, Khalily, and Khan (1995) find that commercial banks in Bangladesh favor well-endowed areas, and a study in India (Binswanger, Khandker, and Rosenzweig 1993) concluded that commercial banks are more likely to be located in places where the road infrastructure and marketing system are relatively developed. Is this also the case with group-based financial systems promoted by NGOs? In other words, do NGO programs target services on the poor in relatively underdeveloped or disadvantaged regions or do they locate their branches in the relatively better endowed areas? What kinds of tensions arise between organizational goals and operational realities in making decisions about branch placement? Once branches have been placed, what does client coverage look like across branches? For example, do decisions on branch placement and client coverage follow similar patterns, or are they different? To what extent does decisionmaking related to client coverage appear to be decentralized (Ravallion and Wodon 1997)? Knowing whether certain types of area are systematically favored or disfavored is of interest and importance to policymakers as well as to program managers. This knowledge can also assist in disentangling program effects from location effects and hence is useful for an assessment of the impact of group-based credit programs (Pitt, Rosenzweig, and Gibbons 1995).

This chapter uses secondary *thana*- (*upa zilla*) level data from 391 *thanas* in Bangladesh to examine the placement of branches and group coverage of the Association for Social Advancement (ASA), the Bangladesh Rural Advancement Committee (BRAC), and Proshika, institutions for which all relevant data were available. First, conceptual considerations in

Table 2.1 Descriptive statistics of regression variables: *Thana* level ($n = 391$)

Variables	Mean	Standard deviation	Minimum	Maximum
Dependent variables				
Presence of NGO[a]	0.40	0.49	0.00	1.00
Presence of ASA[a]	0.10	0.31	0.00	1.00
Presence of BRAC[a]	0.24	0.43	0.00	1.00
Presence of Proshika[a]	0.13	0.33	0.00	1.00
Client density (all)[b]	17.86	33.01	0.00	297.59
Client density (ASA)[b]	1.94	6.35	0.00	39.80
Client density (BRAC)[b]	9.35	24.45	0.00	297.59
Client density (Proshika)[b]	6.57	19.95	0.00	155.99
Independent variables[c]				
Years of operation (BRAC)	1.46	3.33	0.00	18.00
Years of operation (ASA)	0.41	1.33	0.00	7.00
ELECTRICITY	6.96	8.47	0.00	54.90
LANDSIZE	23.90	7.60	1.97	52.87
LITERATE	24.54	9.94	11.00	60.40
MARKET	26.22	13.37	1.00	75.00
DENSITY	791.10	666.54	93.20	10,557.35
URBAN	11.26	16.58	0.00	100.00
ROAD	0.17	0.21	0.00	2.61
POSTOFFICE	16.18	9.69	1.00	82.00
HOSPITAL	12,576.33	11,499.45	0.00	99,726.00
DOCTOR	42,905.03	44,555.82	0.00	329,739.00
DISTRESS	1.10	0.15	1.00	1.50

Sources: BBS, *Statistical yearbook* (various issues); BRAC 1994; ASA 1994; data for Proshika obtained in interviews from Head Office; data for variable distress index from HKI 1994.

[a] Dummy variables.
[b] Client density (that is, outreach) is defined as the number of NGO clients in the *thana* divided by the *thana*'s population multiplied by a factor of 1,000.
[c] For definition of variables, see page 16.

studying the placement of group-based financial institutions are discussed and their implications for the specification of the econometric model are derived. Results from the estimation of determinants of the placement of NGO branch offices in rural areas as well as determinants of their outreach to rural households are then presented.

Analytical Considerations in Studying the Placement and Outreach of Rural Financial Institutions in Bangladesh

When guided by the sole objective of maximizing profits, the decision by a financial firm to place a branch office in a particular location is relatively straightforward because it can be based on standard investment theory: it makes sense to open an additional outlet whenever discounted returns exceed the discounted costs for establishing and operating the branch office. Before resources to a new branch office are committed, the firm is free to choose the scale of operations based on its knowledge of expected demand conditions. The decision on the size of the branch office will affect its future unit cost of supplying services. Once a branch is opened—that is, once resources in the form of building and equipment are committed and the scale of the operation has been determined within some limits—the service volume in the short run (during which time scale is quasi-fixed) is provided such that marginal revenue equals marginal costs. Of course, the possibility of expanding the scale of operations in the fu-

ture remains; this decision would depend on expected changes in the demand for services and the extent to which moving on to a larger scale of operation would bring about a substantial reduction in unit costs of providing services. The firm might also decide to close an existing branch office. It will do so in the short run with the objective of profit maximization if variable costs are no longer covered by revenue, and in the long run if the discounted total costs (including depreciation) of maintaining the branch exceed expected discounted revenue.

Can the above framework be applied to analyze the NGOs' decisions for placing branch offices and for determining their outreach to clients? The answer is in the negative mainly because profitmaking is not a principal aim of these organizations. Two additional considerations are likely to affect the branch placement and client outreach decisions of the NGOs. First, as indicated in the previous chapter, BRAC, Proshika, and ASA came into being principally as a response to the challenge of delivering basic social services to a destitute population, which was further impoverished, at that time, by a devastating war of liberation. The management decisions within these organizations are therefore primarily guided by the goals underlined in the original mission or the charter under which these institutions were established. Second, the original mission is likely to be modified by at least one other important consideration: the interest represented by the principal donors or investors in these institutions, composed of international donor organizations as well as development organizations and foundations such as Bread for the World and MISEREOR. All three NGOs received and continue to receive funding from such sources and, by implication, are likely to be bound by some type of conditionalities accompanying these funding arrangements. Some of these conditionalities relate primarily to maintaining some minimum standards of financial performance (for example, achieving loan repayment rates above 90 percent and having low administrative costs per unit of loan lent). Other investors may also insist on evidence of satisfactory outreach to the poor and a reasonable growth in the numbers of poor reached. More recently, investors have become increasingly interested in obtaining evidence on the impact of the program on poverty reduction. It is therefore reasonable to assume that aiming to fulfill the original organizational objectives as well as the conditionalities imposed by the "investors" results in four specific considerations concerning branch placement and client coverage: (1) poverty targeting, (2) expected demand for services, (3) the cost of supplying services, and (4) the perceived riskiness of operations. These ideas are further expanded below.

The placement rule followed by NGOs is specified as

$$B_i = f[\mathbf{P_i}, E(D_i), E(C_i), R_i], \tag{2.1}$$

where the decision to place a branch, B_i, by an NGO credit institution is specified as a function of $\mathbf{P_i}$, a vector that describes poverty conditions in location i, $E(D_i)$, the expected level of demand for credit services in that area; $E(C_i)$, the expected level of cost of providing services, and R_i, an index of the riskiness of conducting credit-related business in that particular area. Each of these is discussed below.

Poverty Targeting

All group-based NGOs considered in this study claim to be guided, first and foremost, by a common mission to serve the poorest in the rural areas (ASA 1996a, 1996b; Lovell 1992; BRAC 1994). ASA, for example, which provides credit exclusively to women, aims to create "a broader space for marginalized women of rural areas as they can participate in income generation activities to increase income" (ASA 1994). BRAC, on the other hand, aims to work "exclusively with disadvantaged sections of the community"

(Chowdhury, Mahmood, and Abed 1991) and focuses on poor landless groups; Proshika has an explicit mission to "empower the poor" (Jahangir and Zeller 1995). Given these kinds of mission statement, a reasonable hypothesis is that, *ceteris paribus,* locations with higher poverty levels will have a higher probability of a branch placement.

There are, however, two additional questions: (1) What criteria of poverty do these institutions apply in targeting *individuals* at the operations level? (2) What criteria do these institutions apply in making operational decisions about the *areas* in which to target their activities?

The answer to the first question is relatively straightforward. All three programs have clear poverty-based eligibility rules. BRAC lends only to those who own less than 0.5 acres of land and who additionally work as a laborer for at least 100 days in a year (Lovell 1992). ASA lends to women who own less than 0.5 acres of land, whose income does not exceed Tk 1,200 per month, and who also sell their labor for at least 200 days a year (ASA 1993).

The response of NGOs to the differences in poverty levels between different locations in making decisions about placement is a more difficult question. A reasonable assumption is that the NGOs base their decisions on various types of area-level indicators of poverty. One testable hypothesis is that NGOs locate their branches in *thana*s that have larger proportions of households owning less than 0.5 acres of land, because this criterion most closely defines their target households.[6] This need not be the only criterion, however. To explore other criteria, two additional measures are proposed in this study: *thana*-level literacy rates and *thana*-level scores on the "distress" index developed by Helen Keller International (HKI 1994) in Dhaka, Bangladesh, to operationalize the vulnerability focus of its program. Literacy rates in general correlate highly with poverty levels, and the HKI distress index combines information on susceptibility to flooding (a frequently occurring natural disaster in Bangladesh), general wage levels, and the availability of irrigation facilities, all major factors affecting the well-being of the poor in Bangladesh.

Expected Level of Demand for Credit Services

The expected level of demand for credit services in an area is likely to receive important consideration for two reasons. First, it would be important for the NGOs to avoid areas where credit demand is likely to be either nonexistent or lower than some minimum threshold below which credit delivery is prohibitively costly to administer. Second, the marginal impact of NGO services on participating households—a major concern for the NGOs—is likely to be highest in areas where the marginal productivity of credit, and therefore its demand, is likely to be highest. The marginal productivity of credit, in turn, is likely to be high in areas that are affected relatively less by other accompanying constraints on labor and product markets, transportation, and information. Hence, the expected demand for credit is expressed as

$$E(D_i) = g(\mathbf{W}_i), \tag{2.2}$$

where the vector, $\mathbf{W}_i$, consists of *thana*-level variables that affect the level of credit demand and may include the following variables:

- the level of physical infrastructural development such as access to markets, roads, electricity, irrigation, and other services;
- agroclimatic conditions and general income levels; and
- the level of urbanization and commercialization of the local economy.

[6] The poor landless nonfarm population also constitutes the target population. However, the official data set does not contain this information.

The Cost of Supplying Services

As indicated before, whereas profitseeking institutions select locations where expected revenues are at least as high as expected total cost, this may not necessarily be the case for NGOs because profit maximization is not their stated objective. Further, NGOs receive subsidies of different types. Some are explicitly given to set up branches in specific geographical areas. NGOs also are known to cross-subsidize operations between branches. For this reason, they are not likely to base their placement decision solely on expected *net* revenues. The way in which expected financial performance affects the placement of branches is thus essentially an empirical issue.

But at least three other cost-related issues are likely to be important in deciding where to locate a branch office. These concern the general security of the operations, the availability of banking services, and staff incentives for working in backward areas. Credit transactions necessarily involve the handling of cash, which raises security concerns. Proximity to a police station and other law and order establishments may therefore be important. Moreover, when NGOs do not provide their own banking services (with the exception of the Grameen Bank and, more recently, BRAC) but depend on the branch of a public sector bank to make cash disbursements and deposits, then convenient proximity to rural banks becomes important. If banks are generally located in areas that are more urbanized or benefit from better infrastructure (as Khandker, Khalily, and Khan 1995 have shown), then NGOs may also tend to place branches in or near these locations. The third issue relates to the staffing of branches. Since branch managers are recruited from a central pool, and since salaries and other compensation do not reward appointments in more remote locations, managers are likely to prefer locations that have fairly well-developed education, market, and health services. If these considerations are significant in the decision to place branches, placement will be higher in *thana*s that have such services.

To account for all of these considerations, the expected total cost function is specified as

$$E(C_i) = g(\mathbf{Z}_i), \tag{2.3}$$

where the vector $\mathbf{Z}_i$ consists of *thana*-level variables that affect the level of unit service delivery costs. In practice, vectors $\mathbf{W}_i$ in equation (2.2) and $\mathbf{Z}_i$ are likely to be very similar, if not identical.

Perceived Riskiness

An important goal of NGOs administering credit programs is to maintain high repayment rates. Indeed, as noted earlier, all NGO programs report repayment rates in excess of 90 percent. Achieving acceptable repayment rates is critical for NGOs, because most of the subsidies they receive from national and international donors appear to be conditional on maintaining such rates. This objective of maintaining high repayment rates[7] may also affect the placement of branches. In particular, NGOs are likely to avoid areas where marginal returns from new microenterprises are low (poor, backward areas where complementary services either do not exist or are highly inadequate). They are also likely to avoid areas that are particularly susceptible to natural disasters such as flooding and other covariate risks. The risk expectation function is specified as

$$E(R_i) = g(\mathbf{V}_i). \tag{2.4}$$

Elements in $\mathbf{V}_i$ include poverty indicators such as the literacy rate, the level and distribution of landholding, and also the distress-level indicator described earlier.

[7] Note that the repayment rate is different from net financial returns. Net revenues may be negative even when repayment is 100 percent.

Econometric Specification

A linear specification of the placement equation (2.1), upon substituting for (2.2)–(2.4), would be

$$B_i = \mathbf{P}_i\alpha + \mathbf{W}_i\beta + \mathbf{Z}_i\gamma + \mathbf{V}_i\delta. \quad (2.5)$$

However, as indicated in the previous section, it is in principle (and also as a result of data limitations) very difficult to identify **P, W, Z,** and **V** *separately.* For example, it is hard to find variables that affect poverty levels but not credit demand or the riskiness of conducting business. A more practical formulation is therefore to regard the elements in **P, W, Z,** and **V** as common and represented by the vector $\mathbf{X}_i$, as

$$B_i = \sum\eta_i\mathbf{X}_i + \mu_d + e_i, \quad (2.6)$$

and interpreting its coefficient, $\eta_i = (\alpha_i + \beta_i + \gamma_i + \delta_i)$, as the combined effects of the four determinants of placement. After all, infrastructure, urbanization, and other community-level endowments are likely to jointly affect levels of poverty as well as demand for credit services, the cost of credit service delivery, and the riskiness of conducting business. Similarly, susceptibility to natural disasters simultaneously affects poverty, credit demand patterns, and the riskiness and costs of doing business. Note that a priori expectations on the sign of the η_i's are difficult to place unless α_i, β_i, γ_i, and δ_i are of the same expected signs. However, it is possible to make inferences based on the signs of the estimated coefficients on the relative strengths of some subset of the variables. This is done in the next section.

A different consideration is the effect of unobservables. If the placement of government infrastructural programs as well as levels of poverty are functions of unobservable factors such as agroclimatic potentials of lands, or historical or political considerations, then exclusion of such factors in equation (2.6) is likely to lead to biased estimates of the η_i's. In order to minimize bias arising out of location-specific unobservables, a district-level effect, μ_d, is included in equation (2.6). Since B_i in equation (2.6) is a binary dependent variable taking the value of 1 whenever there is a branch of the NGO in a *thana* and 0 otherwise, the equation is estimated using the fixed-effects logit model that sweeps out the effects of district-level unobservables. The last term in the equation, e_i, represents the random error.

The vector **X** in equation (2.6) contains the following variables (see Table 2.1 for descriptive statistics) relating to the *thana:*

Poverty-related variables

LANDSIZE The percentage of farms that are below 0.5 acres in size

LITERATE The percentage of population that is literate

Infrastructure-related variables

ELECTRICITY The percentage of villages electrified

MARKET The number of market centers

DENSITY The population density

URBAN The percentage of urban population

ROAD Kilometers of metaled road per 1,000 persons

HOSPITAL The number of people per hospital bed

DOCTOR The number of people per doctor

POSTOFFICE The number of post offices

Risk/poverty-related variable

DISTRESS The *thana*-wide distress index computed by HKI (the higher the value, the more prone to distress is the *thana*)

Except for the distress-level index, which was directly obtained from HKI in Dhaka,

all the independent variables are taken from the 1994 *Statistical yearbook* of Bangladesh, published by the Bangladesh Bureau of Statistics. Data on the dependent variables for the different programs were obtained from annual reports from BRAC, ASA, and the Grameen Bank for 1994 (BRAC 1994; ASA 1994; Grameen Bank 1994). The data for Proshika also refer to 1994, and were obtained through interviews with staff from its headquarters in Dhaka.

Econometric Results: Placement of Branches

Placement of branch equations were estimated for all three NGOs taken together and for each separately. These are discussed below.

All NGOs

The estimated logit equation where the dependent variable takes on a value of 1 when a branch of at least one of the three NGOs exists in the *thana* and 0 otherwise is presented in Table 2.2. A number of interesting results are discussed below. The coefficients of ROAD and POSTOFFICE are positive and significant at the 5 percent level. These are both infrastructural variables measuring the extent of transportation and communication facilities in the *thana.* Neither the percentage of urban population (URBAN) nor population density (DENSITY) is statistically significant. Nor are the two health service indicators (HOSPITAL) and (DOCTOR), the number of market centers (MARKET), or the percentage of villages that are electrified (ELECTRICITY). It appears therefore that placement decisions are mindful of transportation and communication facilities that directly affect the transaction costs of supplying financial services, but that the *net* effect of other infrastructural facilities measured or proxied by population concentration, urbanization, and the availability of medical and health services is insignificant.

Table 2.2 Placement of all NGOs: Estimated fixed-effects logit equation

Variables	Coefficients	*t*-values
LANDSIZE	0.0242372	0.987
LITERATE	–0.102779**	–3.631
ELECTRICITY	0.0156035	0.842
MARKET	0.0144544	1.162
DENSITY	–0.0002954	0.593
URBAN	0.0099031	0.893
ROAD	1.373573**	2.156
HOSPITAL	4.11×10^{-6}	0.294
DOCTOR	-4.30×10^{-6}	–1.241
POSTOFFICE	0.0344091**	1.875
DISTRESS	–3.255817**	–2.684

$N = 391$
Log likelihood = –172.79

** = significant at 5 percent level.

The coefficient of LITERATE is negative and strongly significant. The illiteracy rate serves in the analysis as an indicator of poverty and backwardness. Hence, NGOs are more likely to place branch offices in *thana*s with lower literacy rates. Note that if considerations of demand, costs, and riskiness favor *thana*s with higher literacy rates, that is, if $(\beta_{literate} + \gamma_{literate} + \delta_{literate}) > 0$, then it may be concluded that the NGOs' strategy to reach the poor ($\alpha_{literate}$) is sufficiently large to overturn the combined positive effect, so that the net effect is negative (that is, $|\alpha_{literate}| > |\beta_{literate} + \gamma_{literate} + \delta_{literate}|$). The positive coefficient of the landholding variable, LANDSIZE, suggests a similar interpretation as far as the farming population in the *thana* is concerned: the NGOs' desire to improve poverty outreach in counties with a higher proportion of farms below 0.5 acres seems to outweigh the combined negative effects on risk costs. However, the coefficient is highly insignificant for the case of all NGOs combined. Moreover, the use of this variable as an indicator of poverty in the *thana* is problematic because it does not take into account the poor, landless, nonfarm population, a declared target group of BRAC and ASA. The variable solely measures the percentage of marginal farms below 0.5 acres. NGOs may actually prefer landed households with less than half an acre of land as clients, compared with

Table 2.3 Placement of ASA: Estimated fixed-effects logit equation

Variables	Coefficients	*t*-values
PRIORCOMP	–2.054474*	–1.810
ELECTRICITY	0.0056169	0.145
LANDSIZE	0.1028597**	2.064
LITERATE	–0.0472607	–0.839
MARKET	0.0290323	1.249
DENSITY	–0.0020257	–1.543
URBAN	–0.0476018	–0.957
ROAD	5.032872*	1.894
POSTOFFICE	0.0317485	0.979
DISTRESS	–1.613692	–0.601
N = 139		
Log likelihood = –45.23		

* = significant at 10 percent level; ** = significant at 5 percent level.

Table 2.4 Placement of BRAC: Estimated fixed-effects logit equation

Variables	Coefficients	*t*-values
PRIORCOMP	–1.767272**	–1.938
ELECTRICITY	0.0418247	1.431
LANDSIZE	0.0713646**	1.965
LITERATE	–0.094561*	–1.822
MARKET	0.009626	0.572
DENSITY	0.0001987	0.515
URBAN	0.0215618	1.394
ROAD	–0.3358834	–0.252
POSTOFFICE	0.0452446*	1.683
DISTRESS	–4.187979**	–2.592
N = 252		
Log likelihood = –98.88		

* = significant at 10 percent level; ** = significant at 5 percent level.

households with no land at all, which may be considered a greater credit risk. Therefore, the partially significant results of the variable LANDSIZE in the subsequent models in this chapter need to be interpreted in light of this variable being an indicator of the number of poor, marginal farmers, and not of the number of poor landless households overall.

The coefficient of DISTRESS is negative and significant at the 5 percent level. NGOs thus are less likely to place branches in high distress locations that are prone to natural disasters such as floods. Unlike the case of LITERATE, it appears that poverty considerations (which are attendant on high-level distress) are not strong enough to compensate for the negative effects arising out of providing credit services in risk-prone areas.[8] This result indicates the lack of preparedness of even large NGOs, such as BRAC and ASA, to cope effectively with covariant risks.

Overall, the estimated branch placement equation indicates that, although NGOs appear to respond to poverty, they are more likely to place branches in locations with favorable infrastructure. They also are less likely to place branches in counties with a high exposure to covariant risks.

NGO-Specific Equations

The equations describing *thana*-level placement of branches of ASA, BRAC, and Proshika are presented in Tables 2.3, 2.4, and 2.5. The explanatory variables are the same as in the combined regression in Table 2.2 except for one extra consideration: the response of an NGO to existing branches of other NGOs. On the one hand, NGOs may prefer to work in exclusive markets, with no competition or any other type of influences from other providers of similar services. On the other hand, existing branches of other NGOs in a particular location may signal to a potential entrant a community's positive social capital, which contributes to social receptivity and the successful operation of group-based programs; if this were the case, clustering of NGOs would be observed. How NGOs respond to existing branches of other NGOs is, hence, an empirical question. For this reason, a dummy variable PRIORCOMP—which takes the value 1 whenever

[8] Zeller, Diagne, and Mataya (1998) find that group-based financial institutions in Malawi also shy away from placing branch offices in areas exposed to covariant drought risk. This is presumably to reduce the risk of systemic loan default.

Table 2.5 Placement of Proshika: Estimated fixed-effects logit equation

Variables	Coefficients	*t*-values
ELECTRICITY	–0.0237360	–0.807
LANDSIZE	–0.0141334	–0.391
LITERATE	–0.0762417**	–2.205
MARKET	0.0161901	0.950
DENSITY	–0.0000959	–0.155
URBAN	0.0116141	0.822
ROAD	0.8796203	1.096
POSTOFFICE	–0.0078585	–0.296
DISTRESS	0.5198919	0.310

N = 308
Log likelihood = –93.42

** = significant at 5 percent level.

a branch of another group-based NGO in the *thana* existed prior to the placement of a branch of the NGO in question—is used in the regression equation.[9] For example, in the BRAC equation, the variable PRIORCOMP would equal 1 whenever a branch of a competing NGO existed in the *thana* prior to the establishment of the BRAC branch, and would equal 0 otherwise. Hence, the estimated coefficient would indicate the extent to which the existence of a competing institution operating in the area affects the decision to establish a branch. Unfortunately, data on the year of branch establishment were available for BRAC and ASA but not for Proshika. Therefore, only the regressions for BRAC and ASA account for the effect of competing institutions operating in the *thana.* Also, because BRAC's group-based credit operation was established well before ASA's (Jahangir and Zeller 1995), a subset of observations that include data only after 1987, when ASA's credit programs were fully initiated, was used in the analysis. The results of the estimated fixed-effects logit equations are discussed below.

- The coefficient of PRIORCOMP in both the ASA and BRAC equations is negative and significant, indicating that both ASA and BRAC are less likely to establish branches in locations that already have a "competitor's" branch.

- The coefficient of the percentage of population owning less than half an acre of land (LANDSIZE) is positive and significant at the 5 percent level in both the ASA and BRAC equations, but not in the Proshika equation. On the other hand, the coefficients of literacy rate (LITERATE) are negative in all three NGO-specific equations, though they are statistically significant only in the BRAC and Proshika equations. Note also that LITERATE is the only significant variable in the Proshika equation. The results of the NGO-specific equations thus are indicative of placement decisions responding to poverty conditions, especially BRAC's, which respond to both literacy and landholding levels. It is noted that the landholding variable is not significant in the combined NGO regression in Table 2.2.

- As for the transport and communication variables, POSTOFFICE is positive and significant at the 5 percent level in the BRAC equation, while ROAD is positive and significant, also at the 5 percent level, in the ASA equation. This is an interesting result because in the early 1990s BRAC was already planning eventually to conduct its own banking services, whereas ASA had no such plans and was likely to continue to use banking services offered by commercial banks. Probably for this reason, it is important for ASA to locate branches in areas with better access to transport infrastructure because it is here that rural banks are located. In fact, since 1998 BRAC no longer depends on rural banking branches, as it has established the Bank of BRAC as a subsidiary holding company.

[9] The variable PRIORCOMP considers the prior existence of the three largest NGOs in Bangladesh: the Grameen Bank, BRAC, and ASA. The reporting system of these organizations provides information on the year of establishment of their branch offices, differentiated by *thana.* The following reports were used to obtain these data: BRAC 1994; ASA 1994; Grameen Bank 1994.

- The coefficient for the DISTRESS variable, reflecting covariate flood and other risks of distress in the *thana,* is both negative and significant only in the BRAC equation.

- None of the other variables is significant in any of the equations. However, in the framework adopted here, this does not mean that the other variables are not considered at all in the placement decision. It just means that their net effect through the four factors (poverty, demand, cost, and riskiness) are not significantly different from zero.

Econometric Results: Client Outreach

Having examined branch placement outcomes for the three NGOs, the analysis now examines factors that influence the client outreach of *thana*-level branches. Apart from learning which poverty characteristics affect the density of outreach to clients, it is also of interest to examine whether any type of decentralization process characterizes the geographical distribution of service delivery. As Ravallion and Wodon (1997) point out, in programs targeted to the poor, it may be that headquarters makes a decision on where to place a branch, but subsequently leaves it up to local managers to determine the scale of operation of the established branch. Is this also the case with Bangladeshi NGOs? As an indicator of client outreach, the participation density (OUTREACH) is used. Outreach is measured as the number of participants in a specific program per 1,000 people in the *thana.*

The econometric specification of the outreach regression equations is similar to that of the branch placement equation in equation (2.6) except that the dependent variable OUTREACH is a truncated variable: client coverage is observed only in *thana*s that have branches. The procedure used to correct this sample selection bias is the two-stage Heckman procedure (1979) whereby a Mills ratio (LAMBDA) computed from the branch placement (logit) equation is used as an additional regressor in the participation density equation and appropriate adjustments are made in the computation of standard errors (Greene 1993). An additional variable, YEARS, is used in the outreach equation to control for the fact that client density is expected to increase with years of operation of the branch. YEARS is the number of years for which the branch has been in operation. However, because YEARS was not available for Proshika, the outreach equation was estimated using data only for BRAC and ASA, with YEARS computed as the sum of years that branches of both ASA and BRAC had been in operation in the *thana.* The combined outreach equation estimated for ASA and BRAC is presented in Table 2.6. The coefficients of only three variables are significant: YEARS, LANDSIZE, and DISTRESS.

- The coefficient of YEARS is positive and highly significant, indicating that NGO institutions have expanded their client base through time. Indeed, if YEARS were the

Table 2.6 Outreach equation: BRAC and ASA

Variables	Coefficients	*t*-values
YEARS	3.6693**	6.305
ELECTRICITY	0.83156×10^{-1}	0.219
LANDSIZE	–1.1799*	–1.782
LITERATE	0.22979	0.377
MARKET	–0.28682	–1.164
DENSITY	-0.77299×10^{-2}	–0.569
URBAN	-0.89751×10^{-1}	–0.283
ROAD	–0.62777	–0.023
POSTOFFICE	-0.84270×10^{-1}	–0.213
HOSPITAL	-0.15839×10^{-3}	–0.595
DOCTOR	-0.33360×10^{-4}	–0.462
DISTRESS	53.777**	4.175
LAMBDA	–5.4164	–0.629

$N = 121$
Log likelihood = –572.11
$F_{12,108} = 4.62$

* = significant at 10 percent level; ** = significant at 5 percent level.

only significant variable in the equation, this would have suggested that, once a branch is placed in a particular location, client coverage is not determined by local specificities. However, this is not the case, since at least two other area characteristics appear to influence outreach.

- Outreach is significantly higher in *thana*s that have a higher distress index. This result is completely opposite to that of the placement equation, which had indicated that NGOs disfavored areas with higher covariant risks. The result thus suggests that, though branches are less likely to be placed in such areas, once established, they have higher client densities. This appears plausible for three reasons. First, it is likely that demand for financial services is especially large in these backward, high-risk *thana*s, especially since these areas are inadequately served by the banking sector. Second, it may indeed be part of institutional policy to have higher levels of outreach in relatively more depressed areas. Third, the result may indicate partial decentralization in service delivery whereby local branch managers, once the branch is set up, exercise more control in outreach-related decision functions and can thus be more responsive to local conditions.

