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A Well of One's Own

Gender Analysis of an Irrigation Program in Bangladesh

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Coverphotograph by Eva Jordans: A woman irrigating her rice crop using a treadle pump.

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Abbreviations

BADC	Bangladesh Agricultural Development Corporation
BRAC	Bangladesh Rural Advancement Committee
BWDB	Bangladesh Water Development Board
DTW	Deep tube well
FHH	Female-headed household(s)
GB	Grameen Bank
GKF	Grameen Krishi Foundation
ha	hectare(s)
HTW	Hand tube well
HYV	High Yielding Variety
IIMI	International Irrigation Management Institute
MHH	Male-headed household(s)
NGO	Nongovernment Organization
RDRS	Rangpur Dinajpur Rural Service
STW	Shallow tube well
Tk	taka
WID	Women in Development

Units

Tk 1 was about US$0.025 in **1995;** so Tk **40** was US$1.00
1 maund = **40** kilograms = **88.4** pounds
1 acre = 0.405 hectare

Glossary

aman	wet season paddy
bhai	brother
boro	dry season paddy
dheki	traditional rice-husking machine
golchi	traditional water-lifting device
hartal	strike
purdah	refers to the practice of female seclusion; a social institution dividing the public male sphere from the private female sphere of life, excluding women from both the economic market place and political decision making

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Executive Summary

A MAJOR PROCESS of irrigation privatization was initiated in Bangladesh in the 1980s. It included: (a) a shift of distribution of equipment from the public to the private sector; (b) the liberalization of importation of equipment, standardization of scale and quality, and the regulation of spacing of wells; (c) the dropping of subsidies for irrigation equipment; and (d) the sale of publicly owned pumps to individual fanners and farmer groups and NGOs.

The Grameen Bank (GB), and later its sister organization the Grameen Krishi Foundation (GKF), became active participants in the irrigation sector in Bangladesh in 1987 through the purchase of 790 deep tube wells from public organizations. Management of this irrigation equipment and the supply of agricultural inputs and credits to farm households are the core activities of GKF. The approach of GKF to irrigation development is unique in that it explicitly links agricultural productivity and efficiency objectives with poverty alleviation and women's empowerment, by targeting the so-called "land-poor'' who own between 0.5 and 3 acres of land.

This study documents the attempts of GKF to involve women in its irrigation program. It is based on an assessment of female involvement and interest in irrigation and irrigated agriculture, and on a process documentation of several GKF activities. In spite of a gender ideology that discourages women to do field-related tasks in agriculture, poverty and landlessness have forced many poor women in Bangladesh to become actively involved in agriculture. In the GKF working area in North-West Bangladesh, women—and particularly those who belong to the poorer categories of households, which constitute the GKF target group—carry out about 50 percent of all tasks in rice production. Even the presumably male task of irrigation is carried out by women and they share 50 percent of this work. Women work: (a) as co-farmers on family land, which is either sharecropped or owned; (b) as agricultural wage laborers; (c) in groups cultivating jointly leased or sharecropped land; and (d) as female heads of households cultivating owned or sharecropped land. While there

exist some income-generating opportunities outside of agriculture for men, possibilities of increasing women's income are most promising in farming.

When GKF realized that women are highly involved in farming and that women are able to make much more income when given adequate support to farm, when compared with the returns to labor in traditional female activities, it shifted its gender strategy in 1992 from the development of specific activities for women to "mainstreaming." This shift was aimed at more directly involving female farmers in irrigation activities of GKF.

GKF makes irrigation services available to either groups or individuals. These services may be in the form of access to deep tube well or shallow tube well irrigation water or in the form of access to irrigation technology (shallow tube wells, treadle pumps, or hand tube wells). Especially for women, it is often difficult to fully enjoy the benefits of access to irrigation, because their access to other resources (land, credit, seeds, and fertilizer) and services (technical information and marketing) is constrained. For this reason, GKF also attempts to provide these resources directly to its members. GKF negotiates with landowners to secure land lease arrangements on behalf of women; it provides seeds, fertilizer and agricultural credit, technical training, and marketing services.

The ***mainsfreaming*** strategy of GKF is gradually showing signs of success. Female involvement in its irrigation-related activities has increased dramatically, from being almost nil in 1992. The study shows that women are very interested in and capable of managing irrigation equipment and irrigated crop production. In spite of some difficulties, all the women somehow involved in irrigation-related activities are very enthusiastic. The seasonal net income from irrigation ranges from Tk 1,000 (in the case of a treadle pump) to Tk 5,000 per woman, which is high when compared to what they would have earned as wage laborers (about Tk 500 per season). Many women have plans to expand the scope of their involvement in irrigation so as to increase their earnings even more.

The increased income-generating capacity and larger contributions to household income appear to strengthen women's self-confidence and reduce their dependence on male intermediaries. Some women report an initial loss of social status because of their higher involvement in field-related tasks, which is against purdah norms. However, the fact that they are organized in groups and strongly supported by GKF staff (who are

permanently resident in the villages) helps them to overcome negative social reactions.

An area of concern is that women do not always have full control over the income they earn. Evidence from this study suggests that their overall control over household income increases when their contributions increase. One way **of** securing greater control over their earnings would be for GKF to provide more direct marketing assistance to women. If women do not depend on their husbands or other male relatives to market their produce, chances of cash income directly accruing to them are much higher. The provision of a basic education to make women literate and numerate is a second possible way of increasing women's control over their incomes and money obtained on loan. Their lack of education creates a dependency on people who can read and write.

Lack of secure and long-term access to land also remains a constraint for many poor women, preventing them from fully benefiting from access to irrigation services. Although GKF has successfully arranged seasonal leases of land for women in a few instances, longer term access to land **is** crucial for women to be able to optimize farm profits.

One key element of the success of GKF is its broad rural development approach, which conceives irrigation as just one critical production input and combines the provision of irrigation with that of credit, agricultural inputs, marketing services, and information. Success of GKF heavily relies on high staff intensity, and especially on the fact that field staff are permanently based in the villages in which they work. The primary basis for the achievements of GKF in terms of empowering women lies in its remarkably serious commitment to women. This commitment led to the gradual recognition and acceptance of women as farmers and irrigators. Unless this recognition is there, any attempt to address gender issues in an irrigation program will have only marginal results.

CHAPTER 1

Introduction

RATIONALE AND BACKGROUND

***MOST* IRRIGATION** PROJECTS and irrigation development approaches are based on an often implicit conception of the farm household as consisting of one main male fanner, his wife and a number of children. The man is thought to be the main decision maker, income earner and provider, while his wife is merely seen as mother and domestic caretaker who occasionally helps her husband in agricultural activities. Although persistent, this picture of the farm household seldom reflects reality. A growing body of literature on Women in Development (WID) has helped to show that the roles of men and women in farming and in the household are highly variable across and within continents and countries and depend on their socio-economic status. Almost everywhere, however, women's contributions to agriculture and irrigation are more important than initially assumed. The failure to recognize the importance of women in agricultural activities, and the gender relations that underlie and determine **roles** of men and women, has in many documented instances not only led to a worsening of the position of women, but has also negatively affected project outcomes (*Zwarteveen* **1994).**

Although the recognition and awareness about the importance of gender relations for planning, designing, and managing irrigation are growing, there are still very few documented examples of irrigation approaches that make a conscious effort to incorporate gender issues. It is in this respect that the experiences of the Grameen Krishi Foundation (GKF) in Bangladesh are thought worthy of documentation and analysis. Founded in 1991 with the primary objective of profitably managing deep tube wells (DTWs) that had been taken over from public agencies, GKF has a remarkably explicit focus on women.

In 1994, GKF requested the International Irrigation Management Institute (IIMI) to assist them in finding ways of improving the performance of DTWs through a collaborative study. IIMI's involvement in GKF prompted the mutual interest of both GKF and IIMI to also look into the gender aspects of GKF's irrigation-related activities. From the perspective of IIMI's Program on Gender and Irrigation Management, a more action-oriented research that would focus on identifying prospects of improving the position of poor rural women through irrigation would neatly supplement the on-going diagnostic case studies, which focused mainly on identifying the linkages between gender relations and irrigation. Staff of the Women Support Program of GKF, on the other hand, were eager to embark upon a study because they were in need of more information about their target group in the context of irrigation, and about the impacts of GKF's irrigation-related activities on men and women.

The Ford Foundation in Bangladesh funded the IIMI-GKF collaborative study, which was conducted from July 1994 to November 1995 in the greater Rangpur and Dinajpur districts of North-West Bangladesh. This gender study was conducted parallel to the IIMI-GKF study on the performance of DTWs. While the performance study primarily aimed at evaluating and analyzing the technical performance of the DTWs, the focus of the gender study was on finding ways of increasing the benefits of GKF's irrigation-related activities to women. The study was conducted in an action research mode, results and findings directly being fed back into the Women Support Program.

GROUNDWATER IRRIGATION

Expansion of irrigation in Bangladesh started in the early 1970s with the installation and operation of DTWs, mostly by the Bangladesh Agricultural Development Corporation (BADC) and by the Bangladesh Water Development Board (BWDB), both governmental organizations. During the 1970s and the 1980s, these organizations expanded their activities toward the rental and sale of subsidized shallow tube wells (STWs). Groundwater development and the green revolution have gradually enabled Bangladesh to achieve a high degree of self-sufficiency in rice, its staple food. This is despite an extremely high population density, rapid population growth, and

extreme vulnerability to floods and droughts, with consequent loss of crops (Mallorie **1994).**

Although successful in terms of raising national agricultural production, development of deep tube well (DTW) irrigation has from the very beginning been fraught with controversies. Most DTWs were installed by government agencies on the land of well-to-do fanners, even in cases where it was not the most ideal location hydrologically and topographically. The same well-to-do fanners often became the chairmen and managers of the irrigation groups, many of which existed only on paper. As a result, a few wealthy landowners generally controlled irrigation sources for their own benefit. This, coupled with the high fragmentation of landholdings, meant that few, if any, of the DTWs irrigated the intended **75** acres (see also Hartmann and Boyce **1983).**

While the public sector never actually operated more than a small number of pump schemes, BADC and BWDB have until very recently been variously (and often deeply) involved in the procurement, distribution, installation, and maintenance of irrigation equipment (both DTWs and STWs) as well **as** the supply of fuel, oil and parts. Both BADC and BWDB operated irrigation equipment at highly subsidized rates (Hakim and Parker **1994)** and thus recovered only a fraction of the actual operational costs. Partly because of the resulting high burden on the government treasury and partly because of the problems described in the previous paragraph, the government of Bangladesh decided in the early **1980s** to withdraw its involvement in minor irrigation support.