- Outreach is significantly lower in *thana*s with a higher proportion of marginal farmers, as shown by the negative coefficient of LANDSIZE. But it remains unclear whether this result is driven by supply or demand factors. A significant proportion of the projects financed by NGOs are off-farm microenterprises in rural trading, food processing, and handicraft production (ASA 1993; BRAC 1994; Dupuis 1994). If, indeed, financing off-farm microenterprises (rather than agricultural production) is one of the main strategies of the NGO institutions, then outreach would respond not just to the proportion of the population owning less than 0.5 acres of land, but also to the presence of landless wage laborers, who are likely to be even poorer.

- Although it was clear from the placement equations that branches are more likely to be established in *thana*s with better communication and transportation infrastructure, there is no evidence that, once a branch is established, client outreach also responds to infrastructure-related characteristics. This once again suggests discontinuities between the placement and outreach decision functions.

Table 2.7 Outreach equation: ASA

Variables	Coefficients	*t*-values
YEARS	1.8775**	2.360
ELECTRICITY	–0.26966	–0.782
LANDSIZE	–0.64975*	–1.803
LITERATE	0.14303	0.727
MARKET	–0.25883**	–2.018
DENSITY	0.64746×10^{-2}	1.137
URBAN	–0.16404	–0.786
ROAD	22.129	1.164
POSTOFFICE	–0.13857	–0.591
HOSPITAL	0.20427×10^{-3}	1.229
DOCTOR	0.58186×10^{-4}	0.896
DISTRESS	29.506**	3.129
LAMBDA	–6.2603	–1.365

$N = 30$
Log likelihood = –88.64
$F_{12,17} = 1.92$

* = significant at 10 percent level; ** = significant at 5 percent level.

The NGO-specific equations in Tables 2.7, 2.8, and 2.9 largely echo the findings of the combined equation in Table 2.6 and are therefore not discussed separately.

Conclusions

The analysis indicates that, even though the placement of branches of NGO institutions responded to poverty considerations, branches were more likely to be established in locations that had better access to transport and communication infrastructure. This is presumably out of a desire to reduce transaction costs in supplying financial services. Hence, it appears that NGO services are geared more towards the poor in relatively well-developed areas rather than towards the poor in more remote and less developed

Table 2.8 Outreach equation: BRAC

Variables	Coefficients	*t*-values
YEARS	11.729**	4.355
ELECTRICITY	0.24252	0.419
LANDSIZE	–1.3952	–1.252
LITERATE	0.75704	0.630
MARKET	–0.23829	–0.608
DENSITY	-0.25463×10^{-2}	–0.098
URBAN	–0.38024	–0.752
ROAD	–46.715	–1.053
POSTOFFICE	–0.20706	–0.373
HOSPITAL	-0.24825×10^{-3}	–0.689
DOCTOR	-0.14880×10^{-4}	–0.110
DISTRESS	27.334	1.366
LAMBDA	0.39479	0.039

$N = 69$
Log likelihood = –328.69
$F_{12,56} = 1.85$

** = significant at 5 percent level.

Table 2.9 Outreach equation: Proshika

Variables	Coefficients	*t*-values
ELECTRICITY	0.25219	0.343
LANDSIZE	–1.2036	–1.474
LITERATE	–0.15589	–0.256
MARKET	–0.67597*	–1.844
DENSITY	0.18198×10^{-1}	1.130
URBAN	1.0296**	2.511
ROAD	54.068	1.510
POSTOFFICE	–0.65262	–1.059
HOSPITAL	0.37920×10^{-3}	1.258
DOCTOR	-0.13099×10^{-3}	–1.479
DISTRESS	91.139**	5.294
LAMBDA	–16.524*	–1.846

$N = 50$
Log likelihood = –197.0947
$F_{11,33} = 2.04$

* = significant at 10 percent level; ** = significant at 5 percent level.

regions. The client outreach of existing branches, however, did not exhibit such a pattern. It actually tended to be better in less favorable and more "distressed" locations.

Greater concentration of branches in the better areas may in part be the result of a search for locations where the marginal impact of credit services is the greatest. Typically, accompanying constraints on production or income—for example, those imposed by the lack of markets, transportation, and communication—are likely to be less severe in areas that have good infrastructure. For example, loans for financing the production of highly market-dependent outputs, such as commercial crops, and other nonfarm microenterprises are less suitable for remote areas. Moreover, banking services become especially risky in remote areas where covariance in household incomes is likely to be higher because the rural economy tends to be less diversified. In such areas, the high repayment rates that are necessary to maintain NGOs' access to subsidized funds from various agencies are more difficult to achieve. Furthermore, the absence of rural banks limits financial operations in remote or poor locations because it increases the transaction costs of branch offices in disbursing loans and collecting savings that are channeled through the rural banking system. Hence, as suggested in the previous section, NGOs may follow a strategy of placing fewer branches in distressed areas, but with each of these branches serving a larger number of clients and achieving a high level of market penetration. The tension between targeting poverty and ensuring adequate financial performance is thus quite clear in the way the NGOs place their services spatially.

If simultaneous efforts to reach the poor, to maximize the marginal impact of services, and to minimize loan default introduce considerable tension in NGOs' service placement decisions, solutions for reducing this tension lie in innovative lending technologies that reduce transaction costs for both lenders and borrowers and increase the marginal returns on loans to the poor in disadvantaged locations. Four strategies are identified: (1) area-specific innovations and differentiations in financial products, (2) per-

formance and location incentives for branch staff, (3) a reduction in dependence on branch offices of commercial banks, and (4) donor support for the expansion of programs in remote and vulnerable areas.

1. Area-specific innovations and differentiations in financial products. The demand for different types of loan and savings services is affected by a range of area-specific factors. Reducing the cost of credit delivery and increasing the marginal impact of credit on the borrower depend on the extent to which credit and savings services are responsive to area-specific characteristics. However, it is currently the case that the financial products of nongovernmental organizations are usually standardized for the entire country. Although branch managers have sufficient flexibility in managing the headquarters-prescribed array of financial products, they do not have the flexibility to design new financial products or to introduce modifications to existing ones. Headquarters offices are unlikely to possess the full information necessary to evaluate the potentials and constraints of service branches. Hence, lower-tier institutions, such as divisional or district offices, should be given some flexibility and incentives to modify existing financial and other services or to introduce new services on a pilot basis. Such area-specific and demand-led product diversification might well alter the terms of the financial contract, including spatial differentiation of interest rates.

2. Performance and location incentives for branch staff. To improve outreach and cost recovery in bank branches, managers and their staff could receive special incentives for above-average performance. Successful innovations by branch or district managers, as mentioned above, could be especially rewarded. Furthermore, if, as seems likely, good managers choose well-developed areas, some form of compensatory payments could be given to managing staff or branch offices in remote areas where access to basic social services and economic infrastructure is lacking.

3. A reduction in dependence on branch offices of banks. Most financial NGOs depend on the proximity of a bank branch office where funds are deposited and withdrawn. An increasing distance from the NGO branch office to the nearest bank branch office raises the transaction costs of NGO operations and jeopardizes its financial performance. This limits the outreach of the NGOs to those areas where such bank branches exist or are close by. The Grameen Bank, one of the pioneers in microcredit, has chosen to maintain its own network of branch offices that perform all functions of money transfer between branches and regional offices and headquarters. BRAC followed this example in 1998 by establishing its own bank subsidiary. When other NGO-supported financial systems, such as ASA, reach a certain size, they may well follow this example. However, this would not be economical for the many smaller NGOs. A solution here may lie in the establishment of subcounty NGO units in remote areas to act as "NGO bank branches" by mediating between individual branch offices and commercial bank branches. Such units could well be supported by a consortium of social investors targeting a particularly vulnerable area, so that the unit services a number of NGOs simultaneously. Another possibility is mobile banking, in which remote branch offices are served by regional or district NGOs or commercial bank offices on a prescribed time schedule. In so far as managers with above-average skills prefer to locate themselves near towns, mobile banking would allow remote branches to be served by a cadre of qualified managers instead of being "trainee branches." For the borrower or saver, this system would provide access to financial services not previously available.

4. Government and donor support for the expansion of programs in particularly

remote and vulnerable areas. The placement of a branch office, the recruitment and training of its personnel, and the formation and training of groups require considerable up-front investments, especially in more remote or risk-prone areas. However, it is also likely that many remote *thana*s in Bangladesh that are currently not served have sufficient long-term demand to support the total operating costs. Hence, donor and government support to target selected remote areas and to accelerate expansion of the branch network in these areas could in many cases be justified, from both efficiency and equity perspectives.

CHAPTER 3

Group-Based Financial Institutions: Structure, Conduct, and Performance

Group-based financial services provided by NGOs in Bangladesh have gone a long way toward demonstrating that the task of financing the poor is indeed feasible. Lending on the basis of group liability and peer monitoring enables these institutions to overcome problems relating to screening, monitoring, and enforcement, problems that plague the more traditional formal institutions. This chapter analyzes the structure, conduct, and performance of credit groups supported by three NGOs in rural Bangladesh: Rangpur-Dinajpur Rural Services (RDRS), the Bangladesh Rural Advancement Committee (BRAC), and the Association for Social Advancement (ASA).

The first section presents a descriptive analysis of the structure of the groups, the process of their formation, and the changes in membership within groups over time. In the second section, the conduct of the groups is described. Activities and regulations are reviewed and compared between the programs. Next, we consider measures related to the performance of the microfinance institutions (MFIs). The third section discusses the performance of the groups, paying special attention to repayment rates. The analysis is based on a survey of 128 groups participating in credit and/or saving programs of the three institutions in four districts of Bangladesh: Dhaka, Rahshahi, Khulna, and Sylhet. The survey consisted of interviews with leaders of the group selected. The number of groups surveyed is presented by administrative division in Table 3.1. The fourth and final section presents secondary data on the costs and financial self-sufficiency of microfinance institutions in South Asia and other regions. Although a cost–benefit analysis is beyond the scope of this report, the data are useful in assessing the approximate extent to which the government or donors subsidize the group-based financial institutions in Bangladesh.

The Structure of the Groups

The structure of the groups is determined not only by the endogenous process of group formation itself, but also by regulations and procedures imposed by the financial institution concerned. All three institutions have rules related to the size of a group and the gender of its members and other eligibility conditions based on landownership and family income levels.

Table 3.1 The number and type of groups, by division

Division	Program		
	RDRS	BRAC	ASA
Dhaka	0	29	25
Chittagong	0	7	15
Rajshahi	19	12	7
Khulna	0	14	0
Barishal	0	0	0

Source: IFPRI 1994.

Notes: BRAC's credit program is known as the Rural Credit Project. ASA administers its credit and saving services through its Income Generation Through Credit Program. RDRS credit services are provided under the Marginal and Small Farms Systems Crop Intensification Project (MSFSCIP) in the Kurigram District of Bangladesh. The project links groups of borrowers to commercial and agricultural banks and receives support from the German Agency for Technical Cooperation (GTZ), the International Fund for Agricultural Development (IFAD), and the Government of Bangladesh. RDRS provides training and technical assistance to the groups.

Who are the principal agents who initiate the process of group formation? Generally, it is expected that institutional employees will play a greater role when a program is first introduced, since the idea of group formation is likely to be an alien concept in the community in the initial phase. However, one might expect more locally initiated groups over time if the NGOs' services are perceived to be beneficial by the people.

Table 3.2 provides information on the agent(s) who were crucial in initiating the process of group formation in the survey areas. It is clear that, overwhelmingly (especially in the case of RDRS), the initiation of group formation is the result of outreach efforts by NGOs. All programs use a cadre of specially trained motivators and organizers to assemble potential borrowers into groups. Of the programs surveyed, BRAC has the highest percentage of locally initiated cases. Not surprisingly, BRAC's credit programs have been around the longest in the sample areas (see below), indicating that success, as well as a period of "learning," are likely to be important necessary conditions for triggering local initiatives for group formation and participation. However, the substantial variation in local initiatives between ASA and RDRS indicates that the program character is also an important element determining group formation.

Table 3.2 The principal person promoting the creation of groups (%)

Principal person	Program		
	RDRS $n = 19$	BRAC $n = 62$	ASA $n = 47$
Agent of the NGO group	94.7	71.0	74.5
Member of the group	4.3	29.0	21.3
Other	0.0	0.0	4.3

Source: IFPRI 1994.

Table 3.3 shows that, whereas the mean age of the groups is about 5 years for RDRS and BRAC, it is only 2.8 years for ASA. The mean age is a function, among other things, of the length of time the program has been in place. The maximum age of the group reported may be taken as an indicator of this length of time, since a program that has been around longer is more likely to have older groups that were formed when the program was initiated. On this basis, it can been seen that BRAC (maximum = 12 years) has been in the sample areas for longer than either RDRS or ASA.

The variance of the age of the group is higher for BRAC than for the others. This

Table 3.3 Age of groups (months)

	Program		
	RDRS $n = 19$	BRAC $n = 62$	ASA $n = 47$
Mean	60	63	34
Variance	944	1,625	611
Minimum	12	0	0
Maximum	108	144	96

Source: IFPRI 1994.

Table 3.4 Relative frequency of relationships between members of the same group (%)

Type of relationship	Program		
	RDRS $n = 19$	BRAC $n = 62$	ASA $n = 47$
Have family relations	46.4	52.7	53.7
Member of the same club	4.8	3.1	0.0
Live in the same village	98.9	95.6	97.3
Live in the same hamlet (*para*)	91.0	80.3	85.3
Member of another NGO group as well	1.6	8.1	7.5

Source: IFPRI 1994.

is expected because BRAC's credit program was established earlier than the others, so that there is likely to be a greater number of groups at different stages of the "life cycle." Note that the minimum age for RDRS is 12 months, indicating that no new groups are currently being formed; the minimum is zero for both BRAC and ASA, indicating that these two NGOs continue to accept new groups.

Table 3.4 provides details on the relationship between members of the same group. In all three of the credit programs an average of nearly 97 percent of members of a particular group live in the same village, and most also live in the same hamlet. This implies that information exchange between members is facilitated and that the costs of monitoring peers can be expected to be relatively low. Nearly half the members are related to each other, which is a further reason that monitoring costs are likely to be low: relatives are likely to have greater knowledge of each others' assets, liabilities, and credit histories. The findings taken together imply that, during a group's formation, substantial importance is placed on known information about potential members.

Note that although simultaneous membership of two credit programs is not totally absent, its incidence was reported to be quite low. Most credit programs, some explicitly and others implicitly, discourage members from joining other similar programs at the same time.

Table 3.5 presents information on the dynamics of group size. Groups in the BRAC program are, on average, twice as big as those in RDRS and ASA. BRAC groups also had the highest degree of fluctuation in membership and, on average, decreased substantially in size in the five years prior to the survey (from 56.2 to 36.9). The high drop-out rates are also evident in ASA groups and, marginally, in RDRS groups. The high rates can be caused by client dissatisfaction (Meyer 2001) or by members expelling peers for loan defaults. Diagne (1998) points out that this type of limited group liability (where the defaulter is excluded but the rest of the group continues to have access if it is willing to pay for the defaulted loan) can be superior to joint and several liability as it is officially demanded by the three NGOs.

The characteristics of members in the three programs are shown in Table 3.6. BRAC and, especially, ASA target women, but this is not the case with RDRS. There is, however, a remarkable similarity in age, level of education, and level of landownership among members across the three programs. Most of the members are illiterate (around 80 percent), possess less than 0.5 acres of land, have the same family size, and are about the same age. The average area of cultivable land owned is slightly below 0.5

Table 3.5 Fluctuation of members, by type of group

	Program		
	RDRS $n = 19$	BRAC $n = 62$	ASA $n = 47$
Members now	17.1	36.9	18.1
Members five years ago	19.7	56.2	25.0
Members two years ago	16.6	49.8	19.9
Members quitting	2.3	17.8	4.7
Members joining	1.43	6.3	3.4
Fluctuation index[a]			
Mean	10.5	42.4	32.2
Coefficient of variation	152.5	55.4	89.9

Source: IFPRI 1994.

[a] Fluctuation index = [(number of members joining + number of members quitting) / members at creation] × 100.

Table 3.6 Characteristics of group members, by NGO program

	Program		
	RDRS ***n*** **= 325**	**BRAC** ***n*** **= 2,315**	**ASA** ***n*** **= 880**
Age of members (years)	35.2	33.3	32.0
Member is head of household (%)	67.1	22.8	13.8
Share of women (%)	28.6	86.4	98.0
Household size of member	4.8	4.8	4.8
Number of household members under 14 years of age	1.9	1.8	2.0
Cultivable land owned by household (decimal[a])	47.4	41.1	49.7
Occurrence of major sickness/death (%)[b]	15.7	18.3	20.9
Occurrence of crop loss (%)[b]	17.2	28.4	21.6
Occurrence of major social event (%)[b]	17.8	21.7	27.4
Level of education (%)			
Illiterate	76.3	79.7	81.0
Primary education	11.1	10.0	11.4
Secondary education	9.8	8.9	7.3
Higher education	2.8	1.4	0.3
Major occupation of member (%)			
Household work	27.1	64.4	66.4
Farmer	14.8	3.1	4.9
Large business	0.0	0.0	0.0
Small business	9.8	12.9	19.8
Salaried professional	2.2	2.3	0.2
Day laborer	36.6	8.2	2.8
Craftsman	1.2	3.0	4.4
Fisherman	0.6	0.8	0.0
Rickshaw puller	3.4	0.7	0.0
House servant	2.2	2.7	0.8
Other	2.1	1.6	0.7

Source: IFPRI 1994.

[a] 100 decimals = 1 acre.
[b] Over previous 18 months.

acres in the case of ASA and BRAC members. This is consistent with conclusions reached by a number of other studies. Morduch (1998b), using the data set of the study by Pitt and Khandker (1998), shows that 28 percent of Grameen Bank members and 21 percent of BRAC members had initial landholdings above 0.5 acres of land at the time of joining the program. Zaman (1997) finds that 28 percent of borrowers from BRAC are above the eligibility criteria.

Obviously, given their small landholding, most members derive a significant part of their income from nonagricultural sources. The percentage reporting farming as the main occupation is significantly higher for RDRS than for the other groups. This may be due to the fact that RDRS, supported by the Marginal and Small Farms Systems Crop Intensification Project (MSFSCIP), takes in members who have as much as 1.5 acres of land, whereas ASA and BRAC limit eligibility to households owning less than 0.5 acres. The fact that a large proportion of members—with the exception of RDRS—derive most of their income from nonagricultural sources has important implications for the financial institutions: because of the wider spectrum of activities in the nonagricultural sector, the incomes of group members are likely to be less correlated. This may have a positive impact on repayment performance,

Table 3.7 Ranking of functions of groups in the first year and in survey year (%)

	Program											
	RDRS $n = 19$			BRAC $n = 62$			ASA $n = 47$			All $n = 128$		
	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
Saving together												
In the first year	100	0	0	100	0	0	89	11	0	96	4	0
In 1994	90	13	0	55	44	0	53	47	0	59	41	0
Receiving credit												
In the first year	0	0	0	0	27	39	11	52	39	4	35	36
In 1994	11	44	0	45	55	0	47	53	0	41	53	0
Purchasing inputs or selling outputs together												
In the first year	0	0	0	0	0	2	0	0	0	0	0	1
In 1994	0	0	0	0	0	2	0	0	0	0	0	1
Investing jointly in business												
In the first year	0	50	0	0	0	4	0	0	0	0	4	2
In 1994	0	31	46	0	0	0	0	0	4	0	4	8
Receiving training in business management, production technologies, and marketing												
In the first year	0	20	57	0	12	14	0	2	0	0	9	13
In 1994	0	6	31	0	0	14	0	0	30	0	1	21
Receiving training in gender issues, human rights, and social awareness												
In the first year	0	0	43	0	7	14	0	2	19	0	4	14
In 1994	0	0	8	0	2	10	0	0	19	0	1	12
Improving education for children												
In the first year	0	0	0	0	0	0	0	0	0	0	0	0
In 1994	0	0	0	0	0	53	0	0	0	0	0	30
Improving education for adults												
In the first year	0	20	0	0	54	22	0	30	35	0	42	27
In 1994	0	0	8	0	0	8	0	0	33	0	0	15
Solving social problems												
In the first year	0	0	0	0	0	2	0	0	4	0	0	2
In 1994	0	0	0	0	0	6	0	0	0	0	0	3
Helping each other in crisis												
In the first year	0	0	0	0	0	2	0	0	4	0	0	2
In 1994	0	0	8	0	0	0	0	0	7	0	0	3
Other functions												
In the first year	0	10	0	0	0	2	0	2	0	0	2	1
In 1994	0	6	0	0	0	11	0	0	7	0	1	7

Source: IFPRI 1994.

since members can potentially bail each other out of household-specific income shocks.

The Conduct of Groups

The conduct of groups is influenced both by regulations stipulated by the NGOs as well as by regulations that are internally decided upon by the members. Table 3.7 not only presents the major functions of the groups, but also indicates how priorities have changed over time. Respondents were asked to rank functions in order of priority at two points in time: during the year of group formation and during the survey year. Most of the functions listed in Table 3.7 are externally stipulated.

Clearly, saving was the most important function during the first year of group formation in all three credit programs. This is because all three credit programs require

members to save initially. RDRS, for example, requires members to save during the training period, which takes place before the groups are certified as creditworthy. BRAC and ASA have similar conditionalities. There was a significant drop in the number of groups in ASA and BRAC that still regarded saving as the most important activity at the time of the survey in 1994. In the case of RDRS, although saving activities continued to be the main priority in 1994, groups saved only a minimum with the banks. Whenever savings increased beyond the minimum stipulated, they were withdrawn. This may indicate that saving is mainly the result of conditionalities imposed on loans by financial institutions and that households view it merely as part of the cost of obtaining a loan. It could also indicate that the interest rates offered by the financial institutions on savings are lower than yields on investment elsewhere.

Groups with RDRS do not borrow at all in the first year of formation, and no BRAC groups reported borrowing to be the most important activity. In contrast, 11 percent of ASA groups ranked receiving credit first. The relatively few credit transactions in the year of group formation indicate considerable screening and monitoring of group members prior to the initiation of a full-fledged lending program. This time may also be used by the members themselves to assess each others' creditworthiness. Training and adult education are important functions in the initial year of group formation, but their role generally declines over the years.

For the survey year, most groups indicated that both credit and saving were the most important services. Close to one-half of the groups belonging to BRAC and ASA ranked both credit and saving as most important. In the case of RDRS, saving continued to be the most important service; only 11 percent ranked credit first. However, even in the case of RDRS, 44 percent reported credit to be the second most important activity.

The Performance of Credit Groups: An Examination of Loan Default Rates

The performance of groups can be evaluated in two general areas: (1) the extent to which they are able to take advantage of the services provided by the financial institutions and use them to enhance their own welfare, and (2) their performance in complying with the contractual arrangements. The first area will be discussed in Chapters 4 and 5. This section will focus on the second area, and more specifically on the repayment performance of groups—in other words, the default rate of credit groups. Loan default is one of the most important determinants of banks' costs. Thus, the financial sustainability of NGO-based financial systems, like that of banks, rests on keeping the default rate below 10 if not below 5 percent.

Table 3.8 shows the historical repayment performance of all ASA, BRAC, and RDRS groups combined. In total, the 128 groups (and their respective subgroups of approximately 5 members each) received 1,725 loans of which 876 were due before the date of survey. The group leaders were asked about the repayment status, and the information provided was verified with the local NGO branch office. Overall, 85 percent of loans were reported to be fully repaid at the due date, but 15 percent were in arrears. The repayment rates are favorable when

Table 3.8 The number of group loans and their repayment rate

	Number	Percent
Total number of loans obtained	1,725	
Due after date of survey	758	
Repayment status not clear	91	
Due before date of survey	876	
Loans for which due date has passed		
Fully paid at due date	743	85
Partially paid at due date	133	15
Totally unpaid	0	0

Source: IFPRI 1994.

compared with those for government-owned commercial banks, which, in 1992, averaged only 19 percent.

Why Are the Repayment Rates of Group-Based Organizations So Good?

Fairly recent work in institutional economics has shed considerable light on why new group-based institutions have been able to perform so well, whereas others fail.

In group lending programs, the functions of screening, monitoring, and enforcement of repayment are, to a large extent, transferred from the bank's agent to the borrowers—the group members themselves. It is argued that groups accomplish these tasks better than banks and therefore achieve higher repayment rates. Stiglitz (1990) and Varian (1990) discuss these perceived advantages of collective action in the screening of loan applicants and monitoring of borrowers. The incentives for screening and monitoring the actions of peers arise from joint liability and the potential loss of access to future loans. The main argument is that, compared with socially and physically distant bank agents, group members can obtain information, at a low cost, on the reputation, indebtedness, and wealth of loan applicants, and about their efforts to ensure the repayment of a loan. Zeller (1994) shows that members of formal groups—like informal lenders—consider a peer's indebtedness in the informal market as a major determinant of credit rationing. Thus, group members are able to access complex and sensitive information, just like informal lenders. Groups may also have a comparative advantage in the enforcement of loan repayment. Whereas the formal lender usually has limited means to compel repayment from delinquent borrowers, group members have the potential to employ social sanctions or seize physical collateral (Besley and Coate 1995). In many rural societies, including those in Bangladesh, commercial bank agents have little leverage actually to go to a village and seize a defaulter's collateral. Furthermore, group members appear to be in a better position to assess the reason for default and to offer insurance services to those members experiencing shocks beyond their control, while imposing sanctions on willful defaulters.

It is important to note, however, that group lending may not ensure higher repayment rates at all times. First, because the risk of loan default by an individual is shared by their peers, a member may choose a riskier project than if it were an individual contract. This may occur because the individual borrower counts on other members to repay the loan so that they can secure future loans for themselves. Bratton (1986) analyzes the repayment record of credit groups in Zimbabwe and shows that expectations about peers' probability of repaying a loan influence the repayment behavior of an individual member: group loans performed better than individual loans in years of good harvest, but worse in drought years. Varian (1990) argues that such domino-like effects may be mitigated if group members are able to exclude potentially bad borrowers. Similar reasoning underlies the suggestion by Stiglitz (1990) and by Devereux and Fishe (1993) that individuals facing a similar magnitude of risks have an incentive to form groups.

However, there is also the problem of covariate shocks when the impaired repayment ability of some members coincides with the equally impaired capacity of other members to bail them out. The empirical analysis by Zeller (1998) suggests that individuals may attempt to exploit economies of risks by grouping with others whose income streams are negatively correlated with theirs. In other words, heterogeneity among members with respect to economic activities or risk exposure is potentially beneficial for repayment rates. The role of mutual intra-group insurance in credit groups is also confirmed by Sadoulet and Carpenter (1999), who find that risk heterogeneity among group members in Guatemala facilitates mutual help. The sustainability of group lending programs

in areas with high covariate risks depends on the ability of the financial intermediary to reschedule defaulting members' loans or to raise funds from borrowers during a normal year to cover such contingencies.

Lastly, there is the question of the optimal group size. Groups beyond a certain size may experience increased difficulty in exchanging information and in coordination. Further, the disincentives to reneging on contracts diminish, because each member may expect the effect of their action on other members to be diluted (Glance and Huberman 1994).

To sum up, although the empirical evidence suggests that the repayment records of group-based credit systems are much better than those of traditional commercial banks, economic theory still suggests situations where groups may actually perform poorly. From a policy point of view, it is important to know more about these types of situation, so that changes can be made in institutional design to minimize their impact.

Econometric Analysis of Default Rates

The dependent variable used in this study is the default rate (DEFAULT), defined as the percentage of debt in arrears at the date when complete repayment was promised. *DEFAULT* = 0 implies the complete repayment is on time, whereas *DEFAULT* = 100 implies complete default. There were no cases of the latter.

The default function is defined as follows:

$$DEFAULT = f(LNAMNT, \mathbf{X}, \mathbf{Z}, \mathbf{M}), \quad (3.1)$$

where *LNAMNT* is the loan size, **X** is a vector of group characteristics, **Z** is a vector of community characteristics, and **M** is a vector of lender characteristics. Note that this function is defined only for *LNAMNT* > 0. A function is specified with the property that $\text{Lim}_{\text{LNAMNT} \to 0}\ DEFAULT = 0$. This is a reasonable assumption, since defaults on small amounts of loans are indeed likely to be zero. When equation (3.1) is a linear function, this specification is achieved by interacting **X, Z, M** with *LNAMNT,* as in equation (3.2). A corollary of this assumption is that the effects of **X, Z,** and **M** on the default rate are made conditional on the loan size, that is,

$$\frac{\partial(DEFAULT)}{\partial \mathbf{X}} = g(LNAMNT),$$

and similarly for **Z** and **M.**

Also, because the dependent variable is truncated at zero (the group decides not to default), the estimating equation is specified more generally as (for the *i*'th group)

$$DEFAULT_i^* = \beta_1(LNAMNT) + (LNAMNT)\mathbf{X}\beta_2 + (LNAMNT)\mathbf{Z}\beta_3 + (LNAMNT)\mathbf{M}\beta_4 + e_i, \quad (3.2)$$

where

$$DEFAULT_i = 0 \qquad \text{if } DEFAULT_i^* \geq 0$$

and

$$DEFAULT_i = DEFAULT_i^*$$

if $DEFAULT_i^* > 0$.

In this framework, $DEFAULT_i^*$ is a latent variable observable only when it takes a positive value. Equation (3.2) is estimated by using the Tobit maximum likelihood technique (Maddala 1983), after correcting for heteroskedasticity, based on the method proposed by Greene (1993). This model was implemented on a subset of the data set that included only those transactions whose due date had passed at the time of the interview (n = 876 in Table 3.8) and for which information on **X, Z,** and **M** was completely available. These transactions totaled 868 loans given to the subgroups of all 128 groups.

Table 3.9 Determinants of default on group loans (Tobit)

Variable[a]	Mean	Unit	Coefficient	*t*–ratio
LNAMNT	12.031	taka	0.11×10^{-4}	4.922**
$(LNAMNT)^2$	25.5×10^7		-0.35×10^{-11}	–0.23
GROUPSIZE	12.5	number	0.18×10^{-7}	1.48
M_LAND	0.50	acres	-0.14×10^{-7}	–2.06**
VARLAND	1.62		-0.33×10^{-6}	–0.73
RATION	25.0	percent	-0.54×10^{-7}	–3.85**
$(RATION)^2$	5,140.0		0.46×10^{-10}	2.26**
RELATIVES	51.5	percent	0.19×10^{-7}	1.82*
SHOCKS	22.0		-0.46×10^{-7}	–2.68**
AG_PROP	0.3	percent	-0.56×10^{-5}	–2.88**
M_DRT	0.35	percent	-0.19×10^{-4}	–4.43**
PCFEMALE	87.0	percent	-0.57×10^{-7}	–6.73**
DUMINTD	0.30		0.15×10^{-5}	3.60**
LN_AGE	1.55	years	-0.35×10^{-7}	–0.15
DISTANCE	12.0	miles	-0.18×10^{-6}	–2.19**
SAMITY	0.23	number	0.97×10^{-6}	1.612*
FFW	0.23	dummy variable	-0.11×10^{-5}	–1.63*
IRRI	30.0	percent	0.18×10^{-7}	1.88*
PARTRATE	200.0	per í000	-0.69×10^{-8}	–3.86**
DUMRDRS	0.013	dummy	-0.18×10^{-5}	–0.26
DUMBRAC	0.71	dummy	0.41×10^{-5}	2.71**
Log likelihood = –438.27				

*= significant at 10 percent level; **= significant at 5 percent level.

[a] Each variable is interacted with loan size.

Regressors, Hypotheses, and Discussion of Results

Table 3.9 presents the results of the Tobit maximum likelihood estimation of the default equation. GROUPSIZE is defined as the average size of a subgroup in a group. If there are no subgroups, GROUPSIZE is equal to the size of the group. The hypothesis is that, the bigger the group, the more likely it is that information flows are imperfect between members. Hence, problems arising out of asymmetric information make monitoring and enforcement costly and less effective. Rates of default are therefore expected to increase with group size. The sign of the coefficient is positive as expected; however, it is insignificant at the 10 percent level.

LNAMNT and $(LNAMNT)^2$ are the value of the loan, in taka, and its square, respectively. Two factors are at work. First, the greater the loan size, the greater the probability of default. Second, the larger the loan, the higher is the borrower's cost of delaying payment [$= (1 + r + p)^* LNAMNT$], where p is the incremental penalty rate of interest. The second factor puts pressure on the borrower to reduce late payments. Consideration of this factor is important, because default in the sample appears to mostly consist of arrears that are eventually paid, even if they are paid late (as opposed to complete default). A squared term is included for this reason. The coefficient on LNAMNT is positive and significant and therefore supports the first part of the hypothesis. Though the sign of the coefficient on the squared term is negative, as expected, it is not significant.

M_LAND is the mean amount of land owned by the group. Since it reflects ownership of an important asset, it was expected that it would enhance the capacity of the group to repay loans on time. In the equation, the effect of landownership on the default rate is found to be negative and significant, as expected. This indicates the importance of even a *marginal* difference in the amount of land owned, since all three programs, especially BRAC and ASA, limit their lending to persons in households owning less than 0.5 acres of land. This result may be partly due to the high marginal productivity of land at such low levels.

VARLAND is the variance of the land owned by members of a particular group. This variable was used as one indicator of the portfolio diversity among members of a group. It was hypothesized that, the greater the diversity, the less the covariance of the incomes. Hence, a higher variance was expected to be associated with a lower rate of default, because it would enable a better pooling of risk among members. A similar measure of portfolio diversity was used by Zeller (1998) in relation to the repayment performance of credit groups in Madagascar. The coefficient is negative, but not significantly different from zero. The insignificance may also be due to the fact that both ASA and BRAC use a strict criterion for landowner-

ship of 0.5 acres or less as one of their eligibility requirements.

RATION is computed as the difference between the value of the loan applied for and the actual value of the loan received, expressed as a percentage of the total loan amount. A higher degree of rationing implies a higher level of unfulfilled credit demand. If this generates a greater concern for future borrowing privileges, groups can be expected to increase efforts to lower default rates. However, if the degree of rationing is too high, it is likely to render the loan amount more and more trivial (in comparison with the demands of the loan applicant), so that the lender may not be considered a worthwhile long-term partner. This may increase incentives to default at the margin. In the regression, the coefficients of both RATION and $(\text{RATION})^2$ are significant and carry the expected sign, supporting both hypotheses.

RELATIVES measures the proportion of members in the group that are related to each other. Since information flows are expected to be better among relatives, there would be less moral hazard associated with bailing out a relative who is unable to meet the repayment requirements. However, cultural factors are important and may limit screening and enforcement among relatives. The coefficient in the regression is positive and significant, implying that the latter effect outweighs the former. The social cohesion among related members seems therefore to work against high repayment rates. This is contrary to the result found by Zeller (1998) for credit groups in Madagascar, where more socially cohesive groups had lower loan default rates. The empirical analysis by Wydick (1999) on groups in Guatemala finds that improvements in repayment rates are associated with variables that proxy for the ability to monitor and enforce a group relationship, such as knowledge of peers' market transactions. He does not find evidence that social ties have an impact on repayment rates. To the contrary, members are sometimes found to be softer on their defaulting friends.

SHOCKS is the number of different types of shock (family emergencies, crop/income loss, major social events) in the previous 18 months, reported by members of the group. The coefficient is obviously expected to be positive. However, the results show that it is negative and significant. This is most likely because the SHOCKS variable contains only incomplete information on the shocks received by groups. As important as the number of shocks, it seems, is their severity; SHOCKS does not contain any information on magnitudes.

AG_PROP is the proportion of members reporting agriculture as the principal occupation. It is therefore another indicator of asset portfolio diversity within groups. An important eligibility criterion, used especially by ASA and BRAC, is that members do not possess land in excess of 0.5 acres. The base scenario is therefore one in which most members derive a major part of their income as agricultural wages or profits from off-farm microenterprise. As AG_PROP increases from this base scenario, incomes within groups tend to be less covariant, making it easier to bail out errant members. Further, since most households generally own very little land, those that report agriculture as their main occupation are likely to be tenant farmers who rent in land. This suggests that they have other borrowing privileges (for example, from a landlord) that may be used to meet the repayment schedule of group loans. In addition, because nonagricultural incomes tend to be more risky, especially from casual laboring, unwilling default, on the average, is likely to be greater for those groups that have a larger proportion of nonagricultural income. The result in the model supports this hypothesis, since the coefficient is strongly significant with a negative sign.

M_DRT is the group's mean dependency ratio (children as a proportion of total household size). In general, the higher the dependency ratio, the lower the capacity of the household to bear risks, since the consequences of adverse economic shocks are

more serious for children. Hence, *ceteris paribus,* the higher the dependency ratio, the less likely the default, because households with lower risk-bearing capacity would want to avoid the loss of future borrowing privileges. In other words, vulnerable households put a higher premium on maintaining access to future credit, and thus may be willing to make more sacrifices in order to repay the loan promptly. The coefficient in the estimated model is significant with the expected sign, supporting the hypothesis.

PCFEMALE is the percentage of group members who are female. The coefficient is negative and significant, suggesting that the default rate decreases as the share of female members increases. This result has been obtained in a number of previous studies (for example, Khandker, Khalily, and Kahn 1995; Rahman 1998; Hashemi, Schuler, and Riley 1996). According to these studies, the major reasons for the better repayment performance of women compared with men are the lack of alternative borrowing options among women, the lower mobility of women in Bangladesh, and the sociocultural pressures imposed especially on women. The first reason relates to the dynamic incentives to repay in order to maintain future access to credit. The second reason reduces the possibility of ex post moral hazard (Morduch 1999). In relation to the third reason, Rahman (1998) argues that women strive to repay their loans because a default would reflect poorly on the reputation of their household.

DUMINTD is a dummy variable that equals 1 when the group is initiated by an NGO agent and 0 otherwise. It may be hypothesized that screening is more effective within self-selected groups than within groups formed with the intervention of an outside agent. However, placing an a priori expectation on the sign is difficult and the interest here is to examine whether or not the manner in which the group was formed makes any difference. The coefficient is significant and positive, indicating that default rates are lower for groups that form on their own.

LN_AGE is the number of years between the time of borrowing a specific loan and the year of the survey. If each subsequent loan transaction reinforces the value of the credit service to the borrower, then one might expect default to decrease with each successive transaction. If this is indeed so, default on more recent loans would be lower than on ones in the past. However, if borrowers perceive the relationship to be only transitory, then one might expect the default on later loans to increase. Hence, the expected sign of the coefficient is ambiguous. The regression determines a negative coefficient, but it is insignificantly different from zero.

DISTANCE is a community-level variable computed as the mean distance from the village to nine types of service center, ranging from a post office to a health post to an agricultural input dealer. The closer the village is to the service centers, the less remote and more buoyant the local economy. Hence, default rates are likely to be lower. However, the coefficient is negative and significant and therefore does not support the hypothesis. A possible explanation is that, the more remote the village, the more value is placed on the credit services of the group programs because fewer alternatives are available (for example, loans from traders or employers); default rates are low to avoid the loss of future borrowing privileges from this important source. Wenner (1995) finds a similar result for Foundation for International Community Assistance (FINCA) groups in Costa Rica. Groups in better-off towns had higher default rates, presumably because locations with improved soft and hard infrastructure offer borrowers more or better alternatives for obtaining loans.

SAMITY is the number of self-help groups in the village (used here as a proxy for informal safety nets). The fewer the number of self-help groups, the greater the value of an outside agency that provides credit, savings, and insurance services for consumption smoothing. Therefore, lower default rates can be expected. This hypothesis is con-

firmed by the results: the coefficient is positive and just significant at the 10 percent level.

FFW is a dummy variable that equals 1 if the village has a Food for Work (FFW) program. Because FFWs are generally placed in relatively depressed areas, poverty-related unwilling default in such villages is likely to be relatively large. On the other hand, the more impoverished the village, the greater the value that is placed on continued access to these credit programs. Hence, the net effect on default is not clear. The coefficient is negative and significant at the 10 percent confidence interval, implying that the second effect is dominant—areas with above-average poverty rates can have better repayment records.

IRRI is the proportion of the cultivated area in the village that can be irrigated. Higher levels of irrigation not only increase the income levels of a village, but also reduce the riskiness of agricultural incomes. Hence, unwilling default is likely to be lower. The coefficient is positive and statistically significant, indicating that other factors associated with a higher level of irrigation—such as, perhaps, a more active informal credit market and better overall access to banking services—are leading to greater default in group-based programs and thereby outweighing the hypothesized positive direct effect of irrigation on group repayment.

PARTRATE is another community-level variable indicating the number of persons participating in group-based institutions per 1,000 inhabitants of the village. The higher the participation rate, the greater the demonstrated benefits of group-based lending in the community. This contributes importantly to the viability and perceived permanence of participating institutions. Hence, default rates are likely to be low as groups act to preserve transactions well into the future. The coefficient is negative and statistically significant.

Lastly, DUMRDRS and DUMBRAC are dummies for RDRS and BRAC, respectively, that indicate whether or not default rates vary across the institutions, even when all the other variables are controlled. The results show that there is no significant difference between ASA and RDRS, but BRAC has a significantly higher default rate than the other two, at least in the sample of the group selected for the analysis.

Conclusions from the Analysis of Default Rates

A number of conclusions can be drawn from the analysis. First, a heartening discovery in the repayment records of group-based financial systems is that, once the right institutional structures are in place, no major conflict need occur between prudent financial management and lending to the asset poor. The repayment rates of group-based systems are especially good in relatively remote communities, even in communities that are likely to have higher than average rates of poverty. The secret seems to lie not just in innovations in delivery systems that reduce the cost of screening, monitoring, and enforcing loan contracts, but also in the successful demonstration to clients in rural communities that group-based institutions are not a transitory phenomenon, that they address, through pro-poor product differentiation, their demand for financial services, and that it is worthwhile for them to invest in a long-term relationship with the group-based financial institution. In fact, it is precisely this type of realization among borrowers that has contributed to the building up of a critical mass of social capital that supports these institutions. Without this critical mass, the concept of joint liability would quickly flounder. Recent research by Diagne and Zeller (2001) in Malawi indicates that clients' perceived net benefit of access to future financial services and not joint liability mainly drives the decision to repay the loan.[10] Healey (1999) similarly concludes that ASA has shown that the group guarantee principle is not an in-

[10] See, also, Morduch (1999), who stresses the importance of dynamic incentives for good repayment performance.

dispensable element of credit delivery. In Bangladesh, mandatory group liability is not always strictly enforced. Instead, program agents often exclude the defaulting member, then renegotiate with the repaying members and reconstitute the group with new members (Hashemi and Schuler 1997a; Matin 1997).

Understanding the poor's demand for financial services is therefore essential. After all, borrowers have little incentive to build a lasting relationship with institutions that do not address their diverse demand for savings, credit, and insurance services (Rutherford 1998; Zeller and Sharma 2000; Zeller 2000; Meyer 2001). Also, when new activities or new technologies are introduced, it is important to take steps to ensure that they are properly understood by borrowers. NGO institutions' general practice of combining lending services with a range of social and entrepreneurial education is a good example.

A second conclusion is that the process of group formation should be made more endogenous to members themselves and less subject to external rules, a conclusion that Sadoulet and Carpenter (1999) also reach. The analysis indicates that factors such as diversity of the asset portfolio within groups significantly affect repayment rates. In general, potential members are in a better position to screen and select the right partners for group formation, giving due consideration to, for example, information asymmetry and the potential benefits of pooling risks and mutual insurance. A good mix of income activities, including agricultural production activities, is likely to lead to better repayments; hence, change in eligibility conditions that increase the maximum allowable landownership from the current low level of about 0.5 acres needs to be considered. ASA has recently started lending to households owning more than 0.5 acres through its Small Entrepreneur Development Program, which reaches 60,000 small entrepreneur clients who are classified as nonpoor but vulnerable (Healey 1999). ASA has done this in order to diversify its loan portfolio and to tap into new market segments that can expand its lending activities financed by member savings.

Finally, the experience of group lending shows that the basic principles of prudent banking have to be adhered to at all times. Delivering finance to the poor should not mean that loan evaluation or rationing are assigned a secondary place. On the contrary, loan size has to take into consideration the limited investment capacities and risk-bearing abilities of the rural poor. Indeed, the analysis showed that default rates increase with loan size. Hence, objective and realistic project evaluation is necessary prior to loan approval. Yet it is important to ensure that this evaluation is not based on traditional forms of gender or age bias. Such biases, however deep rooted, are totally misplaced.

The Sustainability of Group-Based Financial Institutions

High repayment rates, as analyzed above, by no means ensure that group-based financial institutions are able to cover their costs without any financial support by governments or donors or without eroding their equity capital over the years. Increasing the repayment rate has an administrative cost, and may also increase the social costs to the clients of the microfinance institution.

This section provides an overview of the concepts of sustainability, highlighting the different cost components of financial institutions, and then presents secondary data on the unit costs and levels of operational and financial sustainability of group-based financial institutions in the South Asian context. The results are linked in the concluding Chapter 6 with the household-level impact presented in Chapters 4 and 5.

Cost Components of Microfinance Institutions

In the literature on microfinance, sustainability is usually considered at two levels. Operational sustainability refers to the ability of institutions to generate enough revenue to cover their operating costs. Operating costs

here mean not the true opportunity costs of providing funds, but only the costs that the microfinance institution (MFI) actually incurs. If the MFI cannot cover its actual costs through revenues, it will incur financial losses that will need to be covered through depletion of its equity capital (if a donor or government does not eventually cover the losses). MFIs often receive capital at concessionary rates, as well as other forms of subsidies, from either the government, international or national donors, foundations, or nongovernmental organizations. In the following, these institutions are summarized under the term "social investor." Yaron, Donald, and Piprek (1997) distinguish the following types of subsidies that social investors provide to MFIs:

- an interest rate subsidy on funds borrowed at concessionary rates,
- the opportunity cost of the equity capital of the MFI,
- exemptions from reserve requirements,
- coverage of the costs incurred through loan losses and foreign exchange fluctuations (on loans issued under foreign currency), and
- free equipment or free training for staff.

To determine the real costs to society of maintaining or expanding an MFI, measuring its performance from the viewpoint of the social investor should take into account the above subsidies (Yaron 1992). Conventional financial accounting measures provide information only on operational sustainability, not on financial sustainability. The latter performance criterion explicitly seeks to account for the above subsidies by calculating the true costs to society incurred by the social investor. Financial sustainability measures the degree to which MFIs cover all of their direct and imputed social costs, and adjusts the above costs and subsidies to reflect real costs at market prices, including the social opportunity costs of capital.

The more recent concept of economic sustainability (Zeller et al. 1997; Zeller and Meyer 2001), however, seeks to go one step further by comparing the social benefits with the social costs incurred by the social investor in subsidizing the MFI. If the MFI achieves higher social benefits than social costs, it can be economically sustainable, although it may not be sustainable in the operational or even the financial sense.

Recent Evidence on the Financial Performance of Microfinance Institutions

The costs of 104 MFIs in the database of the Calmeadow Foundation assist us in illustrating the concept of economic sustainability. The major results are shown in Table 3.10 (Christen 2000). On average, the MFIs' costs of providing US$100 of credit are US$35.90. These costs have been adjusted for subsidies and valued at market prices. The average MFI has a financial sustainability ratio of 92.1 percent, implying that about 7.9 percent of the above costs (or US$2.84) need to be covered by social investors, that is, by subsidies; the remainder of the costs are covered by the interest and other earnings of the MFI itself.[11] If the net benefit to the average MFI client resulting from credit access of US$100.00 exceeds these social costs of US$2.84, the MFI is economically sustainable because it generates social benefits in excess of its social costs.

In the following, information on operational and financial sustainability is given for 104 MFIs located in developing and transformation countries worldwide (Christen 2000).

[11] This calculation does not include the social opportunity costs of capital that result from alternative uses of the capital by the social investor—for example, subsidizing road construction instead of MFIs. However, assumptions about these opportunity costs in any given country could be incorporated into the calculation of economic sustainability. We further assume that net social benefits or costs for nonclients are negligible. At least in theory, the net benefits to clients could be smaller than the social costs incurred by nonclients due to the MFI, so that the Pareto principle is violated.

Table 3.10 Performance indicators of microfinance institutions

	Number of observations (*N*)	Average outstanding balance per borrower (US$)	Percent of women borrowers	Poverty outreach[a] (%)	Administrative expense/ average loan portfolio (%)	Of which provision for loan loss	Average operational sustain-ability[b]	Average financial sustain-ability[c] (%)
Sustainability								
All MFIs	104	755	56.1	66.6	35.9	2.6	109.2	92.1
Financially sustainable	60	803	54.7	79.3	24.4	7.2	134.3	113.5
Regional size								
Large MFIs in Asia[d]	5	382	>80.0[e]	23.4	9.4	0.6	111.8	100.9
Small/medium in South Asia	6	102	67.6	24.1	17.1	1.5	92.4	70.3
Lending method								
Individual lending	43	1,269		109.6	19.7	2.1	126.9	105.2
Group-based lending	33	381		33.2	47.0	2.6	95.4	83.5
Village banking	22	126		162.0	48.6	2.0	96.9	81.3
Target groups[f]								
Low end	43	131		15.7	54.7	2.2	96.5	79.3
Broad	47	857		59.8	23.1	2.8	116.9	100.5
High end	8	2,833		329.9	13.7	1.3	126.9	100.9
Age								
3–6 years	22	419		55.3	47.0	1.6	99.4	86.3
7+ years	58	651		59.4	27.3	2.7	122.0	101.7

[a] Poverty outreach is defined as the average outstanding loan balance per client divided by GNP per capita. A
[b] Operational sustainability = [(operational income)/(interest plus loan loss and administrative expense)].
[c] Financial sustainability is like operational sustainability, but costs include adjustments for subsidies received.
[d] This group is composed of five MFIs: ASA, BRAC, BAAC of Thailand, BRI of Indonesia, and Bank Dagang of Bali, Indonesia.
[e] Greater than 80 percent for ASA and BRAC combined.
[f] Low end: MFIs for which the average loan balance is less than US$150 or less than 20 percent of GNP per capita; broad: 20–149 percent of GNP per capita; high end: 150 percent or above.

Because of the lack of cost data for the three group-based financial institutions, Table 3.10 provides an overview of the costs of all the MFIs, as well as a breakdown of large MFIs located in Asia. ASA and BRAC are two of the five MFIs in this subgroup. From the evidence presented in other reports discussed below, ASA is likely to be financially sustainable and BRAC may have a financial sufficiency ratio of above 90 percent. As a comparative group for RDRS, the small/medium MFIs in South Asia are chosen. However, RDRS is not part of this group. Table 3.10 also presents indicators for poverty outreach and administrative costs (adjusted for subsidies and loan loss provisions) as a percentage of the average loan amount. At the outset, it should be noted that this sample represents MFIs with above-average performance. Nevertheless, the figures show that 60 out of the 104 MFIs provide financial services on a sustainable basis. In other words, they do not depend on subsidies in carrying out their business while preserving their equity capital in real terms.

The first row in Table 3.10 refers to all 104 MFIs in the sample. The average loan size here is US$755.00, and 56.1 percent of borrowers are women. An indicator of the depth of poverty outreach is the average loan size divided by gross national product (GNP) per capita, expressed as a percentage. The average for all MFIs is 66.6 percent, implying that the average loan size is about two-thirds of per capita GNP. Administrative expenses, adjusted for the real cost of

subsidies and for loan loss provisions, are 35.9 percent of the average outstanding loan portfolio. In other words, it costs roughly 36 cents to provide a loan of US$1.00 for one year. Of these administrative costs, only an absolute 2.6 percent (or 2.6 cents per dollar of outstanding loan balance) is for loan loss provisions, perhaps indicating the very successful loan repayment rates in this sample of 104 MFIs. The average operational sustainability is 109.2 percent, implying that revenues exceed costs by 9.2 percent when using costs as the basis of comparison. If revenues and costs are adjusted for subsidies as well as for loan loss provisions (see Christen 2000), the financial sustainability falls to 92.1 percent. In other words, about 7.9 percent of costs valued at social prices need to be covered by subsidies in order for the MFIs to break even (that is, US$2.84 of a total cost of US$35.90 per US$100.00 of outstanding loan balance). If these costs were not covered by subsidies, in the short run the MFI would be forced to deplete its equity capital (adjusted for inflation), and, in the long run, it would eventually go out of business.

The five large MFIs in Asia are ASA, BRAC, Bankya Rakyat Indonesia, the Bank for Agricultural Credit and Cooperatives (BAAC) in Thailand, and Bank Danang in Bali, Indonesia. BAAC and BRI are successful state-owned MFIs; Bank Danang is a commercial bank catering for a poorer clientele. The average loan size is US$382, which is much larger than the averages for ASA and BRAC. In terms of poverty outreach, this group reaches a much poorer clientele than the average of all MFIs. Differentiation by the poverty level of the target group shows that administrative costs per dollar lent, and therefore operational and financial sustainability, decline with increasing poverty level. Despite this, the large MFIs in Asia achieve financial self-sufficiency of 100.9 percent. In other words, their operations do not require any subsidies. This outstanding performance is likely to be a result of including the very successful BRI (Charitonenko, Patten, and Yaron 1998). In recent years, ASA has reached financial sustainability, according to its own statements provided to the Credit and Development Forum in Bangladesh (CDF 1998). Other analyses (Berthold and Ledgerwood 1996; Rutherford 1995; and Alamgir 1997) support the view that ASA is financially sustainable and fully covers its operational costs in the mature branches. Thus, for the group of large MFIs in South Asia as a whole, the data suggest that social investors no longer need to subsidize current operations. The MFIs are therefore economically sustainable if their clients generate any benefit from borrowing (however small), assuming nonclients are not made worse off by the MFIs.

In contrast, smaller and medium-sized MFIs in South Asia (to which RDRS belongs) achieve a financial sufficiency ratio of only 70.3 percent—they may not have adequately exploited economies of scale and scope. Thus, about 29.7 percent of the administrative costs of these MFIs need to be covered by subsidies. Their administrative expenses amount to 17.1 percent of the outstanding loan portfolio (Table 3.10). Thus, on average, these smaller MFIs in South Asia spend about 17 cents per dollar lent, of which 5 cents need to be covered by the social investor. In order to be economically sustainable, the MFIs' clients would need to generate a net benefit of more than 5 cents for an additional US$1.00 of credit access. In Chapter 5, we compare these cost levels with the income benefits arising from credit access.

From the perspective of a social investor concerned about transferring financial resources to the poor, a useful alternative way to look at cost efficiency is to compare the costs of transferring money through MFIs with the costs of other forms of income transfers. In his study of the cost-effectiveness of the rural food rationing program, Ahmed (1993) finds that the fiscal cost of transferring US$1.00 of income is US$6.55. He compares this figure with the cost efficiencies

found in other income transfer programs reviewed by Garcia and Pinstrup-Andersen (1987). The most cost-effective program, the pilot food price subsidy scheme in the Philippines, required a fiscal cost of US$1.19; the highest cost was US$2.38 for the preschool feeding program in Brazil. The income transfer programs compared by Ahmed (1993) do not require the recipient to repay the transfer of US$1.00. Thus, the costs include the loss of the principal. If one assumes, for the purposes of comparison with a loan scheme, that the recipient repays the transfer after one year, and that this repayment does not create any transaction costs to the state, the food price subsidy scheme would still incur costs of US$0.19 to the social investor. Comparing this with the social costs of US$0.05 for every dollar lent by small MFIs in South Asia, US$0.00 for large MFIs in Asia, and US$0.28 for all 104 MFIs in the database shows that MFIs could be quite cost-efficient in transferring resources to the poor if they reached a clientele as poor as that of the food price subsidy scheme. Admittedly, this comparison is somewhat crude, and ignores a number of issues, such as targeting efficiency, leakage to the nonpoor, and the need to discount costs (assuming continued re-lending of US$1.00 for an indefinite period to match the one-time capital transfer of US$1.00). Nonetheless, it suggests a nonnegligible potential of the established and successful MFIs to be comparatively cost-efficient in transferring resources to the poor.

The data from the 104 MFIs presented in Table 3.10 indicate that a considerable number of MFIs in the developing world are able to cover their costs on their own, or that the subsidies they require are not unreasonable compared with the potential benefits or compared with the costs of an alternative capital transfer. However, two disclaimers to this positive statement need to be mentioned. First, most, if not all, of the 104 MFIs in this table will have required subsidies in the phases of their formation and expansion, which may date back more than 20 years. These past subsidies are not taken into account in the calculation of the subsidy levels, referring only to more recent annual data. Second, the 104 MFIs in this data set are among the most successful in the developing world; many thousands are too small or too inefficient even to come close to the self-sufficiency ratios presented in Table 3.10. In other words, the majority of MFIs may well have transfer cost efficiency ratios as weak as or even worse than those in the income transfer programs reviewed by Ahmed (1993).

CHAPTER 4

Household Participation in Financial Markets

This chapter describes and analyzes the pattern of household participation in group-based financial institutions and its effect on access to credit, as measured by the concept of credit limits (Diagne, Zeller, and Sharma 2000; Diagne and Zeller 2001). The first section provides a descriptive overview of the socioeconomic characteristics of participant and nonparticipant households. This is followed by an econometric analysis of the determinants of program participation. The third section focuses on the nature of loan transactions, and the chapter concludes with the determinants of the credit limits that are available to households from formal lenders.

Overview of the Socioeconomic Characteristics of Households

Table 4.1 presents the characteristics of households, differentiated by their status of participation in NGO credit programs and by landownership. In order to facilitate comparison between program households and control households (the latter being those that are eligible for NGO credit programs because they have less than half an acre of land), participating and nonparticipating households have been subgrouped along the cutoff for program eligibility of half an acre of land owned.[12]

The average household size of the entire sample of 350 households is 5.1 persons. This is slightly lower than the average rural family size, as found by the Household Expenditure Survey (HES) of 1991/92, which reports an average rural family size of 5.4 persons (BBS 1995). Family size in rural Bangladesh is higher in high-income households than in lower-income households. This relationship is also suggested by data in Table 4.1 that show an average household size of 6.1 persons for nonparticipant households owning above 0.5 acres of land, compared with 5.1 and 4.1 persons for NGO participants and for eligible nonparticipants, respectively.