All government involvement in STW irrigation, such as import duties, subsidies, regulations on engine standardization, and tube well siting were rescinded. The result of this irrigation privatization process was an explosive increase in the number of minor irrigation equipment, for example, from 22,000 STWs in **1979** to **349,000** STWs in **1993.** The growth rate of area irrigated under STWs closely reflects that for STW numbers, and by **1993** these wells served **1.4** million hectares **(3.46** million acres), almost 50 per cent of the total area irrigated in Bangladesh (Mandal and Parker **1995).**

As part of the privatization process, DTWs installed by BADC and BWDB were made available for ownership transfer to individual fanners, formal and informal farmer groups, and nongovernment organizations (NGOs). In **1987** and **1988,** the Grameen Bank (GB) started buying DTWs **from** the government. Involvement of **GB** (and other NGOs) in irrigation differs from that of individual farmers or commercial companies in that GB

has social rather than commercial objectives and operates on a nonprofit basis.

GRAMEEN'S INVOLVEMENT IN IRRIGATION

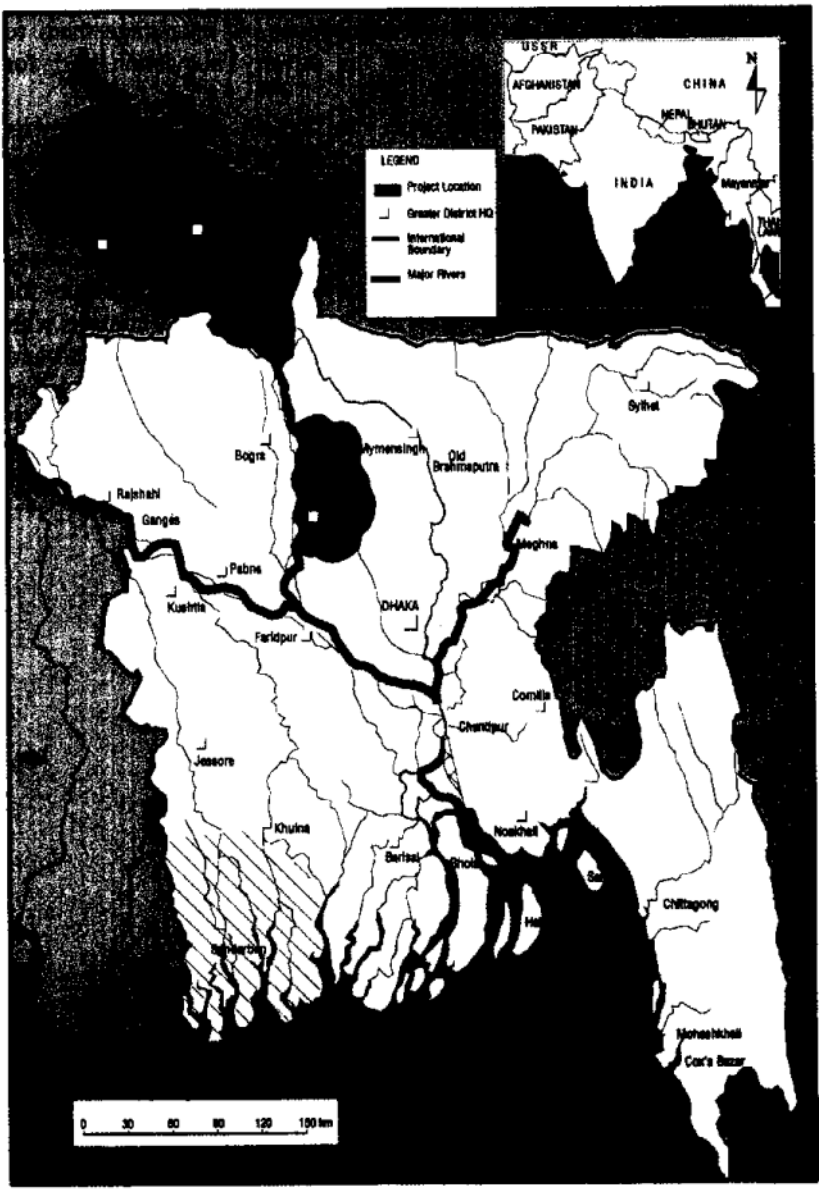
The primary activity of the Grameen Bank (GB) is lending to the rural poor and supporting income-generating activities. GB's activities have been remarkably successful. It is presently disbursing over **$100** million per annum, and has over **$132** million in accumulated savings from its **2** million clients, of which **94** percent are female. The bank's loan recovery rate is more than **95** percent, which is strikingly high given the rate of not more than 30 percent in the government-owned commercial rural banking system. The GB has gradually diversified its activities, primarily because of the government's eagerness to dispose of poorly performing development projects. GB was asked to take over a number of these projects, and has as a result set up enterprises based on fish and shrimp fanning, cold storage facilities, and irrigated agriculture (Mallorie **1994)**

In terms of resources, irrigation is **the** most significant nonbanking activity of GB; it has invested **$7** million to date (ibid.). The number of DTWs acquired by GB was about **805; 574** from BADC and **231** from BWDB. At the time **of** the study, GKF operated **565** DTWs; the **225** DTWs acquired from BWDB were handed back to BWDB in **1995.**

Because of the large scale of the irrigation activity undertaken by GB, it was decided to separate it institutionally from the other activities of the bank.. This resulted, in **1991,** in the foundation of the Grameen Krishi (Agricultural) Foundation (GKF). GKF was to take over and operate the **790** Grameen DTWs. GKF is licensed under the companies act and is a nonprofit NGO. GB provides higher management staff to GKF on secondment.. GKF's working areas are greater Rangpur and Dinajpur districts of North-West Bangladesh, and Tangail district near Dhaka **(see** figure 1). In **1991,** two donors, United Nations Capital Development Fund (UNCDF) and the Netherlands Government, together gave grants **of** $14 million for a five-year technical project aimed at improving the technical, operational, and financial performance of DTW operation and management.

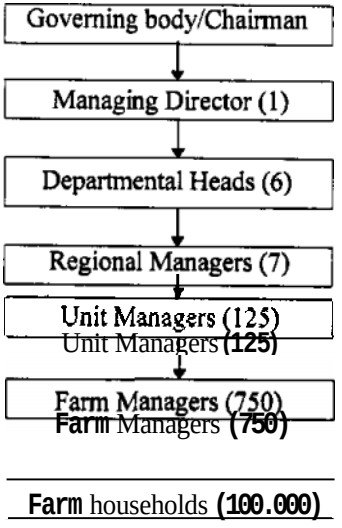
GKF's approach to irrigation management differs a great deal from that followed by public agencies in Bangladesh. First, GKF has an explicit

Figure 1. Location of Grameen Krishi Foundation Project.



poverty alleviation objective. Its activities are aimed at "helping the poor, the landless and assetless and poor women in order to enable them to gain access to resources for their productive self-employment, to encourage them to undertake income-generating activities for poverty alleviation and for enhancing their quality of life" (GKF 1991).

Second, and partly following from the first, in order to achieve its poverty alleviation objectives GKF has adopted ***staff-intensive*** management of the DTWs. GKF's administrative and organizational structure provides for intensive and direct on-site management inputs. Each **DTW,** which is known as a *"Primary* **Farm,"** has one regular GKF staff member whose designation is **Farm** Manager. The **Farm** Manager is responsible for operation and maintenance of the DTW; he or she maintains all contacts with the farmers in the area and is also responsible for distribution of seed and fertilizer to farmers. The **Farm** Manager is permanently resident in his or her working area, and provides the link between higher echelons of the GKF management and GKF's target **group. On** average, each **Farm** Manager has direct contact with 130 farm households. **A** simplified organogram of GKF is:



Eight to fifteen farms make **a** unit, which is headed **by a** GKF Unit Manager who is assisted by other **staff. Ten** to fifteen units **comprise** one region headed by a Regional Manager. The total working area of GKF is

divided into 7 regions. The regional and unit offices are provided with human and material resources, including staff salaries, to support the irrigation program. At the time of the study (September 1994 to November 1995), the total number of GKF staff was 1,250 while its activities reached approximately 100,000 farm households.

GKF puts a lot of effort into their staff recruitment and training to ensure the best results. Higher management is involved in staff recruitment, selecting persons who are born in villages and who understand village life from their youth. Sincerity and motivation are two important criteria for staff selection. Staff mining is very thorough. It lasts two years, and comprises of classes, workshops, assignments, and practicals. These intensive investments in human resources have resulted in an organization of committed and hard-working people.

A third distinguishing feature of GKF's management approach is that GKF, unlike BWDB or BADC, charges *nonsubsidized fees,* in the form of a share of the resulting crop, to farmers who make use of its irrigation services. This is entirely in line with GB's philosophy that it is insulting to give people anything for free, and that philanthropy makes people lose self-respect (Yunus Mohamed, personal communication, 1995). In addition, GKF intends (like the GB) to ultimately become entirely financially autonomous, so as not to depend on external funds for its activities. GKF charges most farmers 12 *maunds* (480 kg) *of* paddy per acre for irrigation water and 20 maunds (800 kg) of paddy per acre for water, seed, and fertilizer (Mallorie 1994).[1] The aim is to cover all operational costs such as those of fuel and maintenance, and overhead costs such as GKF managers' salaries, office expenditure and transport.

The fact that GKF charges nonsubsidized water fees generated a lot of resistance among farmers and former officials of BWDB and BADC, especially during the initial years. Because BWDB continued to operate wells on subsidized rates in areas in which GKF was working, GKF found it impossible to implement its policy of operating wells on nonsubsidized rates and decided to return the 225 wells acquired from BWDB to BWDB.

Fees, however, were not the only reason for resistance to GKF and the govemment's turnover policy. Many agency officials, local opinion leaders and well-to-do fanners had vested interests in public ownership and

[1] In case of crop failure due to unavoidable circumstances, GKF does not require full repayment but arranges a reasonable solution with the farmer. In this sense, the system functions as a kind of crop insurank

management of **DTWs** and actively opposed turnover. Through **DTW** transfer to GKF, fanner cooperative leaders risked **loss** of control of the tube wells. At the same time GKF's explicit focus on small farmers threatened to significantly reduce their dependence on wealthier landowners, and thus the latter's access to cheap labor. Some of the influential farmers chose to no longer cultivate land in the command area of GKF tube wells and also dissuaded their tenants and sharecroppers from using irrigation water provided by GKF. Local opinion leaders, in a few **cases,** persuaded many of the farmers not to pay their shares, or encouraged farmers to give low quality paddy mixed with sand to GKF (Hakim and Parker 1994).