The NGO participant households have the highest proportion (8.9 percent) of female-headed households, compared with eligible nonparticipants (6.2 percent female headship) and with the wealthier nontargeted household group (1.6 percent). These figures suggest that

[12] The data in Table 4.1 and all other descriptive tables in Chapters 4 and 5 have been weighted to correct for the choice-based sampling procedure.

Table 4.1 Socioeconomic characteristics of sample households, by program participation

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All
Number of sample households	43	40	41	124	105	97	129	350
Household size	5.3	5.0	4.9	5.0	5.1	4.1	6.1	5.1
Sex of household head								
Male (%)	95.3	85.0	92.7	91.1	91.4	93.8	98.4	93.9
Female (%)	4.7	15.0	7.3	8.9	8.6	6.2	1.6	6.1
Years of schooling, household head	2.2	1.5	1.4	1.7	1.5	1.1	5.1	2.4
Years of schooling spouse of household head	0.7	0.8	0.6	0.7	0.6	0.6	2.2	1.1
No schooling, adult male (%)	55.4	56.2	55.1	55.6	58.1	62.2	27.3	53.3
No schooling, adult female (%)	67.8	62.3	66.3	65.5	69.6	71.5	51.6	66.3
Dependency ratio[a]	0.41	0.34	0.40	0.38	0.40	0.33	0.34	0.37
Total land possessed by the household (decimals)[b]	23.5	23.8	22.9	23.4	14.6	11.9	266.4	91.4
Aman 1993 cultivated area	2.8	6.0	7.9	5.4	2.9	2.2	148.9	48.1
Boro 1994 cultivated area	7.0	8.3	6.5	7.3	3.2	2.7	142.5	43.9
Primary occupation of household head (%)								
Crop/animal production	9.3	7.5	26.8	14.5	13.3	16.5	73.6	35.3
Wage earner	20.9	47.5	46.3	37.9	39.0	39.2	1.6	24.4
Craftsman	2.3	2.5	0.0	1.6	1.9	3.1	0.8	2.3
Off-farm microenterprise	48.8	17.5	22.0	29.8	31.4	21.6	4.7	21.0
Salaried professional	2.3	10.0	2.4	4.8	3.8	3.1	13.2	5.8
Other	16.3	15.0	2.4	11.3	10.5	16.5	6.2	11.1

Source: IFPRI 1994.

[a] Dependency ratio = [number of dependants (age =10 years and =60 years) / total members].
[b] All land possessed by the household (including homestead, *khashland* or land received temporarily, and land obtained as a temporary gift). Land area is expressed in decimals (1 acre = 100 decimals).

the NGO programs successfully reach out to female-headed households. The income-generating opportunities of female-headed households are very limited, owing to their low levels of physical and human capital. Consequently, female-headed households are among the poorest in rural Bangladesh. An IFPRI survey conducted in rural Bangladesh in 1991/92 on targeted food intervention programs showed that about 28 percent of the beneficiary households in the Vulnerable Group Development (VGD) program were headed by females (Ahmed 1993). According to the 1991/92 HES, 7.6 percent of rural households in Bangladesh are female headed (BBS 1995). However, the 1988/89 HES reported a much lower proportion (4.4 percent) of female-headed rural households (BBS 1991).

The average years of schooling of the household head (mostly male) of the NGO participating households is very low (1.7 years), and even lower for the spouse (0.7 years). Among NGO households with less than 0.5 acres, 58 percent of adult male household members and 70 percent of adult female members never attended school. These low levels of education are in stark contrast to the much higher education level of non-eligible nonparticipants, whose average years

of schooling are 5.1 and 2.2 years, respectively, for head and spouse. The findings of two previous IFPRI surveys conducted in Bangladesh on targeted food intervention programs in 1991/92 and in 1994 suggest that, among adult household members, 69 percent of the males and 90 percent of the females in the VGD program, 72 percent of the males and 92 percent of the females in the Rural Maintenance Program (RMP), and 52 percent of the males and 75 percent of the females in the Food for Work (FFW) program never attended school (Ahmed 1993; Ahmed and Shams 1994).

The size of landownership is the most important determinant of household welfare in the land-poor and predominantly agrarian society of Bangladesh. Ravallion (1989) shows a strong positive correlation between income and landholding in rural Bangladesh. Table 4.1 shows that the average area of land possessed by the entire sample of NGO households is, at 23.4 decimals, almost double the area of land possessed by the eligible nonparticipants. Of the 124 NGO households, 105 households had less than 0.5 acres of land at the time of the survey, whereas 19 households exceeded this cutoff. About half of the latter households had increased their landholdings since joining the NGO program, while the other half were accepted into the program despite not meeting the criteria for maximum ownership of land. Table 4.1 further shows that the average area of land possessed by the participants across the three NGO groups is very similar. The noneligible nonparticipants, in contrast, own, on average, 266.4 decimals, which is about 11 times more land than the NGO households own. These figures suggest that, although the NGOs reach out to very poor people, and usually are successful in accepting only households owning less than half an acre, they seem predominantly to attract or enable the participation of the better-off within that group of very poor people. In other words, the ultra-poor fail to participate proportionately in NGO-based credit schemes.

Since both participants and eligible nonparticipants possess very little cultivable land, wage-earning is by far the major occupation of the heads of these households. However, off-farm microenterprise is the primary occupation of considerably more participating household heads than of nonparticipating household heads. This suggests that the NGO schemes are indeed successful in achieving their declared objective of empowering poor women and men to start up their own microenterprises.

Land Use

The cropping seasons in Bangladesh are generally classified by the period from sowing to harvest of the three rice crops: *Aus* (March–April to July–August), *Aman* (July–August to November–December), and *Boro* (December–January to April–May). The *Aus* season is also termed Kharif I, the *Aman* season Kharif II, and the *Boro* season the Rabi season. The main crops grown during the *Aus* season are *Aus* rice and jute; during the *Aman* season, *Aman* rice; and during the *Boro* or Rabi season, *Boro* rice, wheat, pulses, oilseeds, and potatoes. The average cropping intensity in Bangladesh is about 200 percent.

The use of land by participant and nonparticipant households during the 1993 *Aman* rice season is shown in Table 4.2. *Aman* rice is by far the most important crop cultivated in Bangladesh, accounting for about 70 percent of the net arable area in the country. In recent years *Aman* rice has accounted for about 56 percent of the total rice area and 51 percent of total rice production.

Average farm sizes, as measured by the area of cultivated land, are extremely small for both NGO households and eligible nonparticipants. Farm sizes are relatively higher in the upland than in the lowland across all participants and nonparticipants. Mainly the traditional variety of broadcast *Aman* (also known as the "deep-water" *Aman*) rice is grown in the lowland area during the *Aman* season. Both the local and the modern or high-yielding varieties of transplanted *Aman* rice

Table 4.2 Land use by households in the 1993 *Aman* season (decimals)

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All
Lowland for *Aman* 1993								
Owned and cultivated	1.1	1.6	2.4	1.5	0.7	0.3	49.2	18.1
Owned but fallow	1.7	1.4	0.4	1.2	0.7	0.9	21.6	7.3
Owned but rented out	4.2	0.3	0.0	1.6	0.3	0.8	29.8	10.3
Rented in	0.8	7.5	15.1	7.7	8.7	0.6	3.5	3.9
Total lowland area cultivated by household	1.9	9.1	17.5	9.2	9.4	1.0	52.6	22.0
Total arable lowland owned by household[a]	7.0	3.3	2.8	4.3	1.7	2.0	100.6	35.7
Upland for *Aman* 1993								
Owned and cultivated	1.7	4.4	5.5	3.9	2.2	1.9	99.7	30.9
Owned but fallow	5.8	3.9	3.2	4.3	2.8	2.1	46.4	13.8
Owned but rented out	3.9	6.7	4.5	5.0	1.4	1.2	42.6	12.6
Rented in	2.5	11.9	14.7	9.6	10.5	6.5	10.9	8.3
Total upland area cultivated by household	4.3	16.3	20.2	13.4	12.7	8.4	110.6	39.2
Total arable upland owned by household[a]	11.4	15.0	13.2	13.2	6.4	5.2	188.7	57.3

Source: IFPRI 1994.

Note: 1 acre = 100 decimals.

[a] Total arable land owned by household includes land with temporary user-rights (*khashland* or land received temporarily).

are cultivated in the uplands during the *Aman* season.

Participants with less than half an acre cultivate much more land than they own in both lowland and upland areas. In contrast, the eligible nonparticipants (the control group) cultivate less land than they own. The most common form of tenancy relationship in Bangladesh is sharecropping. Sharecropping terms are usually 50 percent of the crop at harvest-time. Landowners generally do not provide agricultural inputs or share in the cost of inputs.

Household Assets and Liabilities

The value of the total household assets of NGO households owning less than half an acre of land is substantially higher (31 percent) than that of the eligible nonparticipants (Table 4.3). In general, households hold their wealth mostly in land. In spite of very small landholdings, participants' and eligible nonparticipants' most important assets are their land and their labor.

NGO households have much higher savings deposits than nonparticipants. The average monetary savings of NGO members are about five times higher than the savings of eligible nonparticipants. However, most of the monetary savings of the NGO members are compulsory savings that they are required to deposit each week. Thus, the value of members' savings rises with their length of membership.

The participating NGO households have a considerably higher ratio of debt to asset value than do nonparticipants. Debt to the formal financial sector constitutes the largest share of participants' liabilities. Overall, the information provided in Table 4.3 indicates strong potential demand by participants for credit and savings options, particularly among

Table 4.3 Mean value of assets and liabilities of households in Round 1

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All
Number of sample households	43	40	41	124	105	97	129	350
Assets (taka)								
Total 1994 asset value	34,795	33,499	34,603	34,314	27,202	20,775	273,403	105,832
Total 1994 asset value per capita	7,603	7,723	7,711	7,677	6,074	5,559	48,112	28,744
Total 1994 asset value AE[a]	10,168	10,474	10,316	10,316	8,195	7,186	63,040	37,706
Share of asset categories in total asset value (%)								
Land[b]	47.9	49.0	48.8	48.6	43.7	50.8	79.3	57.8
House	16.7	12.9	7.4	12.4	13.3	18.3	8.2	6.7
Livestock and poultry	4.0	12.8	10.7	9.1	9.9	7.8	3.7	13.0
Agricultural production durables	4.7	3.3	5.0	4.4	4.7	4.3	2.3	4.1
Nonagricultural production durables	1.2	0.7	1.7	1.2	1.3	0.4	0.2	0.7
Consumption durables	8.4	5.8	7.0	7.1	7.8	9.2	2.5	6.5
Food stock	1.2	1.0	1.9	1.3	1.4	1.2	1.7	1.4
Jewelry	1.5	1.4	1.0	1.3	1.4	1.3	0.8	1.1
Savings deposit with NGO/banks	5.6	3.5	5.7	5.0	5.7	0.9	0.1	2.3
Savings deposit in informal sector	1.0	0.5	0.4	0.6	0.7	0.3	0.3	0.3
Loan amount lent	7.6	9.3	10.3	9.0	10.3	5.4	1.0	6.1
Liabilities								
Value of outstanding debt (taka)	5,235	4,460	4,918	4,880	4,183	1,180	9,312	4,926
To formal sector (%)	58.5	64.0	64.6	62.2	68.8	14.3	18.5	30.4
To friends and relatives (%)	20.5	19.4	19.2	19.7	18.5	51.4	37.8	34.1
To shopkeeper and other informal sector (%)	21.1	16.6	16.3	18.1	12.7	34.3	43.7	35.5
Net worth (taka)	29,560	29,038	26,686	29,433	23,019	19,595	264,092	100,906
Ratio of debt to total value of asset (%)	15.0	13.3	14.2	14.2	15.4	5.7	3.4	4.7

Source: IFPRI 1994.

Note: Round 1 took place in June and July 1994.

[a] AE stands for adult equivalent.
[b] Land excludes the value of *khashland* (or land received temporarily). It also excludes plots that are not yet inherited and are only temporarily shared with family members. Such land cannot be mortgaged, because the household does not possess the land.

poorer participants. It is noteworthy that participants borrow more in absolute terms from friends and relatives and from other informal sources than do nonparticipants. As indicated previously, this may be because members borrow to meet the strict weekly repayment schedules of NGO programs and that NGO credit is a poor substitute for short-term informal credit.

Household Income

The disposable income of households is made up of net factor income, which is directly derived from the factors of production (land, labor, and capital), and nonfactor income. The components of factor income are net income from crop production (that is, total revenue minus the costs of production), net income from livestock production, wages and

Table 4.4 Mean household income in 1994 (*Boro, Aus,* and *Aman* seasons), by program participation

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All
Total annual household factor income (taka)	20,725	19,301	17,175	19,079	18,854	14,167	34,301	21,857
Factor income per capita	. . .	. . .	. . .	. . .	. . .	. . .	. . .	4,350
Factor income per AE[a]	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5,788
Share of per capita factor income (%)								
Crop production	3.2	6.0	25.9	11.0	9.7	11.4	50.7	28.5
Animal production	2.5	12.4	8.3	7.5	7.5	5.6	6.1	5.6
Wage and contract labor	18.1	52.5	33.8	34.1	36.7	44.1	19.8	26.1
Self-employed off-farm enterprises	73.5	27.4	30.1	45.3	43.8	38.1	15.9	35.8
Renting land out	0.3	0.2	0.0	0.2	0.1	0.4	7.2	2.8
Lending loans	2.4	1.4	1.9	1.9	2.2	0.6	0.2	1.2
Nonfactor income per capita (taka)	2,914	2,833	3,042	2,931	2,879	1,761	5,833	3,381
Share of per capita nonfactor income (%)								
Divestment of animals[b]	9.3	19.7	19.5	16.1	16.9	19.2	14.4	15.2
Divestment of land[c]	5.4	1.8	1.5	2.9	2.2	0.4	6.4	4.0
Divestment of other durables[c]	5.0	1.3	2.4	2.9	2.5	2.8	5.0	4.3
Income from gifts and remittances received	3.5	2.8	5.8	4.1	4.4	8.6	12.4	8.7
Decrease in food stocks	11.4	7.4	20.4	13.3	12.7	19.1	27.5	21.2
Decrease in savings	3.2	3.6	3.4	3.4	3.7	7.2	6.8	5.6
Decrease in loan amount lent	5.0	2.9	9.3	5.8	5.8	7.6	1.6	4.8
Borrowed amount	57.2	60.6	37.7	51.5	51.9	35.2	25.9	36.1
Total disposable income per capita (taka)[d]	7,423	7,022	6,814	7,090	6,987	5,530	11,496	7,728

Source: IFPRI 1994.

Notes: Differences in nonfactor income and disposable income between participants with less than 0.5 acres and eligible nonparticipants are statistically significant at the 0.01 level. The difference in factor income between these two groups is not significant. Levels of significance are based on the *t*-test.

[a] AE stands for adult equivalent.
[b] Divestment of animals = decrease in value of animal stocks from December/January 1994 to December/January 1995.
[c] Divestment of assets = decrease in value of land or other durable assets for production or consumption (including housing) from December/January 1994 to December/January 1995.
[d] Disposable income = [(factor income—cost for taking loan) + nonfactor income].

income earned as contract labor, income from self-employed off-farm activities, net income from renting out land, and interest earned from lending. Nonfactor income includes income from sales of livestock, income from sales of production and consumption durables; income from sales of land; net income from gifts (that is, the value of gifts received minus the value of gifts given) and remittances; depletion of food stocks; cashed savings; and net borrowing or lending.

Table 4.4 presents estimated average incomes for participants and nonparticipants. Per capita factor and nonfactor incomes are higher for NGO households than for eligible nonparticipants. The differences in nonfactor income and disposable income between NGO households owning less than 0.5 acres

Table 4.5 Mean monthly household expenditure in 1994

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
Number of sample households	39	40	40	119	101	95	128
Total expenditure per capita (taka)	798	691	768	752	746	560	1,049
Share of per capita expenditure (%)							
Food	51.1	57.8	39.9	49.3	49.6	62.3	46.1
Nonfood recurrent expenditure	10.3	11.1	5.7	9.0	8.7	10.8	12.3
Gifts/remittances given	0.9	0.5	0.9	0.8	0.8	0.7	1.2
Repayment of loan principal	18.3	15.3	28.8	21.0	21.8	6.2	7.2
Investment in animals	1.2	2.3	1.4	1.6	1.6	1.0	2.4
Investment in land	2.6	2.6	5.5	3.6	3.4	0.6	3.3
Investment in other durables	8.0	2.9	1.6	4.2	4.0	2.8	2.4
Investment in monetary savings and jewelry	0.8	1.4	1.5	1.2	1.3	2.8	5.4
Investment in food stocks	2.9	3.3	10.3	5.6	5.2	7.0	17.1
Investment in loan amount lent	3.9	2.8	4.4	3.8	3.7	5.8	2.8
Monthly food expenditure per capita (taka)	408	400	307	371	370	349	483
Share of food expenditure (%)							
Rice	47.1	50.7	56.6	51.5	51.7	51.4	43.5
Wheat	0.7	1.0	2.0	1.2	1.1	1.8	1.1
Pulses	1.4	1.3	2.1	1.6	1.5	1.4	2.1
Edible oils	3.5	2.9	2.5	3.0	2.9	3.3	3.4
Fish, meat, eggs and milk	19.8	12.8	14.5	15.7	15.5	14.0	19.6
Fruits and vegetables	12.5	17.3	12.4	14.1	14.6	14.4	15.4
Other food	15.0	14.0	9.8	12.9	12.7	13.7	15.0

Source: IFPRI 1994.

Notes: In each round, food consumption expenditure is obtained through a three-day recall, whereas recurrent nonfood expenditures are obtained through varying recall periods (depending on the frequency of purchase). Both types of expenditure are then converted to monthly expenditures. Also, in each round, gifts given and investment in assets are recalled for the preceding months. Again, total expenditure flow during the recall period is converted to monthly averages. Figures in this table represent the average household expenditure of all three rounds.

Investment in assets includes expenditures made for the purchase of land, major house improvements, and animals, and for production and consumption durables (excluding increases in the value of monetary savings, the loan amount lent, and food stocks).

The difference in per capita monthly expenditure between NGO households with less than 0.5 acres and eligible nonparticipants is statistically significant at the 0.01 level. The difference in food expenditure between these two groups is not significant. Levels of significance are based on the *t*-test.

and eligible nonparticipants are statistically significant. However, the difference in factor income between these two subgroups is not statistically significant. The major difference in income is due to the amount borrowed. The average amount of borrowing for NGO households is more than double that for eligible nonparticipants.

Household Expenditure

Average monthly household expenditures in 1994 by program participants and nonparticipants are shown in Table 4.5. Total consumption expenditures and their breakdown into different items are presented. A comparison of total expenditures with income (Table 4.4) suggests that the pattern of distribution of income among the participating and nonparticipating household groups is consistent with the one observed for expenditures. Households participating in ASA, BRAC, and RDRS programs report, respectively, 29 percent, 18 percent, and 35 percent higher expenditure than income. For the eligible nonparticipants, estimated expenditure is 21 percent higher than income. In contrast, the noneligible nonparticipants show income 9 percent higher than their expenditures.

Average per capita expenditure by the NGO participants is 33 percent higher than that of eligible nonparticipants, and this difference is statistically significant. Although the share of food expenditure in total household expenditure is about 13 percent lower for participants than for eligible nonparticipants, absolute food expenditure is 6 percent higher for participants. However, the difference in food expenditure between participants and nonparticipants is not statistically significant.

The breakdown of the household food budget allocated to each food group suggests that rice accounts for about half the budget of participants and eligible nonparticipants. This finding is consistent with previous research—the IFPRI studies on targeted food interventions in Bangladesh suggest that the share of rice in total food expenditure is 53 percent for VGD households, 47 percent for RMP households, and 43 percent for households participating in the FFW program. However, the household food budget shares of wheat are much higher in VGD (19 percent) and FFW (11 percent) households than in the NGO participating sample households in this study, because VGD beneficiaries receive a wheat ration, and FFW participants receive wheat as their wage (Ahmed 1993; Ahmed and Shams 1994).

Calorie and Protein Consumption

Table 4.6 reports the patterns of calorie and protein consumption by participants and nonparticipants. Calorie and protein consumption is presented per capita as well as per adult equivalent (AE) unit. Adult equivalent units represent the calorie requirements of an adult male. AE units are a more appropriate indicator of nutrient consumption than the per capita calculation, because they incorporate the specific calorie requirements for the age and gender of individual family members. Appendix B lists the adult equivalent consumption units differentiated by age and gender of the family member. These have been calculated from IFPRI's consumption and nutrition survey data from Bangladesh (Ahmed 1993).

Adjusting for the age and gender composition and occupation profile (physical activity level) of the Bangladesh population, the Bangladesh Bureau of Statistics estimated the weighted average per capita daily calorie intake requirement at 2,122 kilocalories (BBS 1991). A previous IFPRI study in Bangladesh estimated the calorie requirement of an adult male at 2,714 kilocalories (kcal) per day (Ahmed 1993). In this study, the cutoffs used for daily per capita and per adult equivalent calories, respectively, are 2,122 kcal and 2,714 kcal.

On average, the figures for the per capita and per adult equivalent calorie consumption of participants are, respectively, 3 percent and 4 percent higher than those for eligible nonparticipants. The difference is statistically significant only for adult equivalent consumption. The difference in protein consumption between these two groups is not statistically significant.

The average daily per capita calorie consumption of participants in each of the NGO programs is lower than the rural Bangladesh average of 2,267 kcal per day in 1991/92, as reported by the 1991/92 HES survey (BBS 1995). Only the noneligible nonparticipant group has a higher per capita consumption (2,373 kcal per day) than the rural average. A study by the Grameen Bank conducted in 1985/86 suggests that Grameen Bank members consumed, on average, 2,171 kcal, whereas the control group consumed 1,982 kcal per capita per day. The same study reports a daily per capita protein intake of 59 grams by Grameen Bank members and 48 grams by control group members (Rahman 1989).

In Bangladesh, the poverty line is defined by a calorie requirement of 2,122 kcal per capita per day. Those who consume fewer calories are termed "poor," while those who cannot even meet 80 percent of the poverty line calorie requirement are generally termed "hard-core poor." According to this definition,

Table 4.6 Mean calorie and protein consumption in 1994

	ASA	BRAC	RDRS	All NGO households	NGO households < 0.5 acre	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All
Average nutrient intake								
Calorie consumption per capita	2,118	2,152	2,069	2,113	2,100	2,032	2,373	2,127
Calorie consumption per AE[a]	2,912	2,935	2,807	2,884	2,879	2,757	3,160	2,892
Protein consumption per capita	49	47	48	48	48	46	56	50
Protein consumption per AE[a]	68	65	65	66	65	63	75	67
Calorie composition by food groups (%)								
Rice	78.8	76.4	80.0	78.4	78.8	77.4	74.0	77.1
Wheat	1.6	1.8	3.4	2.3	2.0	2.9	2.5	2.5
Pulses	1.3	1.3	2.1	1.5	1.4	1.3	2.1	1.6
Edible oils	3.1	2.4	1.8	2.4	2.4	2.6	3.2	2.7
Fish, meat, eggs and milk	3.1	2.1	2.3	2.5	2.5	2.2	3.5	2.9
Vegetables and fruits	6.0	9.4	7.2	7.6	7.7	7.6	7.3	7.3
Other	6.1	6.5	3.4	5.3	5.2	5.9	7.4	6.0
Households below calorie requirement (%)								
Per capita basis[b]	53.8	52.5	57.5	54.6	57.4	62.1	28.9	53.7
AE basis[c]	41.0	30.0	55.0	42.0	41.6	45.3	16.4	38.8
Per capita basis, below 80% requirement	10.3	15.0	5.0	10.1	8.9	18.9	4.7	11.7
AE basis, below 80% requirement	5.1	2.5	0.0	2.5	1.0	12.6	2.3	6.0

Source: IFPRI 1994.

Notes: In each round, food consumption is obtained through a three-day recall. Round 1 took place in June and July of 1994, Round 2 in September and October, and Round 3 in December 1994 and January 1995. Round 2 reflects the "hungry" season in Bangladesh. The figures report the food consumption of household as the average of all three rounds.

[a] AE stands for adult equivalent. Appendix B shows the weights used for the calculation of the adult equivalent.
[b] Estimated by using a per capita calorie requirement of 2,122 kilocalories per capita per day.
[c] Estimated by using a per adult equivalent (AE) calorie requirement of 2,714 kcal/AE/day, as calculated by Ahmed (1993) for Bangladesh.

54 percent of ASA participants, 53 percent of BRAC participants, and 58 percent of RDRS participants are poor; and 10 percent, 15 percent, and 5 percent, respectively, in these programs are the hard-core poor. This implies that slightly more than half of the clients of the three microfinance programs are poor, and that about 10 percent are extremely poor. However, the proportions of poor and hard-core poor in the eligible nonparticipant group are 62 percent and 19 percent, respectively, which suggests that the NGO clients are somewhat better off than the eligible population in general.

Table 4.6 also presents calorie composition by food group. In general, the estimates show the overwhelming dominance of rice in the diet. Foodgrains (rice and wheat) account for about 81 percent of the total calorie intake for participants, and 80 percent for eligible nonparticipants, implying very little diversity in the diet. According to IFPRI studies on targeted food interventions in Bangladesh, foodgrains constitute 86 percent of the total calorie intake of VGD beneficiary households, 89 percent of RMP beneficiary households, and 88 percent of FFW participant households.

Table 4.7 The prevalence of malnutrition among preschool children (aged 6–72 months)

	All NGO households	Eligible nonparticipant households (< 0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
Round 2			
Number of observations	96	74	88
Height-for-age *Z*-score	–2.40	–2.58	–2.38
Below 90% standard median (%)	51.00	55.40	38.60
Weight-for-age *Z*-score	–2.28	–2.43	–2.22
Below 80% standard median (%)	64.60	78.40	68.20
Weight-for-height *Z*-score	–1.14	–1.21	–1.04
Below 90% standard median (%)	52.10	56.80	50.00
Round 3			
Number of observations	95	67	83
Height-for-age *Z*-score	–2.51	–2.66	–2.43
Below 90% standard median (%)	52.60	61.20	45.80
Weight-for-age *Z*-score	–2.25	–2.33	–2.07
Below 80% standard median (%)	67.40	77.60	63.90
Weight-for-height *Z*-score	–1.03	–0.97	–0.74
Below 90% standard median (%)	43.20	44.80	39.80

Source: IFPRI 1994.

Notes: Standard median represents the median of growth standards devised by the U.S. National Center for Health Statistics (NCHS).

The differences between program participants and the control group are not statistically significant at the 0.05 level. Levels of significance are based on the *t*-test.

The Nutritional Status of Preschool Children

Within households, some members are at greater nutritional risk than others. An IFPRI study conducted in rural Bangladesh finds that preschool children are at the greatest risk of undernutrition (Ahmed 1993). In the present analysis, the patterns of nutritional status of preschoolers in participant and nonparticipant households are compared.

The nutritional status of preschool children (aged 6 to 72 months) is determined on the basis of anthropometric data for all preschool children in the sample households relative to a particular growth standard. The standards devised by the U.S. National Center for Health Statistics (NCHS) are used. The levels of nutritional status are expressed in *Z*-score values[13] and in percentages below critical cutoff points of a standard median.

Table 4.7 reports three indicators of children's nutritional status: height-for-age, a measure of stunting; weight-for-height, a measure of wasting; and weight-for-age, a measure of underweight. Weight-for-height is a short-run measure (indicating acute undernutrition), whereas height-for-age indicates the nutritional status of children over the long run (indicating chronic undernutrition). Weight-for-age can be viewed as a medium-term indicator, reflecting both acute and chronic undernutrition. The results are compared between Round 2 (the lean or hungry season; October and November 1994) and Round 3 (the peak or plentiful season; December 1994 and January 1995) of the household surveys. The results presented in Table 4.7 show that the seasonal difference in the nutritional status of children between Rounds 2 and 3 is captured by weight-for-

[13] *Z*-score = [actual measurement – (50th percentile standard/standard deviation of 50th percentile standard)]. Levels of nutritional status in comparison with a reference population can be conveniently expressed in terms of *Z*-score values. A *Z*-score value of 0 indicates a child who is "normal"; a negative *Z*-score value indicates an anthropometric measurement below the one in the reference population.

height, the short-run measure. It is interesting to observe that the difference in the short-run measure of nutritional status is more prominent for eligible nonparticipants' preschool children than for participants' preschoolers. This may indicate a consumption smoothing effect due to NGO programs. There is, however, no statistically significant difference in preschooler nutritional status between participants and nonparticipants.

Determinants of Membership in Group-Based Financial Institutions

The criteria used by different group-based NGO institutions to select households for participation in their credit programs were discussed in Chapter 1. It was noted that, within all systems, loans were restricted to members of groups belonging to a NGO program. In this section, using the household survey data, the determinants of membership in NGO programs are addressed in greater detail.

Membership in a group-based NGO program is not solely a supply-side outcome because many households or individuals choose, for some reason, not to apply for membership. Because of this, membership or participation in a group-based program needs to be analyzed as an outcome of the interaction between *both* the demand for and the supply of institutional services. From the viewpoint of the household, its decision to apply for membership depends on its calculations of the costs and benefits of joining the program.

The principal benefit—the high probability of obtaining a loan at a substantially lower interest rate (compared with the informal sector)—is very clear and requires no further elaboration. However, there may be other secondary benefits such as risk-pooling and collective bargaining, or access to various education and skill development programs run by NGO institutions.

Likewise, the cost of participation has several components. First, there is a time cost. All institutions require mandatory attendance at all meetings, which are held, in most cases, at weekly intervals, and last up to one hour. Time costs are associated with screening and co-selecting other members for forming a group, and, once the group is formed, with monitoring the activities of other group members. The time cost associated with engaging in other compulsory activities—such as attendance at training sessions on social awareness or on family planning—can also be substantial. For poor households whose main income-earning asset is labor, the opportunity cost of these activities can be significantly large. The joint liability nature of group-based credit imposes an additional risk burden on members, since they are partly responsible for the repayment actions of other group members; as shown in Chapter 3, this responsibility may go as far as having to bail out members in difficulty by covering their weekly payments. Third, because the terms and conditions of loans are very strictly defined and frequently tied to a specific project that has to be approved by peers and the NGO agent, the cost of diverting funds to other uses is high. Hence, if loan-tied activities do not coincide with the fund-use preference of the household, the full cost of loans (with allowance made for the cost of diverting funds) can be much higher than the stipulated interest rate. Fourth, most programs, including RDRS, BRAC, and ASA, require their prospective members to make small savings at regular (mostly weekly) intervals. The opportunity costs of saving with the NGO may be another hindrance to being interested in becoming a member. Given the array of costs and benefits, a household or an individual will decide to apply for membership if the expected benefits outweigh the expected costs.

A similar accounting of benefits and costs may be made on the supply side. In the context of granting membership, this can be simply stated as a condition that the expected cost of lending to a particular borrower is lower than the expected marginal revenue. However, as indicated before, the objective of the group-based credit programs under

consideration often goes beyond simple profit maximization. Hence, the marginal benefits encompass considerations beyond purely financial returns. As was pointed out in Chapter 2, these programs explicitly target the landless and near-landless households, using cutoffs based on the amount of land owned. It was further shown in Chapter 2 that program placement is nonrandom (see also Pitt and Khandker 1998). Embedding these considerations or regulations in lenders' decisions to grant membership is therefore important.

The supply side is further complicated by group-level considerations. Even though, as noted in Chapter 3, it is the agent of the NGO program who is the principal catalyst in the process of group formation, programs may encourage local initiatives. Hence self- and co-selection of peers into a group remains significant. Issues related to endogenous group formation processes are complex (Glance and Huberman 1994). These processes are not addressed explicitly in the analysis, except to note that a membership application to a group-based system needs to be approved not only by the NGO agent but also by other members of the group. Whatever the process involved, the end result is a group whose members not only meet the criteria of the financial institutions, but also perceive each other as partners from the general pool of applicants. In general, individuals and households who have sufficient information about each other's assets, incomes, and personal characters may be expected to be more likely to accept each other as partners. The two-way information flow between members, in turn, is aided not only by their proximity, but also by the history of interhousehold transactions. Generally, the longer an applicant has resided in a particular location, the higher the likelihood of a greater number of previous transactions. In this analysis, the distance from the residence of a household head to the residences of the parents of the household head and of his/her spouse is used both as a measure of spatial proximity as well as an indicator of the intensity of previous transactions. Generally, newly arrived migrants will be living further away from their parents. Risk-pooling strategies also play an important role in the formation of such groups, for example when individuals and households team up with others whose income profile is not similar to or highly correlated with their own (Zeller 1998; Sadoulet and Carpenter 1999).

The decision of the household to apply and the decision of the NGO agent and group to accept the application are modeled as follows. In the first stage, a latent variable, D_i^*, is defined such that the household decides to apply for membership when $D_i^* > 0$. In the second stage, another latent variable, S_i^*, is defined such that the NGO group decides to accept an application whenever $S_i^* > 0$. D_i^* and S_i^* are functionally specified as

$$D_i^* = f(X_i, C_i)$$

$$S_i^* = g(E_i, X_i, C_i),$$

where X_i and C_i are household-level and community-level characteristics, respectively, and E_i is some indicator stating a household's eligibility to participate in the program.

Moreover, two indicator variables, D_i and S_i, are defined such that

$$D_i = 1 \text{ iff } D_i^* > 0$$

$$D_i = 0 \text{ otherwise,}$$

$$S_i = 1 \text{ iff } D_i^* > 0$$

$$S_i = 0 \text{ otherwise.}$$

Within this formulation note that what is observed in the data is not D_i and S_i separately, but a single indicator variable, $P = D_i S_i$, which equals 1 when a household is a member and 0 when it is not. This problem therefore can be cast in terms of a bivariate probit model with partial observability (Abowd and Farber 1982).

As Maddala (1983) points out, identification of the demand and supply equations

in the above setting is possible if there is at least one nonoverlapping variable in functions $f(\ )$ and $g(\ )$. In this case, the identifying variable used is E_i. Though NGOs impose several eligibility conditions, the most important of these is the eligibility cutoff point based on landownership (0.5 acres for BRAC and ASA and 1.5 acres for RDRS). Hence, ELIGIBILITY—a dummy variable that equals 1 whenever land owned by the household is less than 0.5 acres in ASA or BRAC villages or less than 1.5 acres in RDRS villages—is used in the supply equation but not in the demand equation. All the other variables are common to both equations. LAND is the land owned by the household 10 years prior to the survey date. ADMALE and ADFEMALE are the number of adult males and females in the household, respectively, and measure the stock of labor resource in the household. AGEHH and AGEHHSQ are the age of the household head and its square; they measure the accumulation of local knowledge and experience. MALEDU and FEMEDU measure the highest level of education attained by females and males in the household, respectively. HHSIZE is the total household size. GENDERHH is a binary variable that takes the value of 1 when the head of household is a male and 0 otherwise. Finally, HPDIST and SPDIST measure the distance (in kilometers) from the residence of the household head and spouse to the residence of the parents of the household head and the spouse, respectively. HPDIST and SPDIST are not only proxies for the length of residency of the household in the particular area (those whose parents live further away are more likely to have migrated into the area); they also indicate the ease with which the household can engage in interhousehold economic, social, and other transactions. In addition, village dummy variables were used to account for across-village differences. Descriptive statistics of the variables used in the estimation of the demand and supply equations are presented in Table 4.8. The estimated equations are presented in Table 4.9 and discussed below.

On the demand side, the estimated equation for the decision to apply for membership indicates that the likelihood of applying for membership declines as more land is owned. This is an expected result for three reasons. First, as land increases, especially when it is over the eligibility cutoff point, households are less likely to apply because of the knowledge (or expectation) that their application faces the risk of being denied. Second, an increase in landownership increases access to other sources of financial services, in both the formal and informal sectors. Households with more land are also likely to be wealthier,

Table 4.8 Description of the variables used in the regression analysis

Variable	Variable description	Mean	Standard deviation
LAND	Land owned ten years ago (decimals)	80.081	146.93
HHSIZE	Household size	5.18	2.36
$HHSIZE^2$	Square of household size	32.31	31.81
AGEHH	Age of household head	42.58	13.16
AGEHHSQ	Square of age of head of household	1,985.87	1,236.73
MALEDU	Highest education of male in household	0.90	2.21
FEMEDU	Highest education of female in household	0.37	1.37
ADMALE	Number of adult males in household	1.39	0.84
ADFEMALE	Number of adult females in household	1.30	0.65
GENDERHH	Gender of household head (dummy with male = 1)	0.95	0.23
ASA_BRAC	Credit limit in ASA or BRAC	1,058.75	2,541.48
HPDIST	Distance to home of parents of household head (km)	0.86	0.35
SPDIST	Distance to home of parents of spouse of household head (km)	0.33	0.47
ELIGIBILITY	Dummy variable = 1 if household is eligible		
VILLAGE1-6	Village dummies for six of the seven villages		

Table 4.9 Determinants of membership in NGO credit groups

Variables	Demand side (first-stage)		Supply side (second-stage)	
Demand side (first-stage)	Coefficients	*t*-values	Coefficients	*t*-values
LAND	–0.016**	–2.707	0.010	1.429
HHSIZE	0.954**	2.950	0.025	0.302
HHSIZE^2	–0.038	–1.090	0.033	–0.829
MALEDU	–0.035	–0.174	–0.236	–0.810
FEMEDU	1.306	0.905	–0.438*	–1.848
ADMALE	–0.715**	–2.464	0.201	0.547
ADFEMALE	–0.146	–0.457	0.138	0.418
GENDERHH	0.417	0.787	–5.012**	–2.564
HPDIST	–0.885**	–2.258	1.405**	2.780
SPDIST	0.310	1.073	0.508	1.440
VILLAGE1	–2.090**	–2.242	1.230	1.370
VILLAGE2	–1.478	–1.372	3.070*	1.730
VILLAGE3	–0.608	–0.536	0.579	0.730
VILLAGE4	–0.292	–0.297	–0.271	–0.393
VILLAGE5	–1.584	–1.478	0.747	0.617
VILLAGE6	–2.123**	–2.108	10.589	0.001
ELIGIBILITY	2.997**	3.045		

N = 350
Log likelihood = –151.246
Chi-squared = 152.551

Notes: The dependent variable is membership in group-based programs, which takes the value of 1 if the household is a current member of an NGO credit program, otherwise 0.

* = significant at 10 percent level; ** = significant at 5 percent level

Description of variables used in regression model:

LAND	land owned ten years ago
HHSIZE	household size
HHSIZE^2	household size squared
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
GENDERHH	gender of household head
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
VILLAGE1-6	village dummies
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise

with increased ability to self-finance projects. Third, though NGO loans carry relatively low interest rates, they nonetheless carry other indirect costs such as compulsory participation in other institutional activities (training and social activities), some minimum amount of paperwork, and, in particular, time that needs to be devoted to group meetings and group monitoring. Because all these activities are relatively labor intensive, the real cost of loans increases as the opportunity cost of household labor rises. Hence, to the extent that an increase in land size results in increases in the marginal productivity of labor (and hence its opportunity cost), loans from NGOs become less attractive when full labor costs are accounted for.

The coefficient of HHSIZE is positive and significant at the 5 percent level. Controlling for everything else (especially physical assets and adult male and female labor), it is likely that larger households are also poorer households, simply because the income-earning resources per household member are fewer. Not only do such households have less access to alternative sources

of credit, but they also have greater demand for financial services to cope with various threats to their livelihood.

The coefficient for the number of male adults in the household (ADMALE) is negative and significant at the 5 percent level. This result can be explained by at least two factors. First, ADMALE is an important household income-earning asset in rural Bangladesh, and generally, for a given family size, the more males of income-earning age, the better off the household—with increased ability to self-finance household projects and less demand for livelihood maintenance loans. Second, income-earning males are good collateral substitutes because they provide lenders with easily verifiable information on the income-earning capacity of the household.

The coefficient of HPDIST is negative and significant. Relatively recent migrant households are likely to have less information about other village residents. This makes them less willing to participate in group-based risk-sharing schemes. For the same reason, such households may decide not to apply for membership on the basis of the (possibly wrong) expectation that their application will be rejected precisely because they are viewed as relative "outsiders" in the village.

On the supply side, the following factors emerge as being important determinants of access. ELIGIBILITY is positive and significant at the 5 percent level (p value = .0001). LAND is not significant even at the 10 percent level, indicating that the landownership rule is significantly enforced and that, apart from this land cutoff criterion, the area of land owned does not matter. The efforts of NGOs to target female-headed households are shown by the negative coefficient of GENDERHH, which is significant at the 5 percent level (p = .002). The coefficients of both HPDIST and SPDIST are positive, though only that of HPDIST is significant at the 5 percent level. This result appears counterintuitive, at least initially, as it is usually expected that relatively new village residents will be less preferable partners in group formation because of possible information-related problems. However, if it is also the case that these relatively recent migrant families are endowed with different sets of labor skills and assets than the resident population, their incomes are likely to be less covariant with those of village residents. The newer residents may then present themselves as better risk-sharing partners. It was noted in the discussion of the demand equation that relatively new migrant families are less likely to apply for membership because of their limited social connectedness with other village residents. The supply equation, on the other hand, shows that those households that do apply (presumably because they have greater social capital) have a greater probability of being accepted, presumably because they are better partners in intra-group risk-pooling. The coefficient of FEMEDU is negative and significant, indicating that applications from households with less educated females are more likely to be accepted, in line with NGOs' aim to target less educated women.

The Nature of Loan Transactions

Once membership in an NGO credit group has been granted, an individual is eligible to apply for a loan. This section describes the sources, uses, repayment, and interest rates of loans obtained by 350 sample households from formal as well as informal sectors. All household members older than 13 years of age were asked in each of three rounds about their credit transactions.

The Uses and Sources of Loans

Table 4.10 presents information on the types of use to which the loans were put. Loans are differentiated by informal and formal sectors. The formal sector here includes all of the following institutions: group-based credit programs of NGOs, nationalized commercial banks (NCBs), and specialized agricultural development banks. The informal sector includes family, friends, collectors, shopkeepers, landlords, and informal groups.

Table 4.10 The uses of formal and informal credits

Use	Informal (n = 2,567)		Formal (n = 338)	
	Mean share of amount used (% of total amount borrowed)	Average amount used (taka)	Mean share of amount used (% of total amount borrowed)	Average amount used (taka)
1. Food	15.1	133.82	7.1	260.66
2. Health	6.3	55.93	0.3	11.61
3. Social events	5.3	47.25	1.7	62.07
4. Education	4.0	35.75	0.4	13.76
5. Consumption durables	3.8	33.78	6.3	231.38
6. Farm implements and livestock	18.5	164.82	31.0	1,137.57
7. Farm inputs	9.5	84.66	9.7	354.77
8. Nonfarm inputs	14.1	125.16	24.3	893.40
9. Reimbursement of other loans	8.9	79.35	11.2	411.86
10. Other uses	14.4	128.11	7.7	284.30
Aggregate	100.00	888.62	99.7	3,661.38

Source: IFPRI 1994.

Before the patterns of loan use are described, it is important to address the issue of fungibility of financial funds. Loans are fungible because they affect the household by relaxing the intertemporal capital constraint. It is therefore not analytically easy to classify loans as being either "consumption loans" or "production loans," unless it is possible somehow to observe how the household would have allocated its resources had the loan been denied. To illustrate this point, suppose a household borrows money and then buys an agricultural input—say, a plough. Is this unambiguously a production loan? It would be if, had the loan been denied, the household did not buy the plough *and* left all other expenditures unchanged.[14] If, however, the household reduced consumption so as to finance the purchase of a plough, the loan would take the character more of a consumption loan, since loan denial, in this case, would have resulted in reduced consumption. With this example in mind, information on the purpose of loans should be interpreted in the following context: the classification of loans as "consumption" or "production" should be taken to indicate where the thrust of the expenditure cuts would have been had the loan been denied. In the survey, respondents were asked to report on how the loan was actually used. Up to 12 different types of use, with their corresponding percentages, were recorded.

Given this caveat, a number of interesting patterns emerge from Table 4.10. A greater proportion of loans from informal sources are used to finance consumption expenditures. About 34.5 percent of the loan amount borrowed from the informal sector is used to finance expenditures on food, health, social events, education, and consumption durables. The corresponding figure for loans from the formal sector is only 15.8 percent. This is an expected result because loans from formal sources, especially from the NGO institutions, are usually tied to income-increasing projects, so that there is a considerable cost involved in diverting funds to

[14] Even this is not a pure production loan, because the use of the agricultural input now increases output in the next period and therefore "finances" a higher rate of consumption in the future.

other uses. Also, consumption needs are, at times, such that loans have to be available at very short notice. In such circumstances, it is often not feasible to borrow from formal sources despite the fact that both BRAC and ASA allow for emergency consumption loans up to an amount somewhat less than the savings deposited by the applicant with the NGO.

For both formal and informal sector loans, the largest percentage of loans goes towards financing "directly" productive activities, that is, farm implements and livestock, farm inputs, and nonfarm inputs (65.0 and 42.1 percent, respectively). Financing debt payments, that is, the rolling over of debt, accounts for an average of roughly 10 percent of loan use. The figure for formal loans (11.2 percent) is slightly higher than that for informal loans (8.9 percent). Since most formal loans are provided by NGO-based schemes, and since new loans are given only after full repayment of the previous NGO loan, part of the NGO loans seems to be used to honor repayment obligations to informal lenders. As noted above, informal lenders fulfill important consumption smoothing functions. This pattern suggests that membership in NGO schemes may indirectly improve creditworthiness in the eyes of informal lenders.

Loan Size, Duration, and Repayment

More detailed information on loan size, loan duration, and repayment characteristics is provided in Tables 4.11 and 4.12.

The number of loan transactions reported in the informal sector (2,233) is more than six times the number in the formal sector. This underscores the immense importance of the informal financial market in Bangladesh. Average loan size, however, is significantly larger in the formal sector (Tk 3,672.15) than in the informal sector (Tk 618.31). This is because informal sources, especially friends and relatives, are more constrained for funds compared with formal financial institutions. Informal sources, especially friends and relatives, are, in any case, not in a position to risk loaning large sums of funds.

Whereas there is very little difference in the average size of loans from different agents within the informal sector, loans from commercial banks are about twice as large as those from the NGO sector. This is because commercial and agricultural development banks lend mostly to households with larger farm sizes, which not only have a demand for bigger loans, but also possess the necessary collateral to secure such loans.

There is also a difference in the duration of loans. The informal sector provides sig-

Table 4.11 Loan amount, duration, and repayment, by sector

	Informal sector			Formal sector		
	Friends and relatives	Other informal	All informal	NGOs[a]	Other formal	All formal
Number of observations	1,396	837	2,233	295	43	338
Average loan amount (taka)[b]	585.55	672.95	618.31	3,137.80	7,338.09	3,672.15
Average loan duration (days)[b]	75.57	104.62	86.46	358.97	483.30	374.78
% of loans fully paid on time[c]	50.90	48.10	49.80	70.20	24.10	63.80
% of loans fully paid, but late[c]	31.70	29.40	30.80	25.30	13.80	23.70
% of loans defaulted	17.40	22.50	19.30	4.50	62.10	12.60
If paid late, average number of days in arrears[c]	32.20	27.70	30.60	84.00	239.50	96.70

Source: IFPRI 1994.

[a] ASA, BRAC, GTZ, the Grameen Bank, and other NGOs.
[b] Excludes loans with an open-ended repayment date.
[c] Excludes loans with repayment dates after the final survey.

Table 4.12 Repayment rate in the formal sector, by institution (%)

	Institution				
Repayment	**Grameen Bank**	**BRAC**	**ASA**	**RDRS**	**All other**
Loans fully paid on time[a]	66.7	60.0	74.0	77.5	24.1
Loans fully paid, but late[a]	26.7	34.0	23.3	17.5	13.8
Loans defaulted[a]	6.7	6.0	2.7	5.0	62.1

Source: IFPRI 1994.

[a] Excludes loans with repayment dates after the final survey.

nificantly shorter-term loans than the formal sector. On average, loans in the informal sector have to be paid back in about three months, whereas loan duration in the formal sector averages around one year.

Interesting, too, is the difference in default rates across loan types.[15] Default rates are lowest for the NGOs, lower even than those for friends and relatives. This indicates the enhanced capability of group-based lending to maintain financial discipline among borrowers. On the other hand, default rates are highest in the "other" formal financial sector, where they average an astounding 62 percent. This is consistent with other findings (for example, Adams, Graham, and von Pischke 1984), which all point out that a combination of lack of incentives (on the supply side) and lack of discipline (on the demand side) has led to widespread abuse of formal financial institutions. Even where loans to such formal institutions are paid back, the survey data show that they are paid back very late: an average of about eight months late. Default rates for individual NGOs (Table 4.12) range from 2.7 percent (for ASA) to 6.7 percent for the Grameen Bank (GB). Again, many of these "defaulted" loans may be repaid in the future.

Terms and Conditions of Loans

In the survey, households were asked to report side-conditions (other than interest payments) for each of the loans transacted. The percentage of loans that had different types of side-conditions in both the informal and the formal sector is presented in Table 4.13. Loans are disaggregated by formal and informal sectors. On average, not only are the proportions of loans that require collateral low in both the formal and the informal sectors, but they are also, remarkably, at the same level. However, the picture in the formal sector is considerably distorted by NGOs, because they do not, as a rule, require collateral. A significantly higher proportion (76.7 percent) of the loans from NCBs and agricultural banks require collateral. Another major difference between loans from the two sectors is that whereas 73.0 percent of informal loans do not have any conditionalities attached, most of the formal sector loans (61.8 percent) have such conditionalities. Within the formal sector, conditionalities are more common with loans from NCBs than with loans from NGOs.

The meaning of *bakshish* or "gifts" takes on a different complexion in the formal and informal sectors. In the informal sector, a "gift" is just another component of the regular cost of obtaining a loan. In the formal sector, however, it may mean bribes paid to loan officers to secure loans. Not surprisingly, the incidence of providing "gifts" is much higher in the "other" formal sector.

The practice of charging arrears at a higher interest rate exists in both the informal and formal sectors, although it is much

[15] Defaulted loans include all loans that were not fully repaid as of the final survey round. They therefore include loans that were partially repaid and those that would eventually be fully repaid.

Table 4.13 The relative frequency of loan conditions, by sector (% of all loans)

Condition	Friends and other relatives (n = 1,599)	Other informal (n = 968)	All informal (n = 2,567)	NGO (n = 295)	Other formal (n = 43)	All formal (n = 338)
Collateral required	6.60	12.20	8.7	0.30	76.70	10.1
Bakshish gift given	0.40	0.00	0.2	0.30	39.50	5.3
Must work for lender without wages	0.19	0.62	0.4	0.00	0.00	0.0
Work for lender at very low wage	0.25	0.31	0.3	0.00	0.00	0.0
Credit disbursed with witness	2.88	5.99	4.1	45.76	6.96	40.8
Must sell (part of) harvest to lender	0.00	0.41	0.2	0.00	2.35	0.3
Must buy something from lender	0.06	0.52	0.2	0.34	0.00	0.3
If repaid late, interest will rise	13.76	22.11	16.9	52.88	62.79	54.1
Mortgage out land	6.57	11.36	8.4	0.00	65.12	8.3
Other conditions	3.06	4.34	3.5	0.34	4.65	0.9
No conditions	76.61	63.74	73.0	42.03	11.63	38.2

Source: IFPRI 1994.

more common in the formal sector. More than one-half of the transactions in the formal sector had such a clause (again, mostly for loans given by NGO schemes); the corresponding figure in the informal sector was only 17 percent.

Interest Rates and Repayments

Table 4.14 presents information on interest and repayment rates for various subgroups of loans differentiated by sectoral source and the maturity of the loan. In order not to treat small loans, which usually carry higher interest rates, the same as larger loans, the interest rates shown in Table 4.14 are weighted averages of annual nominal interest rates on all loans in a particular subgroup. The interest rate for each transaction was weighted by the share of the particular loan in the total loan amount borrowed in a particular subgroup.

Whereas all types of loan in the formal sector carry interest charges, this is not always the case in the informal sector. A large number of credit transactions in the informal sector, especially those among friends and relatives, are conducted at a nominally zero rate of interest. However, having stated this, it is important to point out that, in a significant number of cases, even among friends and relatives, interest is charged on credit transactions. Interest is charged especially on loans with a maturity of more than one month. Whereas only 18.0 percent of all credit transactions among friends and relatives carried positive charges, this share increases to 32.7 percent for loans involving a period greater than a month. The same kind of a jump was observed in the case of loans from informal lenders other than friends and relatives. Such cases, therefore, are important in driving up the mean interest rate for the informal sector.

Interest rates are generally much higher in the informal sector than in the formal sector. Also, longer-period loans not only are more likely to be charged interest, but get charged at a higher rate. In the case of transactions between friends and relatives, the mean interest charged on loans with a maturity of more than one month is 46.0 percent per

Table 4.14 Interest and repayment rates, by type of lender and by maturity of loan

	Type of lender					
	Formal lender	Friends and relatives		Other informal lenders		All lenders
Mean of variables	A	A	B	A	B	A
Number of loans obtained[a]	207	1,181	500	697	344	2,085
% of loans with positive interest rates	100.0	18.0	32.7	36.3	64.0	32.2
% of loans repaid at due date[b]	63.8	50.9	44.6	48.1	43.9	51.2
% of loans paid (including late payments)[b]	87.4	82.6	73.6	77.5	69.2	81.3
Average amount borrowed (taka)[a]	3,358.15	511.07	914.17	596.79	926.57	822.39
Mean annual interest rate charged (%)	19.7	40.9	46.0	70.2	77.0	39.4
Loan amount as % of total loans with a maturity of more than one month	47.3	. . .	31.1	. . .	21.7	100.0

Source: IFPRI 1994.

Notes: A = all loans (in corresponding subgroup); B = loans with maturity of more than one month.

[a] Excludes loans with open-ended repayment date that are not repaid at the end of survey ($n = 334$, all from the informal sector). The average loan amount for this subgroup is Tk 2,695.95.

[b] Excludes loans that have a repayment date due after the survey ended ($n = 486$). This subgroup includes informal as well as formal loans.

year; this mean falls to 40.9 when all loans are considered. A similar pattern is noticeable in the case of loans from other informal lenders. Such a maturity-dependent interest differential does not exist in the formal sector, where loans (mostly annual) are charged at a mean rate of 19.7 percent per annum. The loan maturity is longer for the formal sector, too. Of the total loans with a maturity of more than a month, 47.3 percent are from the formal sector, 31.0 percent are from friends and relatives, and 21.7 percent are from other informal lenders. The average annual interest rate paid on loans in rural Bangladesh is 39.4 percent. At an inflation rate of about 5 percent during the survey year this charge constitutes a rather high real rate of interest. Of course, in order to be sustainable, the financial systems—be they formal or informal—need to cover the transaction costs of making loans. These are undoubtedly higher for lending in rural areas.

Loan Size and Interest Rate by Type of Borrower

Tables 4.15, 4.16, and 4.17 show the credit transactions of different types of households from three sources: friends and relatives, other informal lenders, and formal lenders, respectively. Information is presented for each round of the survey. A number of observations follow.

- Nonparticipants with more than 0.5 acres of land generally borrow substantially more from all sources, including formal ones. This reflects the fact that wealthier households have a higher demand for credit as well as a higher credit limit from informal and formal lenders.

- Comparing NGO households with the eligible nonparticipant households, it is seen that the amounts borrowed from informal sources are not that different for the two groups, though borrowing by NGO

Table 4.15 Loans from friends and relatives: Amount borrowed per month and interest rates, by program participation and by round of survey

	All NGO households	Eligible nonparticipant households (<0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
January 1994 to Round 1			
Number of households	81	62	85
Amount borrowed (taka)	184.0	141.0	342.0
Interest rate (%)	31.4	50.08	38.9
Round 1 to Round 2			
Number of households	71	61	64
Amount borrowed (taka)	265.0	214.0	537.0
Interest rate (%)	47.7	55.3	24.4
Round 2 to Round 3			
Number of households	65	48	67
Amount borrowed (taka)	280.0	204.0	674.0
Interest rate (%)	84.6	69.8	14.2

Source: IFPRI 1994.

Notes: The amount borrowed per month by a household is calculated as follows. First, the cumulative loan amount obtained from each type of lender during the recall period for the survey round is computed. For small loans of less than 50 taka or of 50–300 taka, the loans obtained were recorded only for the preceding four weeks or preceding three months, respectively. For these two loan sizes, the cumulative loan amount was extrapolated for the entire recall period. Then, the cumulative loan amount was divided by the length of the recall period to obtain a monthly figure.

The nominal annual interest rate is a weighted average of annual nominal interest rates in a particular cluster. Each interest rate for a particular credit transaction was weighted by the share of the particular loan amount in the total monthly loan amount obtained in the respective cluster.

Households that did not borrow from friends and relatives during the recall period are reflected in the average loan amount.

Round 1 took place in June and July of 1994, Round 2 in October and November, and Round 3 in December 1994 and January 1995.

households is larger in all rounds (Tables 4.15 and 4.16). Several interpretations come to mind. Loans from NGOs are not completely substitutable for loans from other informal sources. Had the loans been substitutable, informal loans for NGO participants would have been smaller. In general, the more project-tied the NGO loans, the less substitutable they are likely to be with other informal loans. Another explanation is that projects that become feasible (for the household) with the availability of NGO loans may require supplementary financing, especially in order to cover unanticipated production costs and shortfalls in revenue. If these supplementary funds are made available from other lenders in the informal market, then informal loans are not likely to decrease as a result of access to NGO loans, and may even increase. Finally, NGO participants may have to resort to borrowing money from informal sources to meet the strict repayment schedules of NGO lenders, in particular if projects funded by the NGO loan do not immediately generate income (such as animal fattening), but require weekly repayment installments right from the first week after taking the loan.