These initial expressions of resistance significantly decreased the sizes of irrigated **DTW** command areas, and reduced the total value of share collections by GKF. As a result, and in spite of its intentions, GKF could not operate all the **DTWs** profitably. Although GKF succeeded in recovering its variable operational costs (fuel, maintenance, etc.) for the **DTWs** in 1992, net income per acre was too low to cover overhead costs. According to Mallorie (1994) an additional Tk 46,300 per primary farm would have been needed to cover GKF management and administration costs at the unit, regional, and headquarters levels. Mallorie's analysis furthermore shows that there are few viable options for increasing GKF's income from **DTWs.** At the same time, due to growing farmer cooperation and **trust** in GKF, the number of **DTWs** that are **run** profitably has increased over the years.

Although the difficulty of attaining financial viability of the **DTWs** is a source of irritation to GKF, it is not one of their primary concerns. This is because GKF does not just depend on the income collected through crop shares for providing **DTW** services (Shah Alam, personal communication, 1995, Rangpur, Bangladesh). Although GKF was established **for** the management of the **DTWs,** GKF has from the beginning conceived its role as being much broader. Initially, GKF entered into contracts with farmers **for** the provision of irrigation water from its **DTWs.** Since poor farmers do not always have access to land in the command area of **DTWs,** GKF also got involved in renting out STWs. Also, it was realized that the poorest farmers do not optimally benefit from improved access to irrigation water because of their limited access to credit and support services. Hence, in addition to supplying irrigation water, GKF started providing farmers with crop inputs like seed and fertilizer, effectively taking **on** the roles of credit agent and input supplier. Income from these activities can be used to cross-subsidize **DTW** irrigation.

GKF also gradually became involved in activities that are less directly related to irrigated crop production, like seed production, nurseries, homestead gardening development, fish fanning and livestock production. In addition, GKF provides credit, hires out machinery, and may market crops on behalf of fanners. Income from these activities can be used to cross-subsidize DTW irrigation.

CHAPTER 2

Research Methodology

THE COLLECTION OF information and data for this study was carried out by staff of the Women Support Program of GKF, alongside the monitoring and implementation of the on-going activities. This chapter explains in more detail the research methodology.

CHOICES AND OBJECTIVES OF THE STUDY

Research area

Of the seven regions GKF is working in, two were selected for the analysis of gender relations in irrigation and irrigated agriculture: Kurigram in the east and Dinajpur in the west of GKF's working area. In these regions, the Rajerhat and Kurigram Sadar Units, and the Kaharol and Dinajpur Units were chosen (see figure 2) and specific villages were selected on the basis of the presence of the GKF Women Support Program, in order to be able to interview female group members and document their activities in irrigated agriculture. For the documentation of women's involvement in GKF's irrigation-related activities, some villages in the Rangpur and Thakurgaon regions were added as some of GKF activities were not implemented in the other two regions.

Research sample

The study primarily focused on female GKF group members and women of households who are involved in irrigated agriculture as cultivators or laborers, with irrigation provided either by GKF or by private

Figure 2. The research area.

means. Although the sample included only women, they were also asked questions about their husbands, other men, and children. The reasons for interviewing only women were of a practical nature. As data collection took place alongside the activities of the Women Support Program, women and female groups who had to be contacted could easily be interviewed at the same time. The risk of "woman bias" was partly overcome through cross-checking the information with mostly male GKF staff.

Objectives

The objectives of the study were to:

1. document and analyze how men and women belonging to different socioeconomic categories of households are involved in, contribute to, and benefit from irrigation;
2. document GKF activities assisting women fanners in irrigated agriculture; and
3. identify opportunities for accommodating irrigation-related needs of female farmers and gender specific constraints on their participation in irrigation.

The main underlying hypothesis of the study, which has guided data collection and analysis, is that irrigation and access to irrigation offers important opportunities for improving the lives, or even empowerment, of rural women.

RESEARCH METHODS

The methods used in the field research were individual in-depth interviews with selected fanners, and process documentation by compiling case studies through regular monitoring and field visits. The research was carried out by the staff of the Women Support Program of GKF, the Dutch Associate Expert working with GKF, Eva Jordans, assisted by the Women and Development Consultant, Kamrun Naher. Although the combination of data collection and regular work was sometimes difficult, it did provide the advantage of giving the researchers a much broader perspective. Margreet

Zwarteveen, IIMI's gender specialist, provided additional support during two visits, the first of three weeks duration, and the other two weeks. Contextual information regarding specific features of an area, or of the women interviewed, was provided by mostly male GKF Farm Managers.

The study can be considered ***an action-research,*** in the sense that research and actual implementation were closely related. A rapidly developing program, which underwent many changes during the research period, was documented. Some of these changes were policy decisions of GKF management. Others were directly caused by research findings that were fed back into the GKF program. Some of the activities that are documented, as for example the management of STWs by women groups, were started for the sake of the research. This action aspect of the research required flexibility on the part of the researchers, especially regarding the focus of the research and data-collection activities. The advantage of the action element of the research was that the findings and conclusions are of practical value, and recommendations could be immediately implemented. Findings were translated into practical guidelines for the field staff. The feedback and discussions of research findings with GKF management further caused an increased awareness on the issue of women farmers and irrigation, which led to a considerable expansion of activities involving women. The action-oriented approach of the study also implies that the data were collected with the primary objective of improving the success of GKF activities, rather than with the objective of scientific validity.

Interviews

Individual interviews were held with 30 women farmers. A questionnaire that was developed covered socio-economic information, the division of labor in household crop production, participation in irrigation water management, and the impacts of irrigation (see appendix 1). The questionnaire served to guide the interviews, but in addition to the questions incorporated in the questionnaire other topics were often covered during encounters with women in the field, such as their loan utilization and plans for the future.

Interviews with women were spread over 9 villages in Dinajpur, 7 villages in Kurigram and 2 villages in Rangpur. The sample was purposively drawn from people in these villages, with the aim of representing the population in the sense of socioeconomic differences (landownership) and

ethnic groups (Muslim and Hindu). Thus 15 women (50%) from households owning 0-0.5 acre, and another 15 from households owning 0.5-3 acres of land were interviewed. In a less structured way, discussions took place with a few women from households owning more than 3 acres of land. Furthermore, among the interviewed women, 23 were Muslim (76 %) and 7 were Hindu (24 %).

Because of the relevance of household status for this study, half of the interviewed women selected belonged to female-headed households. Women heading their households were thus over represented, as the actual proportion of female-headed households in the research area is approximately *20* percent. The majority of the respondents were chosen from GKF groups (63 %), as the members were already known to the GKF staff and they were easier to reach and more trustful towards the researchers.

Process Documentation

A range of activities was selected to describe the process of women's involvement in GKF activities in irrigated agriculture, and to assess the gender impact of these programs. Detailed case studies were compiled. Regular field visits were made to the selected case study sites to monitor the process and progress of implementation. Information was collected by interviewing the group members and the GKF staff, and through direct observation.

In addition, GKF group formation and training of members and other activities were observed and visited on a regular basis. In this way, the activities of more than one thousand women groups, comprising 5.000 women, were monitored.

Secondary Information

In order to correctly interpret and analyze the collected data, extensive use was made of secondary information obtained from sources like hooks and publications documenting the nature of, and changes in, gender relations in rural Bangladesh. The main researcher and coordinator of the study (Eva Jordans), who has lived and worked with rural women in Bangladesh for 2.5 years and speaks the Bengali language quite fluently, was also a source of information. Kamrun Naher, GKF's gender consultant, likewise contributed her knowledge of working with rural women in Bangladesh. Their

accumulated experiences served as an important framework of reference for the study.

CONCEPTS AND TOOLS

Gender Analysis in Agriculture

In this research, use was made of the concepts and tools developed in the context of ***Gender Analysis in Agriculture.*** In contrast to earlier WID approaches, which focused solely on women, gender approaches focus on men as well as women, and on the relation between them. ***Gender*** refers to the different roles played by men and women in society, which are shaped by ideological, historical, religious, ethnic, and cultural determinants.

Feldstein and Poats (1989) have developed a basic and easy to use framework for conducting gender analysis in agriculture. The framework describes the distribution of activities, resources, and benefits between household members. The fiamework proposes three sets of questions, including factors that influence:

1. analysis of activities: who does what, when, and where?
2. analysis of resources: who has access to or control over resources for production?
3. analysis of benefits and incentives: who benefits from each enterprise?

In the questionnaire, section B deals with the gender division of labor. Tbe method used for obtaining information is based on the experiences of the ***Women in Rice Farming System Program,*** as documented by Paris (1994). The different sources of labor (family and hired) were classified by gender and age (male adult, female adult, and children). Both for rice fanning and for other crops, 16 different tasks were defined. In each landholding category, the female respondents were asked who carries out each task, and in case more than one person is involved, they were asked to give an estimate of the degree of involvement of each as a percentage. Data on the cultivation of nonrice crops are limited, because only one third of the households interviewed were involved in the cultivation of these crops. A

separate set of questions (section **C** of the questionnaire) dealt with **tasks** in irrigation water management.

This framework proved quite useful in getting an overall picture of the gender-based organization of activities. It also helped to identify problems and opportunities for improvement of activities in the field of ***women and irrigation.*** However, the framework does not yield information about the underlying processes of negotiation and bargaining that would explain gender divisions. It gives a rather static picture **of** gender roles, while in reality these are constantly changing and are dynamic. Only when the causes of change and the determinants of gender divisions are well understood, a proper analysis of gender relations can he made. It was also felt that the framework neglects the effects of many differences between households and between women: class, age, religion, etc. **For** this study, the information generated **by** the Feldstein and Poats framework was interpreted and analyzed making use of background information about gender relations in rural Bangladesh.

Female–Headed Households

A concept used to distinguish different households is the gender of the household head. In Bangladesh, as elsewhere, defining female-headed households has proven problematic. In the context of this research, a ***female-headed household*** is defined **as** one in which a woman is the major provider and/or protector, carrier, bearer, and decision maker. Women heading their households may either be widowed, divorced or deserted, or have husbands who migrate for longer periods or who are sick or incapable of running the household. Households of widows or divorced women where an adult **son** has become the major provider and decision maker are thus called ***male-headed households***.

Gender Relations

Gender relations, or the relations of power between women and men, are revealed in a range of practices, ideas, and representations, including the division of labor, roles and resources between women and men, and the

ascribing to them of different abilities, attitudes, desires, personality traits, behavioral patterns, and so on. Gender relations are constituted by (and help constitute) these practices and ideas in interaction with other structures of social hierarchy such as class, caste, and race. They may be seen as largely socially constructed (rather than biologically determined), and as variable over time and place.