- In the informal market, the interest charges paid by nonparticipant households with more than 0.5 acres of land to lenders are generally lower than those paid by households with less than 0.5 acres of land (Tables 4.15 and 4.16). This suggests explanations related to market segmentation and the risk portfolio of the borrower. First, poorer households face a thinner market for credit compared with high-income households. Because poorer households have access to only a smaller number of willing lenders, loans are more likely to be monopolistically priced. The higher

Table 4.16 Loans from other informal lenders: Amount borrowed per month and interest rates, by program participation and by round of survey

	All NGO households	Eligible nonparticipant households (<0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
January 1994 to Round 1			
Number of households	52	45	55
Amount borrowed (taka)	120.0	112.0	399.0
Interest rate (%)	129.7	100.4	44.8
Round 1 to Round 2			
Number of households	49	39	33
Amount borrowed (taka)	288.0	191.0	634.0
Interest rate (%)	97.8	80.5	77.7
Round 2 to Round 3			
Number of households	51	32	40
Amount borrowed (taka)	436.0	216.0	431.0
Interest rate (%)	62.0	78.8	59.5

Source: IFPRI 1994.

Notes: The amount borrowed per month by a household is calculated as follows. First, the cumulative loan amount obtained from each type of lender during the recall period for the round is computed. For small loans of less than 50 taka or for 50–300 taka, the loans obtained were recorded only for the preceding four weeks or preceding three months, respectively. For these two loan sizes, the cumulative loan amount was extrapolated for the entire recall period. Then, the cumulative loan amount was divided by the length of the recall period to obtain a monthly figure.

The nominal annual interest rate is a weighted average of annual nominal interest rates in a particular cluster. Each interest rate for a particular credit transaction was weighted by the share of the particular loan amount in the total monthly loan amount obtained in the respective cluster.

Households that did not borrow from other informal lenders during the recall period are reflected in the average loan amount.

Round 1 took place in June and July of 1994, Round 2 in October and November, and Round 3 in December 1994 and January 1995.

interest rate, therefore, can be interpreted as resulting from the monopolistic segment of the market that the poor face. Second, poorer households may present themselves as higher risks to potential lenders. For this reason, they are charged a higher interest rate. However, as pointed out later, data on repayment rates do not indicate significant differences between the two groups. Third, poorer households borrow smaller loan amounts, thus raising the unit transaction costs of the lender compared with a large loan. This higher transaction cost is then covered by a higher interest charge. Zeller (1994) finds a similar pattern in interest rate differentials for the informal market in Madagascar.

- The rates of interest show considerable seasonal movements. What is interesting is that the movement patterns vary according to type of lender as well as type of borrower, indicating, once again, considerable market segmentation. For households with less than 0.5 acres of land, interest rates on loans from friends and relatives increase during the lean season in the second round, and again during the third round, when it was clear to the villagers that the *Aman* harvest that year would be worse than average. Not only would demand for loans (especially to smooth consumption) in these two periods be high, but this would be accompanied by a simultaneous contraction in the supply of credit from their negative shocks to their incomes because of the downturn in incomes. However, these kinds of changes in demand and supply are less likely to take place among higher-income households. Quite the opposite pattern of interest rate change is observed in the case of "other" informal borrowers, suggesting, again, that credit markets are considerably

Table 4.17 Loans from formal lenders: Amount borrowed per month and interest rates, by program participation and by round of survey

	All NGO households	Eligible nonparticipant households (<0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)	All households
January 1994 to Round 1				
Number of households	71	0	8	79
Amount borrowed (taka)	578	n.a.	994	620
Interest rate (%)	21.60	n.a.	22.14	21.69
Round 1 to Round 2				
Number of households	23	1	4	28
Amount borrowed (taka)	1,252	833	1,621	1,290
Interest rate (%)	15.56	15.00	24.20	17.10
Round 2 to Round 3				
Number of households	20	2	6	28
Amount borrowed (taka)	1,596	1,010	2,528	1,754
Interest rate (%)	18.75	24.84	20.96	19.69

Source: IFPRI 1994.

Notes: The amount borrowed per month by a household is calculated as follows. First, the cumulative loan amount obtained from each type of lender during the recall period for the round is computed. For small loans of less than 50 taka or for 50–300 taka, the loans obtained were recorded only for the preceding four weeks or preceding three months, respectively. For these two loan sizes, the cumulative loan amount was extrapolated for the entire recall period. Then, the cumulative loan amount was divided by the length of the recall period to obtain a monthly figure.

The nominal annual interest rate is a weighted average of annual nominal interest rates in a particular cluster. Each interest rate for a particular credit transaction was weighted by the share of the particular loan amount in the total monthly loan amount obtained in the respective cluster.

Households that did not borrow from formal lenders during the recall period are reflected in the average loan amount.

Round 1 took place in June and July of 1994, Round 2 in October and November, and Round 3 in December 1994 and January 1995.

n.a. = not applicable.

segmented. Finally, there is no evidence suggesting systematic interest differentials in the informal market between NGO households and eligible nonparticipants.

- Loans from the formal sector are largest for households with more than 0.5 acres of land, indicating their superior access to NCBs and agricultural banks. Formal sector loans increase in the later rounds for all households. The reason is likely to be related to the loan disbursement schedules of NGOs and other formal sector banks in the survey regions.

Table 4.18 provides information on repayment rates for informal loans by program type. Significant differences either between lender types or between borrower types are not discernible. This suggests that the interest differentials discussed above are likely to be the result more of market segmentation—likely due to imperfect information flows—than of differences in the risk profile of different types of borrowers.

Credit Limits

In the survey, borrowers were asked the maximum amount of loan they could potentially borrow from each source.[16] Access to formal credit is often confused with participation in formal credit programs (Diagne and Zeller 2001). Indeed, the two concepts are used interchangeably in many studies. A household has access to a particular source

[16] Every borrower, irrespective of their wealth and other attributes reflecting their creditworthiness, faces a finite limit to the amount they are able to borrow from lenders at the going market interest rate. For a detailed discussion of the concept of the credit limit and its empirical measurement, which was also the basis for this section, see Diagne and Zeller (2001).

Table 4.18 Repayment rates for informal loans, by program participation and by type of lender

	All NGO households	Eligible nonparticipant households (<0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
Friends and relatives			
Number of loans obtained	405	312	464
Repayment rate at due date	50.60	44.90	55.20
Repayment rate (including late repayment)	82.00	80.80	84.30
If paid late, average days in arrears	27.69	17.93	48.27
Other informal lenders			
Number of loans obtained	229	221	247
Repayment rate at due date	50.70	44.80	48.60
Repayment rate (including late repayment)	81.70	77.80	73.30
If paid late, average days in arrears	28.86	24.27	30.31

Source: IFPRI 1994.

Note: Figures include all loans borrowed from the informal sector during the entire recall period where the due date of the loan was before the end of the survey or where the repayment date was indefinite but the loan was fully repaid.

of credit if it is able to borrow from that source, whether or not it chooses to borrow. The extent of access to credit is measured by the maximum amount a household can borrow (its credit limit). If this amount is positive, the household is said to have access.

Table 4.19 provides information on credit limits by type of household. Whereas the bigger landowners reported the highest average credit limit in the informal sector, the NGO participants reported the highest credit limit in the formal sector. Compared with eligible nonparticipants, NGO members have a 500% higher formal credit limit.

Table 4.20, which compares the perceived credit limit of NGO households differentiated by their length of participation in credit programs, provides further evidence of the way in which credit access improves with participation in NGO-promoted credit groups. Note that it is the perceived credit limit, as opposed to the actual credit limit, that influences investment, production, and consumption plans. The average credit limit of those in the upper tercile is more than 75 percent higher than that of those in the lower tercile. This tabulation suggests a hypothesis of graduated lending, which is tested in the following.

Table 4.19 Per capita credit limits, by sector and by program participation

	Participants	Nonparticipants	
	All	< 0.5 acre	>0.5 acre
Informal sector			
Credit limit (taka)	571	441	1,561
Number of observations	123	95	127
Formal sector			
Credit limit (taka)	1,236	248	737
Number of observations	118	34	59

Source: IFPRI 1994.

Notes: Each individual adult household member who reported having borrowed during the recall period was asked about their formal (including NGOs) and informal credit limit. The question referred to the particular lender identified in the observed credit transactions during the recall period. Thus, data on credit limits were obtained only from those adults who had borrowed during the recall period. In Round 1, the recall period was the previous three years, whereas the other two rounds recalled only the time between the rounds. The table shows the credit limit averaged over the three rounds.

Multivariate Analysis of Credit Limits

The descriptive analysis based on Tables 4.19 and 4.20 is extended here with a multivariate econometric analysis that takes into account self-selection bias. Taking account of this bias is important because, in this survey, information on credit limits was obtained only from borrowers, a subsample of all survey households. This is similar to the case of

studies on labor markets that collect information on wages only from a sample of working individuals (Heckman 1979; Maddala 1983). Therefore, a two-step econometric procedure is used. In the first stage, a probit function is estimated that provides the likelihood of participating in a borrowing transaction in the formal sector and a Mills ratio (Heckman 1979) is computed. In the second stage, the Mills ratio is used as an additional regressor in the credit limit equation estimated, using data on the subsample of borrowers.

Because the main objective in estimating the first-stage probit equation is to obtain a correction factor for the selected credit limit equation, it is estimated in the reduced form. The probit equation contains the eligibility status indicator ELIGIBILITY as a regressor, though this is not included in the credit limit equation, because 90 percent of the "selected" households were members of NGO institutions. All the variables in both the equations—those controlling for household and community-level characteristics—are the same as those used in the bivariate probit model of participation in group-based programs (Table 4.21). However, because credit limit is likely to be strongly conditional on length of membership in the institution, a variable LENGTH (the number of years a household has been a member of an NGO organization) is interacted with all variables except the regional dummies. For the 10 percent of households that were not members, LENGTH is computed as zero; hence, the estimated equation provides information on the determinants of the credit limit for member households only. Thus, ELIGIBILITY and LENGTH are important identifying variables in the selection model presented in Table 4.21. Because the first-stage probit is estimated in the reduced form, the estimated coefficients reflect the confounded effects of both demand and supply factors and therefore are not reported here.[17]

Table 4.20 Per capita credit limits in the formal sector, by length of NGO membership

	Length of NGO membership		
	Lower tercile	**Medium tercile**	**Upper tercile**
Mean years of membership	1.52	4.96	10.34
Credit limit (taka)	891.00	1,296.00	1,581.00
Number of observations	40	46	32

IFPRI 1994.

Table 4.21 Determinants of the formal credit limit per borrowing household

Independent variable	**Coefficient**	***t*-values**
AGEHH*LENGTH	–34.78**	–3.162
AGEHHSQ*LENGTH	0.401**	3.306
MALEDU*LENGTH	31.04	1.228
FEMEDU*LENGTH	13.728	0.582
ADMALE*LENGTH	–23.912	–1.060
ADFEMALE*LENGTH	–93.612**	–3.892
LENGTH	939.178**	3.866
GENDERHH*LENGTH	–129.673**	–2.198
LAND*LENGTH	–0.522	–1.044
HPDIST*LENGTH	38.137	0.902
SPDIST*LENGTH	56.658	–1.8
REGION1	84.62	0.355
REGION2	248.616	0.881
REGION3	489.518	1.511
LAMBDA	954.662**	5.416
$N = 135$		
F-statistic	3.45	
Adj R^2	0.204	
Log likelihood	–1,090.446	

Notes: The dependent variable is the credit limit (in taka) reported to be available by borrowing households from the formal sector.

* = significant at 10 percent level; ** significant at 5 percent level.

Description of variables in regression model:

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
LENGHT	lenght of membership in group-based NGO
GENERHH	gender of household head
LAND	land owned ten years ago
HPDIST	distance of home of parents of household head
SPDIST	distance of home of parents of spouse of household head
REGION1-3	region dummies
LAMBDA	Mills ratio from first-stage probit equation

[17] A bivariate model of participation in NGO programs that separated out the effects of demand and supply factors was presented earlier in this chapter.

The second-stage credit limit equation is presented in Table 4.21 and is discussed below.

The estimated coefficients of the credit limit equation point to some interesting findings. The coefficients of both the age of the household head and its square are significant at the 5 percent level. The average age of household heads for the entire sample is 43 years. It is precisely for ages above this average that credit limit increases with age. Because the age of the household head is likely to be positively correlated with a greater degree of local knowledge and experience, and possibly also higher income-earning capacity, it does make older household heads a better credit risk relative to younger ones. Neither the male nor the female education variable is significant; however, households with more female adults are likely to have a lower credit limit.

The estimated equation indicates that length of membership in the group-based institutions is statistically significant in determining credit limits. This result confirms the finding in Table 4.20 that institutions follow a graduation policy in loan allocation whereby a credit limit is increased on the basis of past repayment record and successful participation in the credit program. Female-headed households have a significantly lower credit limit than male-headed households. It is indeed ironic that, although NGOs make special efforts to reach out to female-headed households (Kabeer 1998), once such households become members they are allocated lower credit limits. The gender-based differences in credit limits probably reflect gender-based differences in earning potential. In Bangladesh, not only do women generally earn significantly less than men, but female-headed households constitute some of the poorest households.

Finally, the estimated equation indicates that the amount of land owned (LAND) is not an important determinant of credit limits. The statistical insignificance of the land variable emphasizes the prime importance of labor earning power in determining credit risk and hence credit limits.

CHAPTER 5

Analysis of the Household-Level Impact of Group-Based Credit Institutions in Bangladesh

In this chapter, the impacts of group-based financial institutions on a variety of behavioral and welfare outcome variables are estimated. The chapter begins with a descriptive analysis of responses by survey households regarding the perceived change in social capacity, social attitudes, and livelihood. This tabular analysis of qualitative impact indicators suggests a significant and positive impact on household welfare. The chapter then presents an econometric analysis of impact of credit access on selected behavioral outcomes. By and large, the econometric analysis confirms the results of the tabular analysis of qualitative indicators. In particular, three areas of possible impact of credit access are explored: adoption of new technology, income generation, and food and calorie consumption. The new technology considered here is the modern high-yielding variety of rice (HYV rice), and the question asked is whether or not increased access to credit leads to higher adoption levels of HYV rice. Regarding household income and welfare outcomes, examination is made whether superior access to credit results in higher levels of (1) monthly per capita total consumption expenditure as a proxy measure of income, (2) monthly per capita off-farm income, (3) monthly per capita food expenditure, and (4) monthly per capita calorie consumption. Throughout the econometric analysis, the household credit limit that was presented and estimated in Chapter 4 is used as the measure of access to credit.

The first section of this chapter begins with a tabular descriptive analysis of perceived changes in social capacity and attitudes as well as livelihood. The second section then highlights the main issues in assessing the impact of programs such as those offered by the group-based institutions in Bangladesh. It discusses the impact on HYV adoption, and presents the results for the impact regressions related to income and consumption. These results on the income effects of credit access are finally compared with the average costs of providing credit access, as discussed in Chapter 3.

A Comparative Analysis of Qualitative Indicators of Credit Program Impact Related to Social Change and Livelihood

Effects on Social Capacity and Attitude[18]

Recent trends in development literature have increasingly expanded the purview of the development focus to include issues of social change. However, the empirical understanding of what constitute meaningful indicators of social change remains rather tenuous. The current exercise is in the nature of a preliminary field-testing of an analytical framework, which correlates development initiatives such as innovative targeted credit programs and selected indicators of social change.

The proposed analytical framework operationalizes the concept of social change along two major dimensions: (1) social capacity and (2) social attitude. Attitudes define the quality of the social environment, while capacity defines the extent to which opportunities afforded by such an environment can be realized. The interplay of these two dimensions can provide an operationally meaningful approximation of the concept of social change as it may pertain to the impact of development programs.

In the third round of the survey, a separate questionnaire was used to collect information designed to capture the impact of the targeted credit programs on social change. The program participants were asked questions for the current period (the "present" situation) and for the period five years previously (the "past" situation). For most participants, the "past" represents the situation before their program participation. Control households (the eligible nonparticipants) were also asked to undertake a "with and without" comparison. In every case, answers were sought separately from male and female respondents in each household.

Table 5.1 presents the findings of the social impact component of the survey. The dimension of social capacity is represented by four indicators: decisionmaking, coping capacity, social participation, and physical mobility.

Rural Bangladesh is strongly characterized by what sociologists term "patriarchal dominance," that is, the domination of the male head of household over all decisionmaking governing the household. Social change in such a context can be taken to mean a weakening of patriarchal dominance through greater female participation in decisionmaking. Table 5.1 shows the incidence of male–female joint decisionmaking for the past and present comparison. Sizable change is detected for only one out of five decision problems, namely children's education: whereas only 36 percent of couples in participating households jointly decided on matters related to children's education five years previously, 50 percent of the same households do so now. This difference is statistically significant with a probability of error of less than 10 percent[19] The remaining observed differences, including those for the "with and without" comparisons, are not statistically significant.

A critical indicator of household well-being is the capacity to cope with emergencies, and maintaining access to emergency credit is an important coping strategy in many societies. The data in Table 5.1 show sizable

[18] Dr. Hossain Zillur Rahman of the Bangladesh Institute of Development Studies (BIDS) is the principal contributor to this section of the report.

[19] To test whether the observed differences between the past and present situation for the same households are statistically significant, a paired *t*-test was performed. For the "with and without" comparison, an independent *t*-test was conducted with the assumption of variances not being equal. Statistical significance throughout the discussion of results for Tables 5.1 and 5.2 refers to a probability of error of 10 percent or less. It needs to be pointed out, however, that the tabular analysis, even if statistical significance is detected, can be only indicative of an impact of program participation on social change and changes in livelihood because the *t*-test does not control for other variables influencing the differences between the groups.

Table 5.1 Indicators of social change (% of affirmative responses)

	"Past and present"[a]		"With and without"[b]	
	Now	Five years ago	Participant	Eligible nonparticipant
Male—female joint decisionmaking				
Children's education	50	36	50	58
Son/daughter's marriage	60	64	60	61
Purchase of consumer durables	51	56	51	49
Land purchase	61	55	61	60
Major investments	54	51	54	43
Coping capacity				
Female access to 5 or more sources of emergency credit	30	20	30	25
Female access to 1,000 taka or more as emergency credit	13	4	13	6
Physical mobility				
Female mobility beyond village	55	25	55	22
Female mobility for purposes other than social visits	55	32	55	31
Participation in development programs				
Male	. . .	. . .	44	42
Female	. . .	. . .	15	5
Male attitudes				
Do not approve dowry	. . .	. . .	57	62
Voting as I think fit	. . .	. . .	73	81
Protest unjust *shalish* decision	. . .	. . .	46	37
Marriage age for girls to be above 20	. . .	. . .	30	18
Do not approve female income-earning	. . .	. . .	34	34
Do not approve family planning	. . .	. . .	25	27
Female attitudes				
Do not approve dowry	. . .	. . .	60	46
Voting as I think fit	. . .	. . .	24	20
Protest unjust *shalish* decision	. . .	. . .	16	12
Marriage age for girls to be above 20	. . .	. . .	28	28
Do not approve female income-earning	. . .	. . .	16	27
Do not approve family planning	. . .	. . .	21	23

Source: IFPRI 1994.

[a] "Past and present" examines changes among participants since five years ago.
[b] "With and without" examines changes between participant and control groups. Control groups in this context refer to persons who are part of the target group but are not participants in the credit schemes, that is, eligible nonparticipants.

differences for this indicator for both types of comparison. Of participating women, 30 percent now have access to five or more sources of emergency credit, whereas only 20 percent in the same group of women had such access five years previously. Moreover, 13 percent of women report access to emergency credit of Tk 1,000 or more, whereas only 4 percent could borrow such an amount five years previously. This suggests that participation in group-based programs also improves access to informal consumption credit. These differences are statistically significant. Similar sizable and statistically significant differences exist for the "with and without" comparison.

Roughly half of female members were found to have some say in decisions that concern the family overall. This limited empowerment of women is also discernible from their restrictions on physical mobility, that is, being allowed to leave the homestead for visits outside the village or for attending social events. The survey findings show a very large and statistically significant change in

this indicator for both types of comparison. Women in participating households are more than twice as likely to be able to travel beyond the village, compared with five years previously. Women in eligible nonparticipant households are roughly half as likely to attend social events or to travel outside the village. These findings of an increase in the scope of physical mobility among women in participating households are indicative of a process of empowerment and social change in general.

Greater participation by the poor in various social events suggests a process of empowerment of the poor. Program participation appears to have no impact on male participation in development programs, whereas women in participating households are three times more likely to participate compared with women in eligible nonparticipant households (15 percent compared with 5 percent). The latter difference is statistically significant.

Besides the issue of social capacity, the other crucial dimension of social change is the social attitudes of women and men. However, the use of memory recall was not deemed appropriate to capture changes in attitude. Therefore, only a "with and without" comparison was included in the survey. Table 5.1 shows that female members of participating households are more likely to disapprove dowry than are female members of target nonparticipant households (60 percent against 46 percent). The other five indicators related to female attitudes show the expected differences, but they are smaller and not statistically significant. The effects of program participation on men are, as expected, less distinct, and none is statistically significant.

In summary, the tabular analysis finds some evidence of social change, in particular in the areas of intrahousehold decisionmaking and women's empowerment, women's coping capacity, the physical mobility of women, and social attitudes of women. For all of these indicators, the targeted NGO credit programs appear to have brought about distinct and favorable changes, despite the fact that targeted rural credit schemes are but one factor among the totality of factors that affect these areas of behavior.

Changes in Livelihood

One of the first modules of the household survey sought information about longer-term changes in livelihood. All heads of households were asked about their perception of change in their livelihood during the previous seven years. The interviewer was trained not to mention the issue of program participation when asking these questions so as to minimize respondent bias as much as possible. The responses are summarized in Table 5.2.

Of the participating households, 50 percent reported a positive change in their livelihood, while 44 percent perceived a negative change. The corresponding figures for eligible nonparticipants, in contrast, are 39 and 56 percent. The observed differences between participants and eligible nonparticipants are statistically significant, suggesting that participation in the group-based financial institution improved the livelihood of the members compared with nonmembers. It is interesting to see that nonparticipants owning more than 0.5 acres of land reported negative change more frequently than did participating households (49 percent compared with 43 percent for participants).

The general question about the change in livelihood was followed by detailed questions on various aspects of livelihood, as listed at the bottom of Table 5.2. Of the total households reporting positive change, about 90 percent of participating and 85 percent of nonparticipating households reported improvements in their food consumption in terms of quantity as well as quality. Very stark and statistically significant differences are found for positive changes related to the health status of family members (52 percent for participants against 34 percent for eligible nonparticipants) and even more so for the education of children (50 percent against 26 percent).

These qualitative results are consistent with other impact studies in Bangladesh. With

Table 5.2 The effects of program participation on livelihood

	All NGO households	Eligible nonparticipant households (<0.5 acre)	Noneligible nonparticipant households (≥0.5 acre)
Number of observations	124	97	129
% of households reporting			
No change	6.5	5.2	3.1
Positive change	50.0	39.2	48.1
Negative change	43.5	55.7	48.8
Number of households reporting positive change	62	38	62
Main areas of positive change (%)			
Quantity of food	90.3	84.2	71.0
Quality of food	91.9	86.8	71.0
Quality of drinking water	41.9	34.2	29.0
Health of members	51.6	34.2	43.5
Education of children	50.0	26.3	54.8
Housing	59.7	55.3	67.1

Source: IFPRI 1994.

Note: The questions referred to the change in livelihood, as perceived by the household head, during the previous seven years.

respect to the use of contraceptives, Hashemi and Schuler (1997b) find a positive impact of women's participation in microfinance programs in Bangladesh. Pitt and Khandker (1998) identify large and significant effects of group-based institutions on health and children's schooling, especially if the loans are targeted at women as opposed to men. However, using the same data set, Morduch finds no significant impact on these outcome variables (Morduch 1998a; 1999).

Econometric Analysis of Program Impact

General Issues in Impact Analysis

Because it is impossible to observe a household with and without program participation simultaneously, and lacking a panel data set that allows observation of households before and after program participation, impact analysis in this chapter is based on comparing household outcomes differentiated by access to credit while simultaneously controlling for various other factors that affect the outcome in question (for example, levels of prior-owned human and physical capital). However, not all of the "other factors" can be measured or even observed. For example, factors such as innate abilities, entrepreneurship, social skills, and management abilities make some households more productive than others, but these cannot be fully observed or adequately measured. If these same factors also affect a household's participation or acceptance in credit programs, selectivity bias results and attribution becomes difficult (Heckman 1979). As reported in Morduch (1997), this type of selection bias can lead to an overestimation of impact by as much as 100 percent (McKernan 1996). It could also lead to underestimation of benefits in cases where programs take special care to select clients who have some inherent but unmeasurable weaknesses.

Further, if programs tend to be placed in locations with better infrastructure, not accounting for this fact will again lead to the overstating of benefits, and vice versa if they are placed in worse-off communities. As indicated in Chapter 2, placements of branches of NGO institutions were by no means random: they heeded poverty considerations, with services geared more toward poor pockets

of relatively well-developed areas. Location considerations have therefore been explicitly accounted for in the estimated impact equations.

The methods used in this chapter are based on Kochar (1997) for the adoption of high-yielding varieties (HYV) of rice and on Morduch (1998a) for welfare impact. In the assessment of the effect of credit access on household income and expenditures, villages with RDRS programs are used as control villages. The method involves comparing welfare indicators of eligible households in the ASA and BRAC villages with eligible households in the RDRS village to derive an average impact of the ASA and BRAC programs. The estimated impact level therefore represents the net impact of ASA and BRAC services relative to the effect of other programs, including the RDRS credit program, in the control villages. The RDRS's credit program was initiated in 1992 (only two years prior to the survey). Since a reallocation of consumption expenditures is usually linked to changes in some notion of the "permanent" income of the household, it is likely that only a small fraction of the full impact would be realized in such a short time span. This is because there is likely to be a time lag—or an interim period—during which the household completes a subjective assessment of the permanence of the institution and assured access to credit. For this reason, the estimated net impacts of BRAC and ASA are likely to be quite close to the full impact of their services. Of course, the present-day reality of Bangladesh is such that it is now difficult to find a control village that is strictly "uncontaminated" by social services provided by some type of NGO institutions. This means that the absolute level of impact is likely to be higher than the net impact measured in most cases.

The treatment/control groupings were not used in assessing the impact on HYV adoption for two reasons. First, relating the level of credit access to the extent of HYV adoption necessitated working with a subsample of adopters-cum-group member households, and further subgrouping these into treatment and control villages led to a very small number of observations in each of the groups. Second, HYV rice in Bangladesh is not a new technology whose adoption is conditional upon an initial learning period. Hence, whereas it is reasonable to expect that the full effects of increased credit access on household consumption behavior will occur after some time lag, there is less reason to believe that there will be such a time lag in the adoption of HYV rice, especially where the household already possesses land suitable for the cultivation of HYV rice. The method used to assess impact is therefore based on estimation of a two-stage regression equation linking adoption with credit access that incorporates information on the decision to adopt as well as the decision to participate in group-based credit programs (Kochar 1997).

Credit Access and HYV Adoption

Access to credit may affect the adoption of HYV rice principally in two ways. First, by relaxing the liquidity constraint, credit facilitates timely purchase and use of various agricultural inputs, including seed, fertilizer, pesticides, water, and labor at appropriate stages of production and in combinations that maximize returns. HYV rice production is not only significantly more input intensive than traditional varieties, but also more sensitive to the timing of application. Hence the ability to finance the timely purchase of agricultural inputs is expected to be an important determinant of the proportion of land allocated to HYV rice. Financial constraints are especially relevant to small and marginal farmer-households for whom liquidity bottoms out during the planting season, when stocks of food and agricultural products from the previous harvest have already been depleted. Second, HYV rice is less adaptable and less resilient in the face of commonly occurring adverse climatic events (Bera and Kelley 1990), so access to unused credit lines enables poor households an uphold essential

consumption during adverse periods. This protection provided by credit makes it possible for poor households to reduce their dependence on traditional rice varieties that have a low risk and a lower average profitability. Hence an increase in access to credit is likely to be associated with an increased allocation of available land to HYV rice.

An earlier IFPRI study examined the effects of increased access to credit on HYV rice cultivation in Bangladesh and concluded that lack of access to credit did not constrain cultivation (Hossain 1988). However, the methodology used in that study did not adequately address endogeneity problems arising out of self-selection into programs, thus leading to an examination of this issue once again.

In the methodology used here, three separate, but not unrelated, activities are brought together: (1) the household's participation in a group-based organization, (2) its decision on whether or not to cultivate HYV rice, and—conditional upon (1) and (2)—(3) its decision in how much land to allocate to HYV rice cultivation. The methodology is described below.