CHAPTER 3

Gender Relations and Irrigated Agriculture

THIS CHAPTER ANALYZES the linkages between irrigated agriculture and gender relations in rural Bangladesh. The information presented here is based on secondary literature on gender relations in Bangladesh and outcomes of household interviews.

GENDER RELATIONS IN RURAL BANGLADESH

Table I gives some demographic and social indicators for men and women in Bangladesh. The data clearly illustrate the discrepancies between men and women in terms of literacy and health.

Table 1. Some demographic and social indicators for men and women in Bangladesh.

	Male	Female
Share of employment in agricultural activity (%)	49.0	51.0
Share of employment in nonagricultural activity (%)	85.0	15.0
Share of unpaid family labor (%)	25.6	74.4
Literacy rate (%)	47.1	22.0
Infant mortality rate (per 1,000 live births)	90-115	105-125
Average life expectancy (years)	55.9	54.4.
Males per 100 females:		
All ages	111	
16-54	107	
Over 55	148	

Source: Baden et al. *1994.*

Bangladesh is a highly patriarchal society. Within the household and through local decision-making and legal bodies, men exercise control over women's labor, their sexuality, their choice of marriage partner, their access to labor and other markets, and their income and assets. Women's access to social, economic, political, and legal institutions is mediated by men (Baden et al. 1994). Purdah, the practice of female seclusion, prescribes a marked gender segregation in rural tasks and activities, roughly corresponding to an "inside/outside" divide. It constrains women's ability to move freely in the "outside" world (the fields, the roads, and the marketplace) and confines them to tasks and activities that can be performed within the precincts of the homestead (Kabeer 1990). Purdah also operates at the ideological level. It represents cultural ideals about sexual behavior, family status, and female propriety. Families signal their status within the community by their ability to provide the symbolic shelter of purdah to their women, protecting their virtue and moral reputation. Women in turn invoke the constraints of purdah and propriety as the basis of their claims to shelter and support from male guardians. Those who are forced to move outside the boundaries of the homestead generally do so with reluctance, because of the antagonism they encounter and the anxiety they experience. It is this close meshing together of the ideological and material that makes purdah such a powerful controlling mechanism on the behavior of all women, regardless of class (ibid.)

Although the purdah ideology, to a certain extent, still represents the most important cultural and ideological frame of reference, in practice growing ***impoverishment and landlessness*** have made it progressively more difficult for the poorest households to maintain purdah norms. Poor women attempt to cope with poverty as far as possible in ways that will not threaten their kin-based networks and their family's standing within the village community (ibid.). However, poverty has led to a gradual process of renegotiation and reinterpretation of aspects of gender relations, including the division of labor, rules about female mobility, and family structures.

As some Bangladesh scholars (e.g., Kabeer 1990, White 1992, and Goetz and Gupta 1994) argue, the fact that traditional gender norms and divisions of labor are being challenged by poor rural women should not be automatically taken to imply an increase in autonomy for women. Women themselves, at least initially, do *not* seek their movement into "male space" for liberation; they are often pushed into these spaces by sheer necessity. Women's increased economic participation may even result in loss of social status for them. At the same time. the fact that women earn some income

may significantly increase their bargaining position within the household, and also at village level. While losing social status by not strictly adhering to purdah norms, women gain respect because of their income-earning ability.

INTRA-HOUSEHOLD ORGANIZATION OF IRRIGATED RICE PRODUCTION?

Traditionally, in the agricultural process, field-based stages of production are carried out by men while those activities located in or near the homestead are the preserve of women, along with various domestic chores. In the case of rice, the primary food crop, all tasks from sowing to threshing are traditionally the responsibility of men. Threshing appears to mark a transition point where women and men can participate; all postthreshing stages necessary to turn paddy into rice ready for consumption or sale are supposed to be performed by women. Transport of produce to the marketplace, on the other hand, is undertaken by men Qabeer 1990).

Table 2 presents the interview findings on the ***intra-household organization of rice production,*** disagregated by landownership. Among the 30 households interviewed, 23 were cultivators producing rice. The remaining 7 either did not cultivate rice, or worked as agricultural laborers on other people's land.

Although the relatively small size of the sample makes it difficult to draw general conclusions, the data seem to indicate that the degree of involvement of male and female household members in irrigated agriculture and irrigation management is related to the size of the land the household owns.

In the ***poor or marginal farmer*** households (0.01-0.50 acre), most agricultural activities are carried out by family members themselves. In the absence of adult male household members. female-headed households do

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[2]The findings on the intra-household organization of nonrice crop production (maize, potato, and wheat), also disagregated hy landownership, are limited as among the 30 interviewed households, only 8 were cultivating nonrice crops. Findings from these 8 households show a substantial use of female family labor (around 40%), and hardly any involvement of hired labor for the marginal farmer households as well as for the middle farmer households.

Table 2. Survey findings on intra-household organization of rice production.

	Family labor (%)			Hire	abor (%)	Total
	Male	Female	Children	Male	Female	
0.01-0.50acre:						
Average (N=11)	27	57	3	8	1	96
Male-headed household (N=4)	56	35	8	1		100
Female-headed household (N=7)	22	60	4	13	1	100
Average (N=12)	34	41	5	10	6	
Male-headed household (N=9)	44	42	2	10	2	
Female-headed household (N=3)	2	55	25	1	17	100

n the calculation of the average figure, activities that are not executed are taken into ac-)unt, creating a 4 percent difference (see also appendix 2).

Eva Jordans

Male and female laborers harvesting rice together in Nalapur, Dinajpur.

engage hued laborers, mostly men, for labor-intensive activities such as land preparation and harvesting. Overall, the use of female family labor in rice production is higher than male family labor.

A woman, Rodika, commenting on her contributions to rice cultivation, said:

> *My husband and me nowadays do all work together. When you work with two people, the task is done quickly and easily, Our family situation has improved and now we decide everything together. Therefore I do not mind the extra work*

The organization of agricultural production in *middle class* households *(0.5-0.3* acre) involves male and female family labor almost equally. These more affluent households use more hued laborers, who are replacing family labor. A higher percentage of female laborers than in the marginal farmer households is used, mostly in transplanting and crop-processing tasks. Female-headed households, especially, use many female laborers, which can probably be explained by the fact that for them female laborers are easier to contact, while it is also more acceptable for women to work alongside female laborers. Interestingly, female household heads pay female laborers the same wage as male laborers. The use of male laborers is very little, as grown-up sons perform most of the male tasks.

Another factor that appears to influence the intra-household organization of production is *religion.* Data obtained from the interviews of 7 Hindu middle farmer households, and 5 Muslim middle farmer households show that in Muslim male-headed families, women contribute 31 percent of total labor, while in Hindu male-headed families women contribute 54 percent of all labor in rice production. The higher involvement of female household labor in Hindu families can be explained by the fact that these women face less cultural restrictions with respect to working outside the homestead area.

In appendix 2, the interview findings on intra-household organization of rice production are presented taskwise. Apart from the traditional crop processing tasks, female family labor is also used for makiig seedbeds, uprooting seedlings, transplanting, fertilizing, weeding, and harvesting, all traditionally male activities. In the context of this research, the most striking finding is the relatively high involvement of women in *irrigation* tasks. Around 40-50 percent of field irrigation and on-farm water management is

done by women, nearly equaling the contribution of male family labor. Women supervise the water delivery or actually distribute the irrigation water by opening and closing the bunds between plots. One irrigation water application takes about one hour, once every two to six days. Male household members are often absent because of work or activities elsewhere, which is why women take up this responsibility. Men always supervise the night irrigation though.

The interviews confirm the trend observed by Kabeer (1990) and others of an increase in the involvement of women in field-based activities, mainly due to growing rural poverty and landlessness. Hitherto strictly enforced rules preventing women engaging in field-based stages of rice production are showing signs of crumbling. Most women interviewed confirm that their participation in agricultural activities has increased considerably over the last 5-10 years. Some of them could clearly recall the times in which they only worked in the homestead, while they are now assuming a lot of tasks *beyond* their traditional homestead area.

Some women experience their increased participation in rice production as a loss of social status. In order to minimize negative associations, women attempt to define their new roles in culturally acceptable ways. One woman in Kurigram said:

> *I am the one who usually irrigates the family plot, and I also make and repair the irrigation channels. Our land is very close to my homestead, that is why I do this.*

The same phenomenon of women avoiding negative implications for household and personal status was observed by White **(1992)** who encountered women who conceived their field activities as fulfillment of their family obligation. She cites a woman, saying "Crop production is our homework, so how can it be shame?"

Women used to face harsh social disapproval when working in the fields. One Muslim widow, Bacha Mai, in Rangpur, recalls:

> *I became a widow 21 years ago, and was lucky to inherit some land from my late husband I had five young children at that time, whom I had to feed My only choice was to cultivate my land to produce food for the family. People in the village made very rude remarks. They said 'she is a tribal' or 'if she prays, God will not accept her prayer,' and 'she is*

> *the husband of a man' and other similar things. I continued with my struggle. Nowadays my life is easier as my son and daughter-in-law live in my house and help with all the work I am now a professional farmer, doing all men's work I am no longer interested in household work*

The fact that the number of women involved in field-related tasks has increased considerably over the years has also increased social acceptance. Like Bacha Mai of the previous example, many of the interviewed women are quite proud of their achievements and agricultural knowledge and have developed a distinct identity as fanners. Anju Ara provides another illustration. She is a Hindu and has been a widow for the last twenty years. She has no children. She cultivates 35 acres of land quite close to Dinajpur that belonged to her husband. She is managing her farm area professionally, involving twenty female laborers almost full time. She is producing rice, wheat, potato, sugarcane and all kinds of new crops, and is involved in on-farm trials of a research institute. When asked whether she would he interested in any further training in agriculture, she answered "Not really, I already know everything about agriculture."

An interesting aspect of the shift in the gender division of labor is that while women increasingly perform tasks traditionally considered male, they remain totally responsible for the traditional female tasks. In other words, their overall share of the total amount of work in agricultural production increases, increasing their total work load.

When comparing the fmdings about female involvement in agricultural production of this study with findings from other studies (e.g., Halim and Alam 1995, Hannan and Hannan 1993, Safilios-Rothschild and Mahmud 1989, and White 1992), it is striking that these do highlight the important role of women in post-harvest activities and homestead-based production, but report a lower degree of participation of women in field-based activities, particularly in irrigation. This difference is partly the result of higher women's involvement in field agriculture in the area of study than in other areas of Bangladesh, first because this is one of the poorest regions in Bangladesh and second because of the relatively high number of tribals and Hindu inhabitants who traditionally have less-strict purdah norms than Muslims. Furthermore, it is plausible that the explicit focus of this study on irrigation and irrigation-related activities can be partly held accountable for the research fmdings. Also, the surprisingly high degree of involvement of women in field-based activities in irrigated agriculture in this study is partly

a result of sampling. First, the sample includes a relatively large number of female-headed households, whose female members are in general more involved in agriculture than women of male-headed households. Second, 63 percent of the interviewed women are members of a GKF group, which is most likely not an average group of women.