Let A be the amount of land devoted to HYV rice. The decision to cultivate HYV rice (the adoption decision) is determined by a latent variable A^* such that

$$A = A^* \quad \text{if } A^* > 0$$

$$= 0 \quad \text{otherwise.}$$

A^* is specified as

$$A_i^* = \beta_0 + \mathbf{X}_i\beta_1 + \beta_2 C_i + \beta_3 V_i + u_i, \qquad (5.1)$$

where $\mathbf{X}_i$ is a vector that includes household specific characteristics, C_i is the household credit line (limit) at the group-based credit program, V_i represents community-level effects, and u_i is a random term. Now, let P^* denote the latent variable determining participation in a group-based credit program such that a household participates if and only if $P^* > 0$. The area allocated to HYV rice can therefore be written as

$$E(A^*) = \partial_0 + \mathbf{X}_i\partial_1 + \partial_2 C_i \quad \text{if } (P^*_1 > 0, A^*_i > 0)$$

$$= \partial_0 + \mathbf{X}_i\partial_1 \quad \text{if } P^*_i \le 0, A^*_i > 0)$$

$$= 0 \quad \text{otherwise} \qquad (5.2)$$

Only the first line of equation system (5.2) is estimated and this is rewritten as

$$(A|P^* > 0, A^* > 0) = \partial_0 + \mathbf{X}_i\partial_1 + \partial_2 C_i + e_i \qquad (5.3)$$

Since $E(e_i \mid P^* > 0, A^* > 0) \neq 0$, estimating equation (5.3) in its current form results in biased estimates of δ (Heckman 1979; Greene 1993). For this reason, equation (5.3) is estimated in two steps. In the first stage, the joint probability of participating in a group-based institution and adopting HYV is estimated using reduced form specifications of (1) the marginal probability of adoption and (2) the marginal probability of participation in group-based credit programs. The marginal probability of adoption is essentially the binary representation of equation (5.1), where the dependent variable ADOPT = 1 if $A^* > 0$ and takes the value 0 otherwise. The marginal probability of participation is the reduced form version of the bivariate specification of participation in Chapter 4. In the second stage, inverse Mills ratios, λ_1 and λ_2 (see Kochar 1997 for relevant expressions), are computed from the estimated bivariate functions and used as additional regressors in the final estimating equation as follows:

$$A_i \mid C_i^* > 0, A_i^* > 0 = \partial_0 + \mathbf{X}_i\partial_1 + \partial_2 C_i + \sigma_1\lambda_1 + \sigma_2\lambda_2 + w_i. \qquad (5.4)$$

Because of the potential endogeneity of C_i in equation (5.4), an instrumental variable (IV) estimation of ∂_2 is obtained using predicted limits from the estimated equation in Table 5.1 as instruments. Also, use of esti-

mated values of the λ's as well as IV estimation of ∂_2 means that the conventional formula cannot be used to compute standard errors of the regression estimates. Standard errors of estimated coefficients were therefore obtained by bootstrapping (500 replications).

Two further points are noted. First, access to informal credit is not specified as a structural variable on the right-hand side of equation (5.4). Though the important role of informal credit in the financial transactions of poor rural households in Bangladesh is acknowledged, the inability to find an instrument that could legitimately identify the informal credit access equation prevented its inclusion as a structural variable. Of course, since access to informal credit depends on the same set of observable household and community characteristics included in equation (5.4), its effects are already embedded in their estimated coefficients. Hence, it is important to note that, although the impact of informal credit was not quantifiable, its effects are controlled in assessing the impact of group-based credit—the main focus of analysis in this report.

The second point regards irrigation status and land type. Because both these factors are critical in determining the financial returns to HYV rice, and hence its adoption, it is important to specify these characteristics accurately in the estimating equation. This creates a problem for the *Aman* season, since no information was collected on land type in the survey. As indicated in Chapter 4, in the *Aman* season, the traditional variety of broadcast *Aman* (deep-water *Aman*) rice is grown in the lowland area, while both local and HYV rice are cultivated in the uplands. Hence, not specifying upland/lowland information in the regression equation would lead to fairly serious specification bias, because demand for credit—and thus the extent of supply constraint—is likely to be highly correlated with land type.

In contrast, the lowland/upland distinction is not as important for the dry *Boro* season, since flooding is not a problem and irrigation status is quite unambiguously defined. For this reason, the impact equation is estimated only for the *Boro* season crop. Because weather-related uncertainty plays a much lesser role in the *Boro* season, one unintended consequence of restricting analysis to the *Boro* season is that impact now focuses more on the effects of relaxing the liquidity constraint and less on the insurance effects of credit.

The estimation results on adoption of HYV rice are presented in Tables 5.3 and 5.4 (means and standard deviations of variables are presented in Table 4.8). Table 5.3 presents the first-stage participation and adoption equations. Two estimation approaches were tested: one in which the error terms in the participation and adoption equations were assumed to be correlated, and the other in which each function was estimated as an independent probit function. A likelihood ratio test rejected the null hypothesis that the two models were different, and the independent probit functions were chosen as the preferred model because they were more consistent with the second-stage result reported below. Determinants of participation in credit programs have already been discussed in detail in Chapter 4 and will not be pursued here. As for HYV rice, apart from the location dummy variables and the intercept term, the only other statistically significant determinants of adoption of HYV rice are access to irrigated land and the gender of the household head—female-headed households are less likely than male-headed households to adopt HYV. The importance of irrigation in HYV adoption is further emphasized in the second-stage equation, which relates the area devoted to HYV rice to various household characteristics (Table 5.4). The estimated equation rejects the hypothesis that credit lines in group-based programs determine the extent of HYV adoption; the only variable that has a statistically significant effect is access to irrigated land.

Although the above result indicates that access to irrigation is the primary determinant of the extent of adoption of HYV rice, it is important not to conclude that financial

Table 5.3 Independent probit estimates for program participation and the HYV adoption decision

	Propensity to adopt		Program participation	
Explanatory variables	**Estimated coefficient**	**Asymptotic *t*-ratio**	**Estimated coefficient**	**Asymptotic *t*-ratio**
Constant	–2.907**	–1.910	–3.142	–1.407
AGEHH	0.031	0.534	0.088	0.859
AGEHHSQ	0.0002	–0.379	–0.001	–0.973
LAND	. . .	. . .	–0.045**	–4.374
IRRILAND	0.023**	5.744	. . .	. . .
HHSIZE	–0.080	–1.029	0.358**	3.068
MALEDU	0.008	0.135	–0.051	–0.540
FEMEDU	–0.043	–0.435	0.208	1.411
GENDERHH	1.419*	1.634	0.622	0.926
ADMALE	0.293	1.387	0.075	0.220
ADFEMALE	. . .	. . .	0.748*	1.933
REGION1	0.504	1.517	–0.098	–0.203
REGION2	0.600	1.275	0.434	–0.797
REGION3	0.779**	2.096	–0.931*	–1.726
ELIGIBILITY	. . .	. . .	1.226*	1.826

Source: IFPRI household survey data 1993–94.

* = significant at 10 percent level; ** = significant at 5 percent level.

Description of variables used in different regression equations:

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
LAND	total land owned
IRRILAND	total irrigable land
HHSIZE	total number of household members
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
REGION1-6	region dummies
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise

services in general are irrelevant in HYV adoption. From the point of view of the farmer with access to irrigated land, high returns to HYV adoption make even high interest rates worth paying in order to obtain adequate amounts of timely credit. For informal lenders, on the other hand, households that own or otherwise have access to irrigated land are preferred clients, because their higher and also less uncertain levels of income (compared with those who depend on rainfed agriculture) make them better borrowers. Thus, favorable factors operating on both the demand and supply sides mean that access to irrigated land is highly likely actually to facilitate obtaining credit from informal lenders. It may be for this reason that credit lines in group-based institutions do not seem to matter.

Credit Access and Household Welfare

The impact of credit on a household welfare indicator W_i can, as in the case of HYV adoption, be linearly specified as

$$W_i = \beta_0 + \mathbf{X}_i\beta_1 + \beta_2 C_i + \beta_3 V_i + u_i. \qquad (5.5)$$

Though the endogeneity of C_i remains a problem, the dependent variable, unlike in the adoption equation, is no longer censored. As indicated previously, the treatment/control approach was used in evaluating impact. This involves comparing the welfare indicators of

Table 5.4 The impact of credit on HYV cultivation

Variables	Coefficients	*t*-values
CRLIMIT	–0.001	–0.080
AGEHH	–0.639	0.224
AGEHHSQ	0.005	0.148
IRRILAND	0.521**	5.375
HHSIZE	1.759	0.438
MALEDU	2.071	0.345
FEMEDU	3.225	1.065
GENDERHH	–3.970	–0.120
ADMALE	–2.642	–0.127
ADFEMAL	–8.935	–0.400
SPDIST	0.007	0.012
HPDIST	0.210	0.540
LAMBDA1	2.581	0.072
LAMBDA2	1.178	0.223
REGION1	4.904	0.128
REGION4	31.387	0.628
REGION3	2.650	0.077
Constant	32.202	0.547

$N = 137$
$(F_{17,119}) = 21.58$
Adjusted $R^2 = 0.75$

Source: IFPRI household survey data 1993–94.

** = significant at 5 percent level.

Description of variables used in different regression equations:

CRLIMIT	predicted credit limit
AGEHH	age of the household head
AGEHHSQ	square of the age of household head
IRRILAND	total irrigable land
HHSIZE	total number of household members
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
LAMBDA	Mills ratio obtained from first-stage probit equation
REGION1-6	region dummies

eligible households in the ASA and BRAC villages with eligible households in the RDRS village in order to derive the average impact of the ASA and BRAC programs. This is done by defining two binary variables, one indicating eligibility in the ASA/BRAC program (e_i), and the other indicating the presence of ASA/BRAC credit services in the village (b_i). Equation (5.5) is rewritten as

$$y = \beta_0 + \beta_1 e_i b_i + \beta_2 e_i + \mathbf{X}_i \beta_i \beta_3 + \beta_4 V_i + u_i. \qquad (5.6)$$

Hence, once the effects of village and household characteristics as well as eligibility status are separately controlled, the coefficient of $e_i b_i$ (β_1) identifies the impact due to program availability (Morduch 1998a). A slightly different version of the above equation is used for estimation in this study: instead of using $e_i b_i$ as a regressor, credit limit (C_i) was used as the regressor, and instrumented by $e_i b_i$ (see Morduch 1997). This obtained an average impact per taka rather than a total impact (Morduch 1997). Further, because household outcomes vary seasonally, impact is assessed for three major cropping seasons—the *Aman, Aus,* and *Boro* seasons. For all equations estimated, White's (1981) method is used to correct for possible heteroskedasticity in the data set.

As Tables 5.3–5.6 show, the results, unlike Morduch's (1998a), reveal that credit access as measured by the credit limit in general has positive and significant impacts on households' well-being (means and standard deviations of variables are presented in Table 4.8). These are discussed separately below.

Total Household Income

In the following analysis, household income is proxied by total consumption expenditures on food and nonfood goods and services. The dependent variable is per capita monthly total consumption expenditures. The effect of credit access on total household income is statistically significant at a probability error of 5 percent in the *Aus* and *Aman* seasons, but not in the *Boro* season (Table 5.5). On average, and depending on the season, each additional 100 taka of credit limit raises per capita monthly income by 0.84 taka (the *Aus* season), by 1.55 taka (*Aman* season), and by 0.52 taka (*Boro* season). These coefficients are calculated with the following formula:

Marginal impact: $dy/dx = y * b_x$,

Table 5.5 Impacts of ASA/BRAC credit limit on log of monthly per capita consumption expenditure

	Aus season		*Aman* season		*Boro* season	
Explanatory variables	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**
Constant	6.471790	23.37	6.83474	23.15	6.250690	22.78
AGEHH	–0.005097	–0.45	–0.00874	–0.81	0.005797	0.66
AGEHHSQ	0.000005	0.04	0.00006	0.54	–0.000061	–0.66
LAND	0.001081	6.74	0.00127	4.43	0.001056	6.46
HHSIZE	–0.102832	–8.42	–0.10505	–5.92	–0.107064	–7.62
MALEDU	0.006326	0.61	0.04247	2.62	0.035380	2.71
FEMEDU	0.016780	0.90	0.00262	0.10	0.020528	0.73
GENDERHH	–0.176824	–2.58	–0.09629	–0.94	–0.122877	–1.39
ADMALE	0.185460	5.76	0.18608	4.50	0.223682	6.83
ADFEMALE	0.030504	0.94	–0.00346	–0.07	–0.010778	–0.29
SPDIST	0.001112	2.61	0.00007	0.11	0.000224	0.61
HPDIST	–0.000097	–0.15	0.00124	2.12	–0.000295	–0.46
ASA/BRAC ELIGIBILITY	–0.110420	–1.97	–0.12821	–1.64	–0.152957	–2.57
ASA/BRAC credit limit (× 1,000)	0.000022	2.70	0.000026	2.71	0.000012	1.34
Village1	0.129812	0.97	0.18914	1.25	0.081635	0.41
Village2	0.105937	0.66	0.12356	0.64	0.290310	1.29
Village3	0.091842	0.63	0.10883	0.63	0.199930	0.97
Village4	–0.168292	–1.23	0.00629	0.04	–0.070656	–0.36
Village5	–0.120581	–0.82	0.02038	0.12	–0.073774	–0.35
Village6	0.171078	1.26	0.16889	1.10	0.149107	0.75
Adjusted R^2	0.44		0.44		0.45	
Model significance ($F_{19,330}$) =	15.40		10.27		15.95	
P-value =	0.00		0.00		0.00	

Note: The dependent variable is the monthly per capita total consumption expenditure (in taka) in the *Aus, Aman,* and *Boro* seasons, with means of 379.93, 595.86, and 437.03, respectively.

Description of variables used in the regression model (see Table 4.8 for descriptive statistics):

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
LAND	land owned ten years ago
HHSIZE	household size
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
VILLAGE1-6	village dummies
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise

where b_x = regression coefficient for ASA/BRAC credit limit in Table 5.5 and y = mean of dependent variable. It is noteworthy that the income effects of credit access are higher in the *Aman* season, compared with the *Aus* and *Boro* seasons. The *Boro* season follows the *Aman* harvest, the main harvest of the year, and is therefore the most favorable season for income for the poor, because liquidity is less of a problem. Thus, the shadow interest rate, or the return to credit access, is lower in the *Boro* season. Credit access has a significant impact on improving income levels during the relatively unfavorable *Aus* and *Aman* seasons. The higher income effects of formal credit access in the lean seasons can also be explained by the reduced cost to the household for consumption stabi-

lization compared with households that have to rely on costly borrowing from the informal sector. A positive link between credit access and consumption stabilization is also found by Morduch (1998a; 1999), who uses a data set from Bangladesh.

The elasticity of per capita monthly income with respect to the credit limit at the mean is estimated to be 0.0233 and 0.0275 for the *Aus* and the *Aman* seasons, respectively, and 0.0127 for the *Boro* season. Because of the semi-log specification of the regression model, the elasticities are computed as the product of the regression coefficient (for the credit limit) and the value of the average credit limit (that is, elasticity = b_i^* credit limit). Apart from credit access, important determinants of income in all three seasons are the size of land owned and male labor power. Female-headed households generally have significantly lower income levels, especially during the hungry *Aus* season. Women's education levels appear not to matter for household income, but those of men do, especially in the *Aman* and *Boro* seasons.

Per Capita Food Expenditure

As in the case of income, the impacts of credit access on per capita monthly food expenditures are statistically significant at a 5 percent probability of error in the *Aus* and *Aman* season (Table 5.6). For the *Boro* season, the positive affect is significant at a probability of error of 15 percent. On average, each additional 100 taka of credit limit raises monthly per capita food expenditure by 0.67 and 0.69 taka in the *Aus* and *Aman* seasons, respectively. For the *Boro* season, the corresponding effect is only 0.43 taka. Also, the elasticity at the mean is higher for the *Aus* season (0.0213) than for the *Aman* (0.0191) and *Boro* (0.0138) seasons. The major determinants of food expenditures are the same as for income. It is worth noting that female-headed households have lower levels of food consumption than male-headed households, especially during the *Aus* season.

Per Capita Off-Farm Self-Employment Income

The impact of credit access on self-employment income is statistically significant at the 95 percent level in all three seasons (Table 5.7). In addition, the estimated elasticities with respect to the credit limit at the mean level (0.17 for *Aus,* 0.14 for *Aman,* and 0.19 for *Boro*) are higher than the income elasticities reported above. For example, for the *Aus* season, the elasticity of total income is 0.0233, whereas it is 0.17 for off-farm income. This result suggests that access to credit from the group-based microfinance institutions increases overall household income, but encourages a shift out of agricultural, wage, and other income sources into off-farm microenterprises. As far as wage labor income is concerned, this is consistent with the declared objective of microfinance institutions to enable the poor to reduce their dependence on wage labor income by entering into or expanding existing microenterprises. This result indicates the strong off-farm credit focus of the microfinance institutions. It further supports the view that informal lenders play an important role in financing agricultural operations (as the previous result for HYV adoption implied). As for the other determinants, apart from the village dummies, the only variable that is consistently significant across seasons is male labor power.

Per Capita Calorie Consumption

The estimates indicate that the observed impacts of credit access on income (proxied by total expenditure) and food expenditures do not translate into increased calorie intake (Table 5.8). The coefficients for the credit limit are positive in all three seasons, but insignificant at a probability of error of 10 percent. However, the coefficient for the lean *Aus* season is significant at the 15 percent level. The latter result provides weak evidence that credit access may increase calorie consumption in the hungry season. In view of the significant income and food expenditure effects shown above, these results suggest a household preference toward improving the

Table 5.6 Impacts of ASA/BRAC credit limit on monthly per capita food expenditure

	Aus season		*Aman* season		*Boro* season	
Explanatory variables	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**
Constant	6.263260	25.59	5.989920	26.66	5.966440	27.30
AGEHH	–0.002136	–0.23	0.002126	0.29	0.005908	0.78
AGEHHSQ	–0.000020	–0.19	–0.000034	–0.45	–0.000066	–0.85
LAND	0.000886	4.50	0.000676	4.94	0.000886	7.51
HHSIZE	–0.092959	–7.52	–0.081265	–6.05	–0.098084	–7.38
MALEDU	0.007070	0.68	0.038105	3.31	0.025851	2.17
FEMEDU	0.009655	0.51	0.001993	0.09	0.010110	0.38
GENDERHH	–0.158001	–2.39	–0.048335	–0.67	–0.109208	–1.30
ADMALE	0.164204	5.17	0.169357	4.92	0.180157	5.85
ADFEMALE	0.019670	0.59	0.014573	0.44	0.016952	0.47
SPDIST	0.001175	2.60	0.000094	0.19	0.000145	0.43
HPDIST	–0.000203	–0.36	0.001105	2.27	–0.000207	–0.34
ASA/BRAC ELIGIBILITY	–0.117153	–1.98	–0.127325	–2.45	–0.125725	–2.27
ASA/BRAC credit limit	0.000020	2.54	0.000018	2.46	0.000013	1.61
VILLAGE1	0.152595	1.18	0.282967	2.05	0.067365	0.47
VILLAGE2	0.088427	0.56	0.111765	0.68	0.199764	1.13
VILLAGE3	0.117173	0.82	0.163782	1.10	0.150760	0.94
VILLAGE4	–0.153220	–1.16	–0.029153	–0.21	–0.091145	–0.63
VILLAGE5	–0.075756	–0.53	0.102095	0.61	–0.040489	–0.25
VILLAGE6	0.168070	1.28	0.186346	1.32	0.150070	1.02
Adjusted R^2	0.34		0.36		0.37	
Model significance ($F_{19,330}$) =	12.41		11.31		11.59	
P-value =	0.00		0.00		0.00	

Note: The dependent variable is the monthly per capita food consumption expenditure (in taka) in the *Aus, Aman,* and *Boro* seasons, with means of 336.97, 387.61, and 333.62, respectively.

Description of variables used in the regression model (see Table 4.8 for descriptive statistics):

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
LAND	land owned ten years ago
HHSIZE	household size
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise
VILLAGE1-6	village dummies

quality of food eaten rather than increasing its quantity. In other words, a substantial part of the additional income generated through credit access appears to be spent on increasing the quality of food or on nonfood items.

Do Microfinance Programs Really Help the Poor?

The question of whether microfinance programs really help the poor was raised by Morduch (1998a). In the following, we seek to summarize our results, and compare them with those of Morduch (1998a; 1999) and Pitt and Khandker (1998).

As presented above, the impacts of credit access on total per capita monthly household income, on per capita monthly food expenditures, and on monthly off-farm self-employment income are positive and statistically significant. However, it is important to consider the size of the effects. Based on the computed elasticities of income with respect to the credit limit, a 100 percent increase in the credit limit increases per capita

Table 5.7 Impacts of ASA/BRAC credit limit on log of monthly per capita off-farm self-employment income

	Aus season		*Aman* season		*Boro* season	
Explanatory variables	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**
Constant	1.21956	0.85	–0.8987	–0.60	–0.14184	–0.09
AGEHH	–0.00654	–0.14	0.075155	1.43	0.045587	0.78
AGEHHSQ	-1.28×10^{-5}	–0.03	–0.00087	–1.61	–0.00049	–0.79
LAND	–0.00049	–0.47	–0.00102	–0.93	0.001249	1.01
HHSIZE	–0.03092	–0.41	0.04033	0.52	–0.12685	–1.47
MALEDU	0.0812	0.97	0.162297	2.04	0.074342	0.92
FEMEDU	0.18393	1.37	–0.05079	–0.50	0.013925	0.11
GENDERHH	–0.39491	–0.79	0.223107	0.48	0.384281	0.53
ADMALE	0.513097	2.69	0.523479	2.51	0.557117	2.50
ADFEMALE	–0.36581	–1.61	–0.60852	–2.92	–0.51468	–2.11
SPDIST	0.002601	1.17	0.001385	0.86	–0.00238	–0.59
HPDIST	–0.00583	–1.47	–0.00178	–0.33	–0.00829	–2.78
ASA/BRAC ELIGIBILITY	0.959806	2.87	0.443575	1.26	1.36933	3.84
ASA/BRAC credit limit	0.000158	3.49	0.000127	2.28	0.000182	4.01
Village1	1.62987	1.79	1.44368	1.62	1.0405	1.09
Village2	0.45539	0.42	0.224461	0.22	0.311286	0.27
Village3	–0.33636	–0.35	–0.18008	–0.19	–0.0306	–0.03
Village4	0.387879	0.43	0.307239	0.35	–0.02039	–0.02
Village5	1.68832	1.62	1.36803	1.38	1.6291	1.50
Village6	3.57887	3.90	3.60742	4.06	3.44232	3.62
Adjusted R^2	0.29		0.28		0.29	
Model significance ($F_{19,330}$) =	8.62		8.26		8.41	
P-value =	0.00		0.00		0.00	

Note: The dependent variable is the monthly per capita off-farm income (in taka) in the *Aus, Aman,* and *Boro* seasons, with means of 17.46, 15.49, and 13.33, respectively.

Description of variables used in the regression model (see Table 4.8 for descriptive statistics):

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
LAND	land owned ten years ago
HHSIZE	household size
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise
VILLAGE1-6	village dummies

monthly income in the range of 0–2.3 percent, depending on the season. Because of the larger effect found for off-farm income —ranging from 14 to 19 percent, depending on the season—the results overall suggest that program participation partly substitutes wage labor income and other income sources with off-farm income. This is consistent with results by Khandker, Khalily, and Khan (1995), who found that the Grameen Bank increased the rural wage rate by 4 percent. They argued that the shift from wage labor to self-employed microenterprises financed by Grameen Bank credit resulted in a reduced supply of labor that pushed rural wages upward. The above substitution effect in our analysis supports this result.

The size of the impacts, and their significance, show considerable seasonal variation. The effects on total income and food expenditure are lower in the *Boro* season compared with the other two seasons. The realities of rural Bangladesh explain this pattern quite well. The *Boro* season is when employment

Table 5.8 Impacts of ASA/BRAC credit limit on log of monthly per capita calorie consumption

	Aus season		*Aman* season		*Boro* season	
Explanatory variables	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**	**Estimated**	**Asymptotic**
Constant	7.74080	31.07	7.540400	42.34	7.789510	29.76
AGEHH	0.00560	0.72	0.001800	0.34	–0.004042	–0.29
AGEHHSQ	–0.00005	–0.62	–0.000012	–0.22	0.000063	0.43
LAND	0.00042	1.81	0.000269	3.45	0.000323	3.50
HHSIZE	–0.05299	–4.67	–0.031895	–3.54	–0.039798	–3.16
MALEDU	–0.03999	–0.76	0.000873	0.13	0.012354	1.65
FEMEDU	0.02195	0.66	0.000330	0.03	–0.006101	–0.55
GENDERHH	–0.06611	–1.12	0.073978	1.22	0.026532	0.33
ADMALE	0.09791	2.91	0.095709	4.44	0.093581	3.81
ADFEMALE	0.02182	0.68	–0.018208	–0.67	0.016654	0.67
SPDIST	–0.00100	–0.54	–0.000036	–0.15	–0.000282	–1.70
HPDIST	–0.00081	–1.62	–0.000052	–0.15	0.000184	0.45
ASA/BRAC ELIGIBILITY	–0.10985	–1.07	–0.062373	–1.82	–0.123345	–2.48
ASA/BRAC credit limit	0.00001	1.51	0.000004	0.79	0.000003	0.67
Village1	–0.01731	–0.15	0.053909	0.39	–0.063583	–0.47
Village2	–0.05591	–0.20	0.052936	0.35	0.032523	0.21
Village3	–0.11691	–0.48	0.078316	0.55	0.018935	0.14
Village4	–0.13326	–1.11	0.027927	0.20	–0.177436	–1.15
Village5	–0.04535	–0.33	0.073032	0.50	–0.034660	–0.25
Village6	0.05413	0.45	0.007581	0.05	0.043436	0.32
Adjusted R^2	0.062		0.034		0.032	
Model significance ($F_{19,330}$) =	2.20		1.65		1.61	
P-value =	0.003		0.040		0.053	

Description of variables used in the regression model (see Table 4.8 for descriptive statistics):

AGEHH	age of the household head
AGEHHSQ	square of the age of household head
LAND	land owned ten years ago
HHSIZE	household size
MALEDU	highest education of male in household
FEMEDU	highest education of female in household
GENDERHH	gender of household head (dummy, 1 = male)
ADMALE	number of adult males in household
ADFEMALE	number of adult females in household
HPDIST	distance to home of parents of household head
SPDIST	distance to home of parents of spouse of household head
ELIGIBILITY	dummy variable that equals 1 if household is eligible and 0 otherwise
LENGTH	length of membership in group-based NGO
VILLAGE1-6	village dummies

opportunities for wage earners are higher and even smaller farmers possess some stock of food from the just harvested *Aman* crop. On the other hand, during the *Aus* season and the preharvest *Aman* season, both demand for agricultural labor and foodstocks are low. It is in these lean seasons that access to credit appears to matter significantly for income generation and food consumption.

It is possible that the methodology used here (which is similar to that employed by Morduch 1998a) systematically underestimates the impact of group-based financial institutions, because of the lack of a totally "uncontaminated" control village in the data set. The control villages were exposed to the RDRS program for one to two years. However, it is difficult to find true "control villages" in rural Bangladesh that have not yet been reached by some sort of development program, if not by a group-based financial institution. Morduch (1998a), who finds no significant program impacts on consumption levels, also points out that the control villages

in his data set may not yet have credit programs, but they are served in other ways by social service organizations. He concludes therefore that "it should not be surprising that strong positive differences between treatment and control villages remain elusive. The microfinance programs may make important absolute differences in the lives of borrowers, even if the relative differences are small."

Using the same data as Morduch (1998a), Pitt and Khandker (1998) find sizable and significant effects of microcredit on household income. They find that every additional Tk 100 borrowed by women significantly increased annual household income by Tk 18 (for borrowing by men, the impact is only Tk 11). In order to compare their results with ours, some calculations need to be performed to adjust our results. This is described next. As shown above, each additional Tk 100 of credit limit raises per capita monthly income by Tk 0.84 in the *Aus* season and Tk 1.55 in the *Aman* season; the coefficient is not significant for the *Boro* season. To make these figures comparable with the results on annual household income by Pitt and Khandker (1998), they need to be multiplied by a factor of 12 (so as to arrive at yearly income) and multiplied by the average household size of participant households (which is 5.16). Following this, the marginal effects of credit access in the amount of Tk 100 on annual household income are Tk 52 in the *Aus* season, Tk 96 in the *Aman* season, and Tk 0 in the *Boro* season (this latter coefficient is not significant).

Moreover, Round 1 took place in June and July of 1994, and recalled the expenditures during the *Boro* season (since January 1994). Thus, the *Boro* season is equivalent to six months of recall time. Round 2 recalled all expenditures since Round 1 (during the *Aus* season), and took place in October and November 1994. Accordingly, the *Aus* season accounts for approximately three months of recall time. The third and final round took place in December 1994 and January 1995, and recalled all expenditures since Round 2. Again, the approximate recall period is three months. Hence, to arrive at an annual figure, the average expenditures weighted by the recall periods for the three seasons are used. Assuming that the income effect in the *Boro* season is nil, this results in an average annual income effect of Tk 37 for each additional Tk 100 of credit limit. This is about double the estimate provided by Pitt and Khandker (1998), who estimated the effect on annual household income to range between Tk 11 and TK 19 for each additional Tk 100 borrowed. However, the result could be due to the fact that the method used here, in contrast to that of Pitt and Khandker (1998), measures not only the effect of actual borrowing, but also the effect of access to credit. This has the advantage of being able to capture the potentially beneficial effects of having access to credit, that is, the ability to borrow sometime in the future even if the household in the current period chooses not to borrow (Diagne, Zeller, and Sharma 2000; Diagne and Zeller 2001). These indirect beneficial effects of credit access include the reduced costs of consumption smoothing, such as a decrease in distress sales and an increased risk-bearing capacity favoring more profitable production and investment portfolios. The large difference between the effect of borrowing, as shown by Pitt and Khandker (1998), and the total effect of credit access suggests that poor households can derive much benefit by simply being in a position to be able to borrow if faced by shocks jeopardizing their already low consumption levels.