FEMALE-HEADED HOUSEHOLDS

Apart from a noted shift in the gender-based organization of agricultural production, another direct consequence of growing rural poverty and landlessness is the high number of female heads of households. The rise in poverty-related divorces and desertions reflects the unwillingness or inability of men to discharge their customary responsibilities towards their dependents—wives, sisters, mothers, and children (Kabeer 1990). Increasingly, poor rural women are becoming the major providers and decision makers in their households. Survival strategies in situations where women are sole breadwinners generally display a diminished concern with propriety and purdah; scarcity becomes the overriding issue (ibid.).

In the study area, the most common reason for a woman to be heading the household is that the husband has died. However, there are also many women that have divorced or have been deserted mainly due to dowry disputes. Women also become temporarily responsible for family affairs and crop production if the husband has migrated, is sick or very busy with other income-generating activities. Divorced or deserted women mostly move back to the homes of their parents, but continue to manage their households separately.

The data in table 3 indicate that female-headed households (FHH) have a lower average income than male-headed households (MHH), and a higher proportion of FHH than MHH fall into the category of extreme poverty.

Baden et al. (1994) present a national figure of 16.5 percent FHH in rural areas, and among the landless households it is as high as 26.2 percent

	Male-headed household	Female- headed household
Average monthly income of household	**Tk 2,909**	**Tk 1,892**
Proportion of households in **extreme** poverty	**27.7%**	**32.6%**

Region	0-0.5 acre	0.5-3 acres	> 3 acres	Average
Kurigram	32 %	12 %	0 %	22.7 %
Rangpur	14 %	4 %	0 %	11.5 %
Thakurgaon	13 %	5 %	6 %	9.6 %

'In Bangladesh, as elsewhere, many different definitions of female-headed households are used. As a result, figures and data stated in various reports differ quite considerably and cannot be easily compared. Besides, the figures are not static, as household status can change over time: husbands do sometimes return, some women many again, etc.

Findings of this study show the following differences between FHH and **MHH:**

- The average ***household size*** of a FHH is much smaller than that of a MHH **(2-3** versus ***5-6).*** This is because the number of children is small as divorce or desertion occurs mostly early in marriage, especially when the cause is dowry related.

- The total ***farm size,*** actual cultivated acreage, of a FHH is almost half that of a **MHH** (table ***5).*** From these data it appears that land ownership is more or less equal for MHH and FHH. The difference in actual farm size is related to the higher proportion of land taken on lease or sharecropping basis **among MHH.** It shows that women's access to land on lease, mortgage or sharecropping basis is more restricted than that of **men.** This is so because: (1) it is less acceptable for women to acquire temporary land rights, **(2)** land- owners often do not trust women's ability to produce profitably, and **(3)** women may not have access to the required capital for productive cultivation of additional land.

Table 5. *Survey findings on access to land for* ***male- andfernale-headed households in the GKF area.***

Land ownership	Gender of household head	Total farm size (acres)	Owned land (acres)	Shared/leased land (acres)
0.0-0.50 acre	Male (N=6)	1.17	0.27	0.90
	Female (N=9)	0.45	0.18	0.27
0.50-3.0 acres	Male (N=9)	1.21	0.58	0.63
	Female (N=6)	0.87	0.87	0.00

- MHH have more ***income-earning opportunities*** (agricultural laborer, rickshaw puller, businessman, etc.). Income-earning opportunities for women are much more limited, and FHH are predominantly dependent on the income from their crop produc-

tion. Although they can earn an income through agricultural labor, animal husbandry, crop processing, or handicrafts, returns to these activities are generally much lower than returns to crop production.

Agricultural production is easier for female beads of households if they have grown-up or teenage sons. Some women are able to obtain assistance from their fathers or other male family members. One widow in Kurigram, who did not have any family members at all, adopted a stepson who carries out some work for her in return for pocket money and food.

Sustaining their agricultural production over time may be especially problematic for female heads of households, as illustrated by the experiences of five female landowners in the sample who were involved in irrigated agriculture under a GKF deep tube well for two successive irrigation seasons. Only two women were able to continue irrigated boro cultivation in the second year without problems. The other three women could not sustain production. One of them lacked the necessary capital to buy seedlings in the market after her own seedling production had failed. The second experienced problems because the former owner of the land she had bought, fraudulently sold the land a second time to a third person. Her struggle to regain ownership of the land prevented her from cultivating. The third woman had to give in to family pressures to mortgage all her land for a high price. The reason was that her family needed cash for the wedding of her sister and for the funeral of her brother.

Overall, women heading a household and deriving their main income from agriculture are a quite vulnerable group. They often have limited access to inputs such as land, credit, seed, and fertilizer. Besides, they face problems of control over their land. All these factors reduce their agricultural output, and consequently their family income.

LINKAGES BETWEEN GENDER AND IRRIGATION

During the study, an attempt was made to determine the direct and indirect linkages between gender and irrigation through household interviews.[4] The

[4] Irrigation in this chapter comprises not only irrigation provided by GKF, but also that provided by private means or other water sellers.

respondents were asked to indicate whether income sources, and access to resources and assets had changed after the introduction of irrigation, and whether these changes affect men and women differently. Although not all reported changes can be directly attributed to irrigation, some clear linkages could be identified. The results are discussed below, according to the data presented in the tables.

Income Sources

Overall, an increase in income from ***crop production*** due to irrigation was reported by 78 percent of the marginal fanner households, and by all middle fanner households (table 6). Irrigation makes it possible to grow crops year-round, and most **farm** households now cultivate **two** rice crops a year, instead of the earlier one monsoon crop.

Table 6. Changes in income sources of households after the introduction of irrigation

Income source	Decrease (%)	No change (%)	Increase (%)	Total
0- 0.50 *acre* (N=9)				
Crop production	11	11	78	100
Labor/business	22	11	67	100
Animal production		34	*66*	100
0.50-3.0 acres (N=11)				
Crop production			100	100
Labor/business		18	82	100
Animal production	18	27	55	100

Of the women belonging to landless and marginal fanner households, 67 percent reported a higher income through increased ***wage labor*** opportunities in irrigated production. The increase in labor opportunities has been higher for female labor than for male labor. Five years ago, female laborers were hardly employed, while nowadays women are employed

increasingly for weeding, transplanting, and harvesting.' The interview findings regarding the division of labor in rice production indicated a 6 percent use of female labor by middle farmer households, still lower than the 10 percent male labor. Wages for female laborers have increased, especially during peak times. Instead of the former payment in kmd, payment is now made in cash. The maximum female wage is Tk 40 a day, the minimum is around Tk 15 a day, depending on the type of work and the season. Still, women receive on average 20 percent less wages than male laborers, even for the same type of work. Robima, a woman in Kurigram, commenting on lower wages for women said, "There is no value for women's work, that is why they give us a lower daily wage."

Eighty two percent of the middle farmer households reported an increase of their opportunities to earn income from *business.* Modem irrigated agriculture increases their scope to earn off-farm income. This is especially true for male members of the household who can start, for example, a rice or irrigation equipment business.

An increase of income from *animal production* was reported in both categories, and was explained by the fact that revenues from increased crop production are invested in livestock. Caring for livestock is predominantly a task of women. They reported that caring for livestock has become easier, as irrigation increases water availability for bathing the cows in the *dry* season. Women often have control over the income from the sale of milk and calves nd benefit from their increased access to cow dung, which is used as manure and fuel.

In most farm families, women are the main managers of household income, either cash or stock of produce. As they are much more at home than men this seems a sensible arrangement. In spite of this, men often have more power in decision making regarding expenditure. Cultural restrictions on women limit their access to markets as well as their mobility, causing men to actually buy most things. The increased significance of women's contribution to household income does nevertheless seem to result in a greater say for them on what the money is used for. Among other things,

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'This finding is corroborated by Solaiman (1988) who states that "it has been observed that the average number of days of hired female labor is eight times more in villages that adapted the high yielding variety seed, fertilizer and irrigation technology than in villages where the level of adoption of improved cultivation is minimal."

women have a clear preference to spend money on the education of their daughters.

Table 7. Changes in access to resources of households after the introduction of irrigation.

Resource	Decrease (%)	No change (%)	Increase (%)	Total
0.0-0.50 *acre* (N=9)				
Land	78	-	22	100
Fodder/grazing land	44	33	23	100
Drinking water		22	78	100
Credit		-	100	100
Labor	11	-	89	100
Fuel wood	*66*	-	34	100
0.50-3.0 acres (N=11)				
Land	45	37	18	100
Fodder/grazing land	54	18	28	100
Drinking water		45	55	100
Credit		18	82	100
Labor	45	18	37	100
Fuel wood	*36*	27	37	100

Access to Resources

More indirect linkages were established between the introduction of irrigation and the access to different resources.

All categories, especially the small farmers and landless, reported a decrease in access to sharecrop *land.* This was explained by the fact that because of irrigation almost everyone is interested in cultivation, and competition for land is high. A few respondents reported an increase in land area. This is partly an increase in land ownership when more land was bought with savings, and partly because some large landowners now prefer to give out part of their land for sharecropping as irrigated production requires high investments.

The changes in access to land do not directly affect women of male-headed households, because they usually only have an indirect access to land through their husbands.[6] Women heading their households are more directly affected by the changes in access to land. Increased competition for landmakes it even more difficult for them to obtain land as they are often already in disadvantaged positions as compared to men with respect to access to land.

Women were unanimous about the reduction in fallow land used for *pasture*, as most land is now cultivated year-round. Two new resources of *fodder* have partly mitigated this change. Irrigated rice production provides an additional amount of straw. Drawbacks are that only women belonging to cultivating households have access to this straw, and that the nutritional value of straw is lower than that of grass. The second resource is fresh grass and weeds that grow on the bunds around the rice fields and in the earthen channels due to irrigation. Women may either lead their cows there to *graze* (a side effect is that earthen channels may be damaged by grazing cattle.), or they may cut these grasses by hand and carry them home. Although women do not report a shortage of fodder, feeding of livestock has become more time consuming.

An overall increase in access to ***drinking water*** was reported, as more hand tube wells were installed by GKF as well as by other development organizations. *So* far irrigation does not seem to decrease ground water levels in such a way that the domestic water supply is endangered. Irrigation sources increase availability of water for domestic purposes such as bathing, washing clothes, cleaning pots and pans, etc. Both the collection of drinking water and the other domestic chores are tasks traditionally done by women. The increased access to water closer to homes affects them positively. They can perform their domestic tasks more easily and spend less time on these activities.

All respondents reported an increase in the availability of ***credit*** for women, mainly from NGOs like GKF. Traditionally women's access to agricultural credit was almost nonexistent, the two available sources being

[6] According to Muslim law, Muslim women inherit land from male relatives, half of what their brothers or children inherit. In practice, women commonly waive their right to the share of the land divided after their father's death. They do this in exchange for teir brothers' suppoti in the event of marital crisis (Kabeer 1990). Hindu women formally hold rights in property for life only, on death land reverts back to the male line (White *1992).*

rich money lenders and commercial banks.' In the research area, NGOs such as GKF, Grameen Bank, BRAC, RDRS, and others provide credit to poor women. NGOs consider women a safer investment; women tend to be more responsive, do not migrate easily, and feel responsible for repaying their debts.'

Another effect of irrigation is that it changes ***labor*** relationships in the villages. Formerly many women used to work for rich households, mainly receiving food in exchange. Now, for many of them, opportunities for income generation such as crop processing, agricultural production or work as agricultural laborers have increased. During interviews with women from middle and large landowning families, 45 percent reported increasing difficulties in finding wage laborers. They complained that nowadays, during peak times, it is hard for them to find male as well as female laborers. If they do, they have to pay high wages. The introduction of irrigation also appears to have changed labor relationships within households, female family labor is increasingly used for own irrigated production, especially among the poorer households.

A decrease in ***fuel wood*** was reported as forest areas have been cut down for fuel or for cultivation. The double rice crop, however, results in an increased availability of straw that is increasingly used as fuel. Collection of fuel is a haditional task for women. Women from landless families, especially, are affected negatively by the decrease in fuel sources, as they have limited access to straw.

Assets

In order to get more insight into the effect of irrigation on the actual living conditions of households, respondents were asked to estimate changes in household assets.

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[7]The main reason for the constrained access to credit for women is that the system of collateral security, such as deeds of land ownership, prevents rural women from entering the credit market (World Bank 1990).

[8]The provision of credit to low-income landless rural women in Bangladesh has increased dramatically over the 1980s, to the extent that there has been a near reversal in the gender balance of members of special credit institutions and in the flow of credit to women (Goetz and Gupta 1994).

The marginal farm households are clearly not able to sustain or improve their living conditions. They reported some decrease of assets like ***housing*** (11%) and ***wedding presents*** (17%). The households that reported a decrease in amount of ***food*** available **(44%)** are all landless, and not able to earn enough income to sustain their livelihoods, especially when the number of family members is increasing. Middle farmer families show overall stable assets or an increase in **assets;** they seem to have succeeded in improving their living conditions mostly due to the benefits of irrigated agriculture.

Access to ***education*** has remained more or less the same in the area, especially for girls. Until now girls had less access to education than boys; their enrollment in schools is lower and their drop-out rate is higher. This leaves women with a literacy rate of 22.0 percent, while men have achieved a rate of 47.1 percent (Baden et al. **1994).** This is a serious constraint for women who want to increase their activities in agriculture or business.

It is clear that households with access to land benefit most from irrigation. **The** development of irrigated agriculture has affected women belonging to different classes differently. Women from middle landowning families have benefited relatively more than women from marginal farm households. Marginal farm households experienced a constrained access to resources as well as a reduction in **assets.**

Table 8. Changes in assets of households after the introduction of irrigation.

Assets	Decrease (%)	No change (%)	Increase (%)	Total
0.0-0.50 acre (N=9)				
Housing	11	67	22	100
Furniture	-	*61*	*33*	100
Food	44	22	34	100
Education	-	67	33	100
Wedding presents	17	78	11	100
0.50-3.0 acres (N=11)				
Housing	-	**55**	45	100
Furniture	-	55	45	100
Food	-	63	37	100
Education	-	63	37	100
Wedding presents	-	55	45	100

CHAPTER 4

Gender Policies and Strategies of GKF

WHILE BEINGCLEARLY committed to improving the position of women, initially the Grameen Krishi Foundation (GKF) was less clear on *how* to achieve its goals with respect to rural women. This chapter describes how GKF's thinking and practices with respect to gender evolved over the years.

GENDER STRATEGY OF GKF

GKF's main objective is the alleviation of poverty. In achieving this objective, GKF recognizes that both men and women belong to their target group. GKF's commitment to women stems to a large extent from the experience of the Grameen Bank (GB), that women, and especially those of female-headed households, belong to a most disadvantaged group in rural Bangladesh. In addition, GKF's management is convinced that targeting women is more effective in terms of improving the living conditions of poor families than targeting men (Mohammed Yunus, personal communication, Dhaka, Bangladesh 1995). As Professor Yunus, Managing Director of GB and Chairman of GKF, explains:

> *GB's experience is that money going through a woman in a household brings more benefits to the household than money entering the household through a man. When a woman brings in some income, the immediate beneficiaries of the income are the children, who get top priority from the mother. The secondpriority a woman has is improving the living conditions of the household But a man has a different set of priorities, which do not give thefamily a top position.... We want to see changes taking place within the family. If the children are benefiting through their mothers more directly we should aim at mothers....So we graduallyfocused more and more on women.*

GKF's mode of operation can be best described as a continuous adapting strategy in which the nature of the activities is almost directly determined by the needs and problems of the target group, land-poor women and men. Based on the success of GKF's mother organization, the GB, all GKF activities start with organizing male and female members of poor rural households in groups. When GKF started forming groups in 1991, at first it selected landless and destitute women and men, the same target group as that of the GB. However, it was soon realized that GKF, as an agricultural organization, could not do much to improve the position of people not actively involved in agriculture or owning land. Because of this, GKF changed the criteria for group membership (in October 1994) and restricted membership to those who own between 0.5 and 3 acres of land, thereby targeting the so–called land-poor?

In spite of the change in membership criteria, GKF does continue to provide labor opportunities to landless people, by employing them in experimental crop cultivation managed directly by GKF. Yearly, this amounts to around 110,000 labor days for women, and around 175,000 labor days for men. In addition to wage labor provision, in the fust few years of its operations the only other activity of GKF that explicitly targeted women was the so-called "value-adding" activity. This activity consists of GKF buying and supplying different crops to women for processing or resale. The "value adding" program focuses on women only, and is implemented in times of scarcity or disasters. Most women involved in this program succeed in generating some additional income enabling survival during hard times. From September 1994 to April 1995, a serious drought period, a total of 500,000 kg of crops was distributed among 4,500 women under this program. Both the creation of temporary employment, and the "value adding" program can be categorized as a ***relief strategy.*** A basic characteristic of this strategy is that it does not fundamentally change the structural determinants of poverty.

During the fust years of being in operation, while being seriously committed to assisting poor rural women, GKF found it difficult to relate women to its core activity of operating and managing deep tube well (DTW) irrigation. Identification of agriculture-related activities that would be suitable for women and providing them with an income proved likewise to

[9] As most NGOs in Bangladesh target the destitute and landless people, the group of land-poor does receive very little assistance from them.

be difficult. Those GKF activities that did target women displayed the characteristics of many early *Women in Development* projects, by isolating women as a separate target group and through demarcation of specific women's spheres, domains or activities. Implicitly, the focus was on women's roles as mothers and domestic caretakers and not on their roles as farmers or providers.

The direct encounter with a large number of women actively engaged in field-related tasks and the experience in working with and listening to rural women made GKF staff gradually discover that women can and should be considered as farmers. Preliminary fmdmgs from this study underscored this discovery by highlighting the high involvement of women in agriculture and irrigation and by showing that many women are extremely eager to engage in irrigated crop production.

Together with the growing acceptance of women as farmers, GKF's recognition that poor women often lack access to and control of resources was also growing. In accordance with the fmdings of this study, GKF realized that women cultivators face the following constraints:

1. Lack of access to and control over land
2. Lack of access to and control over inputs, including irrigation water
3. Lack of access to and control over credit
4. Lack of access to information and markets and control over marketing

In sum, it was realized that bringing about structural poverty alleviation of land-poor women is conditional upon improvements in women's access to resources (land, water, and agricultural inputs), information, and markets. This recognition led, in 1994, to a change in GKF's gender policy. The following objectives were formulated with respect to women:

1. Enhance the participation of women and improve their productivity in agriculture-relatedproduction activities, including livestock farming.
2. Respond to the needs of women farmers for agricultural resources.

Meanwhile, GKF gradually expanded its activities beyond DTW irrigation, to include irrigation by other equipment. GKF's mission had become agricultural development in the broadest sense. This tremendously increased the scope of realizing the above two objectives.

Most of the activities resulting from this policy change consisted of involving women in GKF activities in the areas of (irrigated) crop production and input supply. Traditionally, most poor women only have access to agricultural resources through men, on terms that are often very unfavorable. GKF made a deliberate effort to reduce women's dependency on male intermediaries by directly providing services and resources to women on fairer terms.

To develop the program, a special ***Women in Development Unit*** was established at the GKF Head Office. The activities are implemented and monitored under the Women Support Program based at the GKF office in Rangpur, while most field-based activities are carried out by GKF staff. A deliberate attempt was made to increase the number of female staff, In September 1994, 3 percent of the GKF staff was female, which gradually increased to 13 percent by December 1995. The majority of the staff working with rural women continues to be male. Although it is generally believed that it is problematic for male staff to work with rural women in Bangladesh, GKF has come across remarkably few difficulties so far. Due to their thorough training and because they permanently live among the villagers, most Farm Managers develop a high degree of understanding of the people they are working with. Female group members refer to them as "brothers" or "sisters."

GKF's current gender strategy is a "*mainstreaming*" strategy, involving women in existing core project activities." A concerted effort is being made to make irrigation and irrigation-related services available to women. In doing so, GKF realized that women often need specific support, for example, in obtaining access to land or credit or for marketing their produce. Hence, in order to successfully allow women to use and control irrigation services, a number of additional activities had to be developed or strengthened. Alongside the provision of irrigation services to female farmers, GKF increased provision of agricultural inputs to women and became directly involved in negotiating access to land for women. GKF also helps female

[10]**The next chapter (chapter 5) gives a detailed description of GKF's experiences with involving women in its irrigation-related activities.**

cultivators with marketing the produce and provides technical assistance and training.