In summary, the analysis in this chapter has confirmed, by and large, the results of the descriptive analysis. A number of significant and quite sizable effects of credit access on income and food consumption have been identified. The effect of Tk 100 additional credit limit provided to a participant household by BRAC or ASA is estimated to be an additional Tk 37 in annual household income. As shown in Chapter 3, the social cost of providing credit access for the sample of 104 MFIs (costs are 7.9% of debt) is Tk 7.9 per Tk 100 of outstanding loan balance. In other words, the social investor needs to

spend about Tk 8 to provide an additional Tk 100 of credit access. The net benefit to society of providing Tk 100 more of credit access would therefore be quite sizable (Tk 37.0 – Tk 7.9 = Tk 29.1). Although this calculation falls short of a full cost–benefit analysis, since it does not take into account the sizable start-up costs of the microfinance institutions (including the costs of failed experiments and pilot projects not going to plan), it provides evidence that large and comparably efficient MFIs such as ASA and BRAC can generate net social benefits even if the funds provided by donors and governments are valued at market prices.

CHAPTER 6

Conclusions and Implications for Policy

This study comprised analysis at the level of group-based financial institutions, focusing on determinants of placement, outreach, and performance, and at the level of households, exploring the impact of access to such institutions on household income generation as well as on welfare outcomes. Although a full cost–benefit analysis is beyond the scope of this research, the study aimed to investigate the following three main issues that form the critical triangle of microfinance: outreach to the poor, financial sustainability, and impact (Zeller and Meyer 2001).

Such an analysis is important for policy purposes because all three issues are central to the recent policy debate on the role of public action—led either by the state or by non-governmental organizations (NGOs)—in innovating and building financial institutions that reach the poor and contribute to poverty alleviation. In general, from a welfare economy standpoint, such public action to address market failures can be justified if its social benefits outweigh its social costs. On the benefits side, the study investigates, in particular, the issues of outreach, that is, the placement of group-based institutions in rural areas and the coverage of poor clients within those areas, and the issues related to the impact of participation in group-based schemes on household income and consumption. On the costs side, the study investigates the determinants of loan default in group-based financial institutions, recognizing that loan default is the major cost component in lending activities. The study further reviews secondary data, from a sample of 104 relatively successful microfinance institutions (MFIs), on costs for lending and the subsidies required to achieve financial sustainability. A number of conclusions related to these three issues of the critical triangle of microfinance are derived.

Outreach to the Poor

The analysis of determinants of placement of group-based financial institutions shows that NGOs in Bangladesh tend to place their branch offices within better-developed rural areas with lower costs of access to roads, telecommunications, and banking infrastructure. Moreover, NGO schemes seem to shy away from areas that are known to be at high risk of being affected by floods and other distress factors. On the other hand, within these somewhat more advantaged rural areas, NGO branch offices seek out and are successful in penetrating poorer

villages with their financial services and, within these villages, in reaching out to very poor people, mostly women.

Although NGOs overwhelmingly target and succeed in reaching those owning less than half an acre of land, the poorest of the poor are underrepresented among members. Groups such as the physically or mentally disabled, the old, or those not having a permanent residence are often unable to conduct a profitable enterprise for which it is worth borrowing. Others may not be accepted into a group by their peers in the village because they either are new migrants or otherwise have not established a reputation as reliable partners. Many of the ultra-poor thus lack either the human and physical capital that is required for establishing a microenterprise, or the social capital necessary to get accepted as group members. Assisting these ultra-poor people through microfinance schemes appears to be an unsuitable policy option. It may very well be that social security or safety-net interventions would be more appropriate for this group among the poorest of the poor.

Having noted this caveat regarding the ultra-poor, the analysis of placement and outreach at the institutional level as well as the determinants of participation derived in the household-level analysis suggest that NGOs have achieved remarkable progress in reaching large numbers of very poor people in rural Bangladesh. This is particularly noteworthy when compared with the dismal record of other rural banking schemes that simply have not been able to service this clientele even when armed with significant levels of government subsidy.

Financial Sustainability

This study has noted the appalling loan repayment rates of the state-owned rural banking sector, which insists on land as loan collateral and thereby in effect excludes any poor people as their clientele. The repayment rates of the state-driven rural banking system hovered around 20–30 percent during the 1980s and 1990s, and this required huge government subsidies just to keep these institutions solvent. Since the interest rates in these schemes were well below the opportunity cost of capital, the full level of subsidization was even higher. In fact, the state-driven rural banking system could be described as an income transfer program, albeit one that was not only ill-targeted, because it benefited only the better-off landowning class, but also unscrupulously inefficient.

The NGO schemes, on the other hand, charge interest rates that are 10–20 percent above the inflation rate and achieve repayment rates in excess of 95 percent, and as high as an average of 98 percent over the years. Once a branch office is established, many of the better-managed NGOs described in this report are likely to cover most if not all of their operational costs, as, for example, ASA claims in its 1996 annual report (ASA 1996b). With respect to the criteria of financial sustainability then, the NGO-supported group-based institutions far outperform the traditional rural banking approach.

With respect to overall indicators of financial sustainability, Chapter 3 reviews data on operational and financial sustainability from a sample of 104 MFIs. These MFIs are, without any doubt, among the most advanced and efficient worldwide. According to these data, the group of large MFIs in Asia (which includes ASA and BRAC), once established at a large scale, can perform their current operations, on average, without any subsidies. This positive picture for ASA and BRAC might, however, be somewhat bleaker if the very successful and highly profitable village banking system of the Bankya Rakyat in Indonesia were not part of this group. However, according to these secondary data, smaller MFIs in South Asia spend about US$0.17 per dollar lent, of which $0.05 needs to be covered by subsidies in order for the MFIs to cover all their costs. For a social investor seeking to generate a net social benefit, the minimum social return generated by the borrowing household (net of economywide effects) would need to exceed the $0.05 subsidy. It is of note, however, that the data on

financial sustainability do not take into account past subsidies used to establish and expand the MFIs in the sample. Thus, the relatively low figures for subsidies required to transfer capital in the form of loans would be substantially higher if past subsidies received by the MFIs during the innovation and expansion phases were taken into account. Nonetheless, the subsidy figures appear quite favorable in comparison with other forms of transferring capital to the poor, such as the pilot food price subsidy scheme in the Philippines (Garcia and Pinstrup-Andersen 1987), which was found to cost US$0.19 for each dollar of subsidy, assuming for the purposes of comparison with a credit scheme that the recipient repays the dollar of food price subsidy after one year at no transaction cost to the government.

Impact

The descriptive and econometric analysis presented in this report provides strong evidence of the group-based financial institutions' positive impact on a range of household-level behavioral and outcome variables. A number of qualitative impact variables were used to assess changes in livelihood, social attitudes, and social capacity, as perceived by the survey respondents. This and other descriptive analyses presented in the report suggest positive impacts on the quantity and quality of food consumed, on the health status of family members, and on children's education. The survey on social attitudes and self-reported changes in social capacity provides further evidence of social change, in particular in the areas of intrahousehold decisionmaking, women's coping capacity, and women's physical mobility and social attitudes. On all of these indicators, the targeted NGO credit programs appear to have brought about distinct and favorable changes.

By and large, the econometric analysis confirms the results of the tabular analysis of qualitative indicators. In particular, it explores three areas of possible impact of credit access: adoption of high-yielding rice varieties, level of income generation, and food and calorie consumption. In the latter two areas, a robust, significant, and positive effect of credit access is obtained; the effect of improved credit access provided by group-based financial institutions on the adoption of high-yielding rice varieties, albeit positive, proved to be statistically insignificant. The analysis yielded an average annual effect of Tk 37 in annual household income for each additional Tk 100 of credit limit provided to a household belonging to ASA or BRAC. This estimate is more than double the estimate provided by Pitt and Khandker (1998), who estimated the effect on annual household income for the Grameen Bank and BRAC to range between Tk 11 and Tk 19 for each additional Tk 100 borrowed. However, the discrepancies in the results could be due to the fact that the method used in this study measures not only the effect of actual borrowing, as Pitt and Khandker (1998) did, but also other effects of access to credit. This has the advantage of being able to capture the potentially beneficial effects of having access to credit, that is, the ability to borrow sometime in the future, even if the household in the current period chooses not to borrow (Diagne and Zeller 2001). These indirect beneficial effects include the reduced costs of consumption smoothing, such as a decrease in distress sales and an increased risk-bearing capacity favoring more profitable production and investment portfolios. The large difference between the effect of borrowing, as shown by Pitt and Khandker (1998), and the total effect of credit access suggests that poor households can derive much benefit by being able to borrow if faced by shocks jeopardizing their already low consumption levels.

Finally, when comparing the social costs of about Tk 5 (in the case of small and medium-sized successful MFIs in South Asia) for the provision of Tk 100 of credit access with the increase in annual household income of Tk 37, one arrives at a net social benefit of Tk 32. Admittedly, as indicated above, the cost side is likely to be substantially underestimated because past subsidies dur-

ing the establishment of the MFI are not taken into account. Nonetheless, the figures suggest that MFIs have the potential to generate sizable social benefits in the long run.

Implications for Policy

In a nutshell, the analysis presented in this report supports the overall conclusion that the group-based financial institutions supported by the NGOs investigated in this study have made remarkable progress in effectively reaching very poor people in Bangladesh, and in providing financial services to rural women and men that enable them to increase their income and food consumption as well as triggering social change in a number of important areas. In light of these results, continuing public support for the expansion of group-based financial institutions in Bangladesh therefore appears warranted. However, the report falls short of a classical cost–benefit analysis that considers the full social costs of bringing the MFIs studied here to their present scale of operation. Moreover, most of the start-up MFIs that are subsidized by social investors in Bangladesh and elsewhere will not succeed in growing to the outreach levels and efficiency of BRAC and ASA, but eventually will fail. These costs of failure in promoting the MFI sector overall need to be taken into account when evaluating on an aggregate level whether or not to invest in MFI development as opposed to other areas in rural development. Thus, although the results certainly provide some arguments for continued support of the MFI sector, they need to be appreciated in the light of the limitations of the study in performing a cost–benefit assessment. Moreover, the group-based institutional approach may seem to be an effective response to state and market failures concerning rural finance in Bangladesh, but simple replication of group lending techniques elsewhere should proceed with caution and in full cognizance of differing social, economic, and cultural settings. After all, successful institutional innovation necessarily involves adapting the organizational set-up, structure, and conduct of member-based financial institutions—such as credit and savings cooperatives and village banks, or the solidarity credit groups investigated in this study—to the different socioeconomic and agroecological environments.

APPENDIX A

Survey Modules, Sampling Frame, and Location of Survey Sites

Survey Modules

In order to address the research questions described in Chapter 1, data were collected at the level of community, group, and household.

At the household level, the questionnaire covered modules on demography, family events, membership in a credit program, agricultural production (by crop), animal production, landownership and land rental transactions, ownership of other assets as well as monetary savings, food consumption and nonfood expenditures, credit lent and borrowed, gifts and remittances received or given, time allocation of adults and children, social capacity and attitudes among men and women, and the incidence of sickness and nutritional status among preschoolers and their mothers.

In order to cover seasonal variations in income, consumption, indebtedness, nutritional status, and savings, the household survey was administered in three rounds. The first round of data collection was conducted in June and July of 1994, at the beginning of the rainy season following the harvest of the *Boro* rice crop. The second round was conducted in October 1994, that is, during the lean season immediately before the commencement of the harvest of the major rice crop called *Aman.* The third round was administered from mid-December 1994 to mid-January 1995, that is, after the *Aman* rice crop was harvested. Thus, the survey covered the peak season and the lean season in rural Bangladesh during 1994.

The survey at the community level obtained data on village characteristics that are expected either to influence the formation of savings and credit groups or to influence the income generation and consumption opportunities of households. The modules covered the general characteristics of the village, its access to rural service centers, the major crops grown in the village, the seasonal fluctuations of wages and rice prices, the existence of formal credit programs and informal self-help groups, the structure of markets for major agricultural inputs and outputs, and major production, storage, and marketing risks in the village, as well as the natural catastrophes and other shocks that occurred during the previous 10 years in the village. Key respondents for this survey were the chairmen or members of the union council, resident school teachers, and respected village members identified by the villagers. When

appropriate, such as for population size of village or number of credit group members in the village, the information obtained for selected community survey modules was cross-checked with officials from government and nongovernment organizations.

The survey at the group level obtained information on the process of group formation, the socioeconomic characteristics of group members, internal rules set by the groups themselves, and the savings and credit transactions of the group and its repayment record. The respondent for this module was the president of the group.

In addition to these primary data collection efforts, data were obtained from selected nongovernmental organizations on the structure, outreach, conduct, and performance of their group-based savings and credit programs. Additional secondary data at the county (*thana*) and higher levels were collated from published reports of the Bangladesh Bureau of Statistics (BBS).

Sampling Procedure

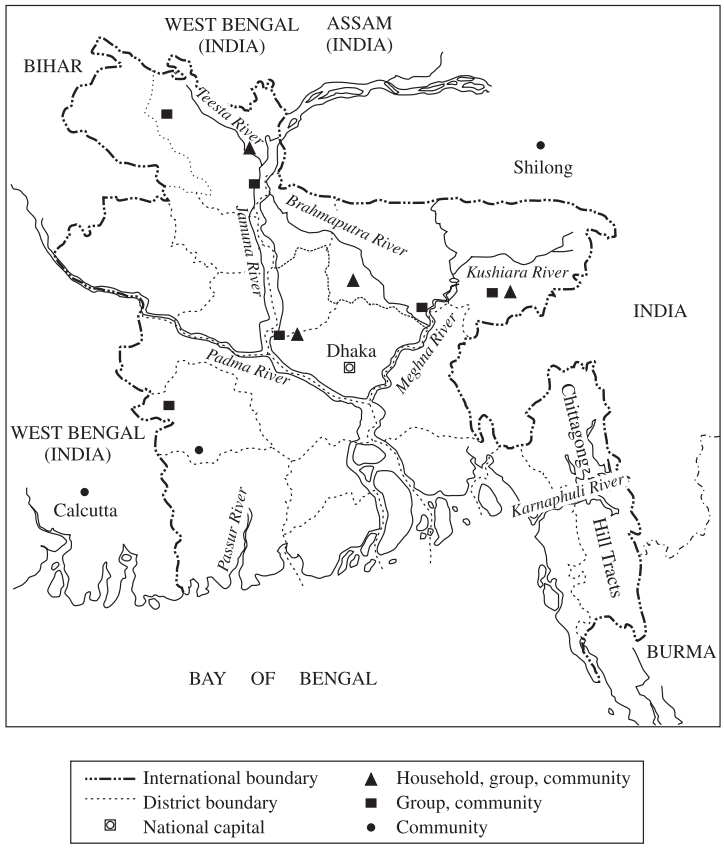
Bangladesh is administratively divided into 5 divisions, 21 so-called "old" districts (which were later redrawn into 64 "new" districts), and 489 *thanas* (counties). Each *thana* is further divided into unions, which perform some lower-level administrative functions for a number of small villages. Each *thana* has, on average, about 9 unions, and each union administers about 15 villages.

A three-stage sampling method was used randomly to select the survey villages for the community, group, and household surveys. In the first stage, 5 districts were purposely selected from 19 of the old districts in Bangladesh (excluding Bandarban and Chittagong Hill tracts). The selection aimed at reducing logistical costs while preserving as much variability in the major determinants of financial market development. In the selection of these districts, a number of considerations were made. First, the five districts were selected from four of the five divisions of the country. Second, the five districts were each required to represent one of the quintiles of population density by district in the country. Third, districts were ranked according to an index computed by Helen Keller International (HKI) in Bangladesh, which measures the exposure of the district to distress and natural disasters. Again, the selection of districts was made in a way that each of the quintiles of the distress factor were represented. These three criteria limited the possible number of combinations for the selection to a considerable extent. The final selection was then based on two additional, but subordinate, criteria. Here again, the objective was to achieve diversity. The criteria were cropping intensity in the district and its infrastructure (proxied by kilometers of tarred road per 1,000 inhabitants).[1] Based on these criteria, the following districts were chosen: Jessore, Rangpur, Mymensingh, Sylhet, and Dhaka.

In the second stage, a complete enumeration of *thanas* for these five districts was undertaken. For each of the 160 *thanas* in these districts, secondary data were obtained on population density, percentage of villages electrified, and presence of ASA, BRAC, or RDRS programs. From each district, two to three *thanas* were purposely selected in which at least one of these credit programs was active. The selection also had to conform with the restriction that one of the *thanas* selected must represent *thanas* above the median for the district-specific population density, while the other *thana* was drawn from less densely populated *thanas.* Other less stringent criteria for selection were the percentage of villages electrified and the distribution of farm sizes. Again, these other criteria were subordinate but were considered in order to achieve diversity. The following 12 *thanas* were selected based on the second-stage sampling: Daulatpur, Saturia, Bajitpur, Trishal, Kotchandpur, Manirampur,

[1] Data for these characteristics came from two sources: BBS, *Statistical yearbook,* various issues, and HKI 1994.

Figure A.1 Location of the survey *thanas*



Nilphamari Sadar, Gaibandha Sadar, Habiganj Sadar, Bahubal, Rajarhat, and Ulipur.

In the third stage, all unions in each of the 12 *thanas* were listed. Five unions were randomly selected from each *thana,* but excluding unions that were part of *thana* headquarters in order to avoid urban samples. For each of the unions, a complete enumeration of villages based on secondary data was undertaken. Two villages were then randomly selected from each union.

In summary, 120 villages were randomly drawn for the community-level survey, based on the preceding purposeful selection of 12 *thanas.* In each of the 120 villages, a community-level questionnaire was administered. This questionnaire also obtained information on the presence of credit and savings programs administered through the Association for Social Advancement (ASA), the Bangladesh Rural Advancement Committee (BRAC), and Rangpur-Dinajpur Rural Services (RDRS). The information was cross-checked with branch offices of the NGOs.

Not all of the 120 randomly selected villages were reached by credit schemes of any of the three NGOs. In the subset of villages that had credit groups formed by BRAC, ASA, or RDRS, the group-level survey was administered to all existing groups in these villages.[2]

Finally, among those villages with ASA, BRAC, or RDRS programs, seven villages

[2] Table A.1 of this appendix gives a complete listing of the 120 villages, as well as a breakdown of villages surveyed for the community, group, and household modules. Figure A.1 shows the locations of the community, group, and household surveys on the map of Bangladesh.

Table A.1 List of villages for the community, group, and household surveys

				Level of questionnaires		
Old District	***Thana***	***Union***	**Village**	**Community**	**Credit/ savings group**	**Household**
Manikganj	Daulatpur	Bachamara	Hashadia	Y	. . .	. . .
		Bachamara	Rohal	Y	. . .	. . .
		Baghutia	Saizuddin matbar para	Y	. . .	. . .
		Baghutia	Azhar moliapara	Y	. . .	. . .
		Dhamsar	Bill pauli	Y	Y	. . .
		Dhamsar	Laxmidia	Y	Y	. . .
		Jiyanpur	Khaspantirchha	Y	. . .	. . .
		Jiyanpur	Jainta	Y	Y	. . .
		Kaliya	Rambatia	Y	. . .	. . .
		Kaliya	Tepri	Y	Y	. . .
Manikganj	Saturia	Baraid	Dhulat	Y	Y	. . .
		Baraid	Patillapara	Y	Y	. . .
		Dargram	Teghari	Y	. . .	. . .
		Dargram	Uttar shimulia	Y	Y	Y
		Dighalia	Jalsuka	Y	. . .	. . .
		Dighalia	Baro chachitara	y	Y	. . .
		Hargaz	Dakshin para	Y	. . .	. . .
		Hargaz	Naya para	y	Y	Y
		Tilli	Salai gobindapur	Y	. . .	. . .
		Tilli	Dakshin aynapur	Y	Y	. . .
Mymensingh	Bajitpur	Dighirpur	Dighirpur mialdi	Y	. . .	. . .
		Dighirpur	Kallag	Y	. . .	. . .
		Dilalpur	Sonakanda	Y	. . .	. . .
		Dilalpur	Tatal char	Y	Y	. . .
		Humaipur	Ujaikhali	Y	. . .	. . .
		Humaipur	Hossainpur	Y	. . .	. . .
		Maizchar	Shibpur	Y	. . .	. . .
		Maizchar	Boali das para	Y	. . .	. . .
		Pirijpur	Nayahati	Y	. . .	. . .
		Pirijpur	Nilakhi	Y	. . .	. . .
Mymensingh	Trishal	Harirampur	Golabhita	Y	. . .	. . .
		Harirampur	Harirampur	Y	. . .	. . .
		Kanihari	Baghadaria dak	Y	. . .	. . .
		Kanthal	Muhuria bari	Y	Y	. . .
		Kanihari	Taltala	Y	. . .	. . .
		Kanthal	Nalchira	Y	Y	. . .
		Rampur	Darila	Y	. . .	. . .
		Rampur	Birrampur ujanpara	Y	Y	Y
		Shakhua	Akhrail	Y	Y	. . .
		Shakhua	Gandakhola	Y	. . .	. . .
Jessore	Kotchanpur	Balahar	Parlet	Y	. . .	. . .
		Balahar	Ramchandrapur	Y	Y	. . .
		Dora	Chuadanga	Y	. . .	. . .
		Dora	Dhopablia	Y	. . .	. . .
		Elangi	Jagadishpur	Y	Y	. . .
		Elangi	Elangi	Y	Y	. . .
		Kushna	Ghaga	Y	Y	. . .
		Kushna	Harindia	Y	Y	. . .
		Safdarpur	Datiarkathi	Y	. . .	. . .
		Safdarpur	Salkopa	Y	Y	. . .

(continued)

Table A.1 (continued)

				Level of questionnaires		
Old District	***Thana***	***Union***	**Village**	**Community**	**Credit/ savings group**	**Household**
Jessore	Monirampur	Bhojgati	Pathalia	Y	. . .	. . .
		Bhojgati	Donar	Y	. . .	. . .
		Dakuria	Barpara	Y	. . .	. . .
		Dakuria	Uttarpara	Y	. . .	. . .
		Durbadaga	Kushorkona	Y	. . .	. . .
		Durbadaga	Khatuadanga	Y	. . .	. . .
		Kultia	Amrojhuta	Y	. . .	. . .
		Kultia	Poradanga	Y	. . .	. . .
		Rohita	Noapara	Y	. . .	. . .
		Rohita	Bagdob	Y	. . .	. . .
Rangpur	Nilphamari	Kachukata	Taluk manushmara	Y	. . .	. . .
		Kachukata	Mahabbat bajitpara	Y	Y	. . .
		Kundapukur	Salhati	Y	Y	. . .
		Kundapukur	Gurguri	Y	. . .	. . .
		Palashbari	Kishmat bhutian	Y	Y	. . .
		Palashbari	Nilphamari	Y	. . .	. . .
		Sangalshi	Kadikol	Y	. . .	. . .
		Sangalshi	Dighal dangi	Y	Y	. . .
		Tapamari	Nityanandi	Y	. . .	. . .
		Tapamari	Kismat dogachhi	Y	Y	. . .
Sylhet	Habiganj	Gopaya	Sripur	Y	. . .	. . .
		Gopaya	Tetuiya	Y	Y	. . .
		Lukhra	Gobindapur	Y	Y	. . .
		Lukhra	Fandrail	Y	. . .	. . .
		Nizampur	Daulatpur	Y	. . .	. . .
		Nizampur	Gourangar chak	Y	. . .	. . .
		Nurpur	Dushashan	Y	Y	. . .
		Nurpur	Brahmandora	Y	Y	. . .
		Poil	Daria	Y	. . .	. . .
		Poil	Atghoria	Y	. . .	. . .
Rangpur	Gaibandha	Boali	Paschim batakamari	Y	. . .	. . .
		Boali	Khamar boali	Y	. . .	. . .
		Kholahati	Kisamat balua	Y	Y	. . .
		Kholahati	Purbakamarnai	Y	. . .	. . .
		Laxmipur	Gobindapur	Y	. . .	. . .
		Laxmipur	Khorda malibari	Y	Y	. . .
		Malibari	Kachuar khamar	Y	. . .	. . .
		Malibari	Kismat malibari	Y	Y	. . .
		Shahapara	Laxmipur	Y	Y	. . .
		Shahapara	Bhabanipur	Y	. . .	. . .
Sylhet	Bahubal	Lamatashi	Chuapur	Y	. . .	. . .
		Lamatashi	Tarapasha	Y	Y	Y
		Mirpur	Purba dattapara	Y	. . .	. . .
		Mirpur	Kachuadi	Y	. . .	. . .
		Putijuri	Noapara	Y	. . .	. . .
		Pitijuri	Mandal kapan	Y	. . .	. . .
		Satkapon	Telikandi	Y	Y	Y
		Satkapon	Sarangpur	Y	. . .	. . .
		Snanghat	Ramchandrapur	Y	. . .	. . .
		Snanghat	Nidanpur	Y	Y	. . .

(continued)

Table A.1 (continued)

Old District	*Thana*	*Union*	Village	Level of questionnaires: Community	Credit/ savings group	Household
Rangpur	Ulipur	Dharanibari	Abdul hakim	Y	. . .	. . .
		Dharanibari	Modhupur	Y	. . .	. . .
		Pandul	Siddhanta maltibari	Y	. . .	. . .
		Pandul	Baro mahishmuri	Y	. . .	. . .
		Tabakput	Hazipara	Y	. . .	. . .
		Tabakpur	Zamer darga	Y	Y	. . .
		Thetrai	Bakshipara	Y	. . .	. . .
		Thetrai	Darikishorepur	Y	. . .	. . .
		Durgapur	Brahmanpara	Y	. . .	. . .
		Durgapur	Paikpara	Y	Y	Y
Rangpur	Rajarhat	Bidyananda	Tongar kuti	Y	. . .	. . .
		Chinai	Noyapara (napitpara)	Y	Y	. . .
		Chinai	Kismat paikpara	Y	. . .	. . .
		Ghariadanga	Bhatia para	Y	. . .	. . .
		Ghariadanga	Nama bharat	Y	. . .	. . .
		Nazim khan	Dararpar	Y	. . .	. . .
		Nazim khan	Ratiram pathanpara	Y	. . .	. . .
		Umar majid	Dhananjay	Y	. . .	. . .
		Umar majid	Umar panthabari	Y	Y	. . .

Note: Total sample is 120 villages for community survey, 128 groups in 42 villages, 350 households

were randomly selected for the household-level survey. In each of these villages, a census was undertaken to obtain data on household possession of land and membership in ASA, BRAC, or RDRS programs. Based on this village census, a stratified random selection of households was undertaken. The first stratifier was land possession above and below 1 acre (British acre). The sample households owning 1 acre or more were drawn in proportion to their distribution in the village, irrespective of their membership in NGO programs. For households owning less than 1 acre of land, participant households were oversampled so that about 55 percent of households were members of BRAC, ASA, or RDRS and 45 percent were nonparticipant households. The oversampling of participating households in the strata of households owning less than 1 acre of land was necessary in order to increase the number of survey households in this category.

Thus, in each survey village, the sample households are representative of the distribution of land ownership found in the village. However, because participant households in the strata below 1 acre are oversampled, averages of all households for a particular village must be weighted by the village-specific sampling ratios for participants and nonparticipants owning less than 1 acre.

The cutoff of 1 acre was chosen because ASA and BRAC stipulate that households owning less than 0.5 acre are eligible to join a program. However, it is possible that participating households have increased their land possession since joining the program. For this reason, a proportional selection of survey households was undertaken for households owning above and below 1 acre. If participating households owning more than 0.5 acres had been a priori excluded from the sample, the measured effects of program participation on income and asset accumulation could potentially have been biased downward. Indeed, 19 of the participating sample households were found to own more than 0.5 acres of land at the time of survey.

APPENDIX B

Adult Equivalent Consumption Units Differentiated by Age and Gender

Table B.1 Adult equivalent consumption units differentiated by age and gender

	Adult equivalent consumption units	
Age(years)	**Male**	**Female**
0+	0.25	0.25
1+	0.37	0.36
2+	0.42	0.40
3+	0.46	0.43
4+	0.49	0.46
5+	0.53	0.48
6+	0.56	0.49
7+	0.58	0.49
8+	0.58	0.49
9+	0.58	0.49
10+	0.70	0.64
11+	0.71	0.64
12+	0.73	0.66
13+	0.77	0.68
14+	0.81	0.70
15+	0.85	0.70
16+	0.89	0.72
17+	0.92	0.75
18–29+	1.03	0.82
30–59+	1.03	0.83
60+	0.68	0.61
Adult	1.00	0.81

Source: Computed from IFPRI's Consumption and Nutrition Survey data (Ahmed 1993), using the adult eqivalent for the members of each survey household.

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