In addition to these *mainstreaming* efforts, GKF continues to **support** specific income-earning activities for women, such **as** vegetable seed production, setting up tree nurseries and livestock farming. These are activities that are often less profitable than irrigated rice production, but which some women prefer since they can be carried out in the homestead area. In recent years, **GKF** has also started to give greater emphasis to provision of information on sanitation and basic health because illnesses and expenses for medical treatment are important factors contributing to continued poverty and indebtedness of the rural households. It was realized that there can be no real poverty alleviation without awareness about health and hygiene; acquired profits and benefits **through** GKF activities are easily lost if a member of the household is sick and needs treatment or hospital care.

In the beginning of ***1995,*** a cash credit program for a variety of income-generating activities was added to the GKF program. Although targeting both men and women, GKF has a clear preference for women in lending money. Reasons for this preference are the experience that incomes earned (and controlled) **by** women are of greater benefit to the household than incomes earned by men, the experience that women tend to feel more responsible for repayment than men, and the fact that women are easier to contact and organize than men.

GROUP FORMATION

The formation of groups is a core element of GKF's mode of operation. Nearly all GKF activities are targeted at groups of five members. Given the high degree of gender segregation in Bangladesh society, women and men are organized separately. The number of five was arrived at based on experiments and experience by GB, which showed that a group of five members is most efficient in terms of group management. Group members support each other, exchange labor, jointly implement activities, and in general have control over their work and the resulting income. The fact that the people GKF **is** targeting are organized in groups is essential for ensuring two-way communication between them and GKF, while it also ensures a high degree of accountability of GKF towards its "clients."

The rationale behind group formation is fourfold

1. To provide an institutional setup for the activities and ensure communication between GKF and group members
2. To achieve mutual responsibility for the repayment of inputs
3. To provide training and information more effectively
4. To accumulate a group fund for future investment and emergencies

Eva Jordans

A four-day workshop ***with 30 female group members*** *of the* ***Jharbari*** *Unit,* ***Thakurgaon Region.***

After changing the membership criteria so as to target the category of land-poor people instead of the landless, the guidelines for group formation were:

- Area of land owned is between **0.5** and **3 acres**
- Above 18 years old, and married
- Not more than one member of a household can become a member
- Main occupation should be agriculture
- Members should be of similar mentality and economic condition, and they should trust each other
- A member cannot be a member of another organization

In practice, these guidelines are followed in a very flexible way. For example, if no other organization or Grameen Bank is active in a GKF working area, members owning less than 0.5 acres of land are accepted. The change in the membership criteria, although implemented flexibly, did nevertheless lead to a considerable increase in the number of cultivators among GKF members.

The reason for the rule that only one member from a household can become a group member is that GKF is distributing loans among its group members. It is much easier to keep track of the total distribution of loans to one household if there is only one member per household participating in the credit program. Experience from other countries and organizations shows that the one member per household rule often is the very regulation that implicitly excludes women from participating, as usually men automatically become the member. With GKF groups this did not happen, because of GKF's explicit positive discrimination of women. Potential members have to officially apply for membership, and applications from women are given preference. By September 1995, a total of 491 male and 1,097 female groups were formed. Regional data on group formation is given in table 9. GKF plans to set up a further 1,000 female groups by the end of 1996.

Region	Male groups	Female **groups**	Total
Rangpur	**91**	**147**	**244**
Kurigram	**94**	**250**	**344**
Dmajpur	**44**	**180**	**224**
Saidpur	**30**	**105**	**135**
Thakurgaon	**63**	**266**	**329**
Tangail	**73**	**56**	**129**
Total	**491**	**1,097**	**1,588**

CHAPTER 5

Irrigation-Related Activities of GKF

THIS CHAPTER DESCRIBES GKF's experiences with *mainstreaming* involving women in core GKF activities. As such, the chapter provides the findings of the process documentation component of this study.

The study findings and case studies show that, given an effective and reliable provision of support services, poor women are capable of and interested in irrigated agriculture and in using and managing irrigation equipment. Although irrigation in Bangladesh is traditionally considered a male sphere of activity, many women feel quite confident about their ability to successfully irrigate and manage irrigation equipment. Due to the proven and documented success of the activities, a large expansion was planned by GKF for 1995-96. To facilitate implementation and to increase awareness among the staff with respect to women fanners' irrigation needs, the results of this study were *used* to produce a set of very concrete and specific guidelines. These guidelines are included in the overall training program of the Farm Managers (see appendix 3 for the English version of the guidelines).

PROVISION OF AGRICULTURAL INPUTS

One of the main constraints of agricultural development in Bangladesh is that most of the land is being cultivated by people who have hardly any capital. This results in de facto low-input, low-risk, and thus low-output agriculture. GKF supplies inputs on credit and negotiates with landowners to arrange access to land for its members, thus allowing resource-poor fanners to extend and intensify their fanning practices.

GKF has developed various systems to provide inputs for crop production to group members and to individual fanners. The inputs are usually given as loans in kind and repaid by a prefixed crop share, also in

kind, after the harvest. The repayment includes a 20 percent service charge to GKF."

Table 10 shows that in 1993-94 there was a 12.5 percent participation by women in the provision of agricultural inputs, indicating the effects of GKF's first attempts to involve more women. Figures for 1994-95 show that female participation increased to 40 percent; a total of 524 acres were cultivated under this program of which 210 acres were by women. Groups as well as individuals participated in the program, covering, on average, 0.5 acre per individual. In 1994-95 a total of around 625 men and 420 women participated in this activity. For 1995-96, GKF planned to further increase female participation and targeted to cover 650 acres cultivated by female farmers.

Agricultural input provision	Male	Female	Total	Women's share (% of total)
1993-94				
Acreage (acres)	91	13	104	12.5
Input loan (Tk)	419,937	47.730	467,667	10
1994-95				
Acreage (acres)	314	210	524	40
Input loan (Tk)	590,281	173,114	763,395	23

Source: GKF monitoring system.

Direct provision of agricultural inputs in kind appears to be a very effective strategy to increase benefits from crop production to poor farmers. Especially for women, it is near impossible to obtain reliable access to good quality inputs at fair prices, because inputs normally are bought from local

[11] The service charge of 20 percent is calculated on outstanding loans, not for the part of the loan that is repaid. For example, a one year loan of Tk 1,000 repaid in weekly installments of Tk 20, results in an amount of Tk 100, or 10 percent of the loan, due as service charge.

markets and access to these markets is restricted for women. In addition, the inputs serve as credit in kind, increasing women's access to capital, which is normally very constrained. The case studies show that once access to inputs is secured, women are able to realize considerable profits. Increased agricultural production also results in more access to crop residues, which can be used as fodder and fuel.

Female group members may use the agricultural inputs on "household" land, or on land that is leased on either an individual basis or group basis. GKF staff may directly mediate between women groups and landowners so as to increase women's access to land. Many large landowners use their land extensively, leaving it fallow for most cropping seasons. By increasing access to land, GKF not only improves the position of the target group hut also increases actual agricultural output.

Some GKF staff have started providing assistance in marketing the produce. Normally women have very limited access to markets and depend on male relatives to **sell** the crop. Although women can arrange for buyers to come to their houses, or **sell** among the village women, or employ someone to sell crops for them, it nearly always means that they have to settle for lower prices. When GKF does the marketing for them, they receive fair prices and have more control over the income derived from their own activities. A more active role of GKF in assisting women with marketing is a clear need. **As** Moni Bala, a female GKF group member actively involved in producing rice, put it: "After the harvest we will ask **our** *bhai* (or brother, referring to the GKF Farm Manager) to help **us** with selling **our** produce."

The following case studies show how, with GKF assistance, women groups and individuals managed to profitably produce crops.

Case Study 1: Mohonpur Farm, Bochaganj Unit, Dinajpur Region

In Bochaganj, group formation started in January 1994. The group members are landless, and have a tribal background. Before they joined the group they were working as day laborers. Seven women displayed interest in GKF's input provision program. They are all married, and their husbands also work as day laborers.

GKF acted as an intermediary in the negotiations between some landowners and the women to obtain *6* acres *(2.5* hectares) of land on a sharecropping basis. The land is suitable for dry season *(boro)* rice production. The landowners were reluctant to give land to female fanners for sharecropping, because they feared that women would not be able to cultivate the land profitably. GKF negotiated directly with the

landowners, and succeeded in convincing them to give the land to women sharecroppers.

The group members obtained individual loans from GKF for inputs like seed and fertilizer. They repaid the loans through a share of the harvested crop. Irrigation water was obtained by renting a STW from a businessman in the village. Each of the group members cultivated about one acre independently. Their husbands assisted them with land preparation. They combined their efforts only for irrigation, because water could be distributed more easily and efficiently when all the plots are irrigated simultaneously. Irrigating the fields at the same time also facilitates arranging the water turns with the STW owner. The women did not make use of any outside labor for cultivating the fields; when needed they exchanged labor.

The female GKF Farm Manager monitored crop growth in the fields, and discussed progress and problems with the women during weekly meetings. The cultivation of irrigated dry season paddy on sharecropped land turned out to be very profitable: yields were good and the average net profit was around Tk 5,000 per member. For the first time in their lives, the women acquired a working capital, which some of them invested in livestock. Instead of being landless laborers, the women became farmers, managing their own production. The access to straw, which can be used for fodder and fuel, provided an additional benefit. The female group members were so enthusiastic about their own success as farmers, that they made plans to continue rice production and expand their farming activities to nonrice crops in the following season.

Case Study 2: Nicheksundor Farm, Hatibandha Unit, Kurigram Region

In the 1994-95 irrigation season, a group of five women of the Nicheksundor Farm (all from male-headed households) cultivated 7.5 acres of a hybrid maize, called Pacific-11. GKF made some land available to the group members on a 3-year lease. GKF supplied all the inputs, seed, fertilizer, and irrigation water from a STW. The women themselves cultivated maize jointly, with some assistance from their husbands in land preparation. A fixed crop share of 36 maund per acre was paid to GKF for the inputs, irrigation water, and lease of land. The yield was quite good, 70 maund per acre. Roughly half was paid as share to GKF and the other half was sold to GKF for Tk 56,100. The net profit per member was Tk 11,220, which is three to four times higher than what they would have normally earned in this period. Their labor input was only 9 days per group member, and a total of 45 work days. Apart from the direct and substantial income, the group members benefited from the straw, a by-product used for fodder and fuel.

The group members, the landowners, and GKF were interested in continuing and even expanding this activity The intention was to cultivate 60 acres of maize in this village during the 1995-96 irrigation season.

Case Study 3: Kesobpur Farm, Shanerhat Unit, Rangpur Region

GKF provides loans to members who cultivate individually. laheda Begun, from Kesobpur village, became a GKF group member in 1993. She is landless and was deserted by her husband who was always gambling. She has a small son. Her only avenue of income generation is agriculture; it is difficult for her to engage in business activities as she has nobody to send to the market. Knowing that she could get inputs and other assistance from GKF, she sold her only cow for Tk 3,000 and leased 0.40 acre of land from a villager for a few years. She grows two rice crops a year and mustard as an intercrop on this land. GKF provides her with seed, fertilizer, and irrigation water from a DTW. In return, she gives GKF half of the harvest. To supplement her income, she processes paddy that she receives separately from GKF. She makes a considerableprofit, but is eager to increase the scope of her activities.

DEEP TUBE WELL IRRIGATION

The deep tube well (DTW) management program is the most important GKF activity in terms of funding and staffing. DTWs are deep set, force mode pumps, or submersible pumps, designed for the irrigation of around 75 acres. The actual command area is only 40 acres, on average. There are different ways in which women are or can he involved in DTW irrigation: (1) cultivating land in the command area of a DTW and participating in water management, (2) fully or partially managing DTW equipment, and (3) constructing earthen irrigation channels in the DTW command area.

Women Cultivators and Water Management

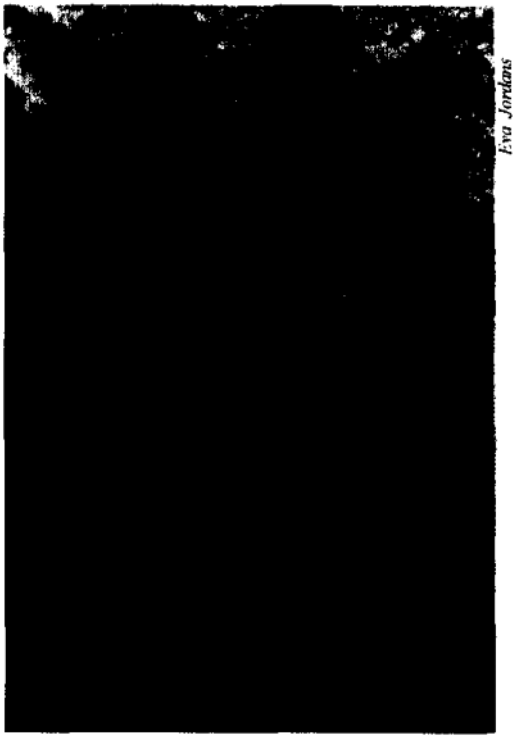
GKF is actively involved in deep tube well management. In the 1994-95 irrigation season, 488 of the 522 GKF deep tube wells were fully managed by a GKF Farm Manager, 12 were managed by fanner groups, and 22 were managed under the so-called "acreage system."

When GKF started managing the DTWs, the intention was to organize Irrigation Water Committees consisting of water user .representatives from different blocks in the command area of a DTW. These Irrigation Water Committees were to be in charge of water distribution, and to be partially involved in operation and maintenance. The idea of having formal Irrigation Water Committees did not prove to be very feasible. In fact, since the total number of fanners per DTW is quite small (30-40, on average), the need to have a formal committee with a selected subgroup of representatives in charge of irrigation water management can be questioned. As an alternative,

it appeared to be quite feasible for the DTW users to regularly meet with the entire group of farmers in a more informal way. This is the management system most in use now by GKF.

Household interviews indicate that women benefit from the shift 60m formal to a more informal organization. While there were no female members in the formal Irrigation Water Committees, women's participation in the informal meetings is quite high, though restricted to female heads of households. Female members of male-headed households normally do not participate in the meetings. Of the female heads of households interviewed, 75 percent participated in the meetings. Two female farmers said:

> *These water distribution meetings used to be only for men. Earlier we sent a male relative, or we eavesdropped in the surrounding. Now we have become members of the GKF women group, and participate regular in center meetings. We nowfeel the need to attend thefarmers' meetings ourselves. Next irrigation season, we are determined to participate.*



Eva Jordans

Moriam irrigating her plots by opening and closing bunds; Ghosalpur, Kaharol Unit, Dinajpur.

The growing acceptance of women as fanners by GKF staff and the effects of group formation increased the scope for and acceptance of female participation in fanners' meetings. GKF intends to increase its efforts to stimulate the involvement of women cultivators in water management in the years to come.

Women who make use of DTW irrigation indicated during interviews that they do not have any specific difficulties in obtaining their share of water at the appropriate time. The location of their land (at the top, middle, or tail end of the command area) rather than gender determines the reliability of water deliveries. One woman said: "I have no problems at all with irrigation. I always get a lot of water. This is because my land is next to the DTW." A few women nevertheless indicated that male fanners are better able to secure their water first when the demand for water is high. These women face some difficulties in getting water in time, especially for land preparation and transplanting. The fact that men can move more freely, physically and socially, makes it easier for them to secure water according to their own needs. As one woman commented, "It is always like this for us women."

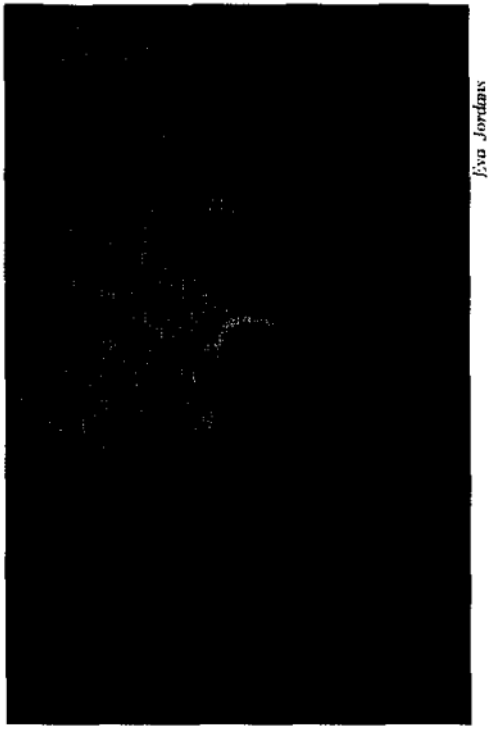
Managing DTW Equipment

In a few places, fanner groups have fully or partially taken over management of a DTW. In the 1994-95 irrigation season, 522 GKF deep tube wells were in operation. Among these, 12 were fully managed by male fanner groups, which had taken over the role of GKF in supplying irrigation water to fanners in the command area. One of the reasons why a small percentage (2%) of DTWs was taken over by fanner groups is the poor mechanical condition of many DTW pumps. Fanners fmd it difficult to meet the frequent maintenance and repair requirements of these pumps. Another reason for the small rate of DTW turnover to fanners is the small or sometimes negative profit margins of DTW management, primarily because of the small size of most command areas. GKF recognizes these problems and is very careful with the handing over of wells.

An alternative approach to full turnover is the system of partial management, or "acreage system." Under this system (in 1994-95), 22 DTWs were rented by 21 male fanner groups and one DTW by a female group. The acreage system requires a rent per acre and cost of diesel to be paid to GKF by the fanner groups. Fanners are also responsible for water

management and maintenance of the channel infrastructure. GKF remains responsible for maintenance of pumps.

Involvement of women in the management of DTWs is very low, although some efforts were made by female groups to increase their particippation. Women themselves are quite confident they can fully manage a DTW and they are interested in doing so if it is considered a profitable activity. When discussing the possibility of managing a DTW with a women group, one woman confidently said: "Of course we can operate a DTW. There is hardly any difference between women and men, nowadays, in agricultural work. And do we not have our sons to help us?" In spite of their own confidence, two women groups failed during 1994-95 because of disapproval by their husbands (Kurigram) and noncooperation of landowners in the command area of the deep tube well (Dinajpur).



Eva Jordans

***Jaheda Begun,** GKF group member, in front of the GKF tube well at Kesobpur Farm, Shancrhat Unit, Rangpur Region.*

Construction of **Earth Channels**

Improved earth channels are constructed in deep tube well command areas as part of the Irrigation Distribution Improvement Program implemented by GKF. The aim of this program is to make water distribution more efficient, thereby increasing the size of the command area and reducing operating costs. The design of these earth channels is made by engineers working for GKF. GKF also finances the construction. External laborers, farmers, and group members are employed in the construction phase.

Employing group members has a few advantages. Group members can earn some additional income during the construction period, December to January, which is a time of scarcity. In addition, group members often own or sharecrop land in the DTW command area, which may give them an additional incentive for carrying out the work properly. Participating in construction may also lead to a greater sense of responsibility for maintenance of channels.

The following case illustrates a pilot activity, involving female group members in the construction of channels.

Case Study 4: Choto Paharpur Farm, Shanerhat Unit, Rangpur Region

On the Choto Paharpur farm, members of a women's group have been engaged in the construction of improved earth channels. Ten group members participated in the work for a period of one month. These female group members are tribal and all are landless. For income they depend on daily wage labor and sharecropping.

The length of the channels constructed was 3,500 feet. A total amount paid as wages was Tk 6,500 (Tk 25 per day per woman). Each member earned a total income of Tk 650. Group members were happy with this income, as labor opportunities in the month of January are very scarce and average wage rates in the area are very low (Tk 10-15 per day).

An engineer from GKF supervised the work. The total cost of the work, Tk 6,500, was far below the set budget of Tk 12.000. The engineer expressed the opinion that the work was of very good quality, even better than similar channels constructed by male laborers in the same area

MINOR IRRIGATION EQUIPMENT

Under the credit program, loans are provided to buy or rent minor irrigation equipment. Management of this equipment by group members is described below under separate headings.

Some data on gender differentiated participation in the management of irrigation equipment, such as STW, treadle pump, and hand tube well, during 1994-95 are presented in table 11.

Loan utilization for buying irrigation equipment has led to considerable profits for GKF members. The acquired income and experience has given women confidence and a determination to expand and improve their irrigation activities. Women involved in STW management have gained technical knowledge on mechanical pump operation and basic maintenance.

Table 11. Number of minor irrigation equipment managed by GKF groups and members during 1994-95.

	STW		Treadlepump		Hand tube well	
	Male	Female	Male	Female	Male	Female
Total	3	2	1	14	42	42

Shallow Tube Well

A STW is a diesel powered or electric motor powered suction pump. STWs are specifically designed for irrigation purposes. The average command area of a STW with a discharge of *20* to *25* liters per second is 12.5 acres. STWs can be used in areas where water tables are not more than 6-7 meters below surface.

STWs are a very suitable technology for irrigation in the GKF working area. Water tables are sufficient almost everywhere and management of their relatively small areas is easier than that for DTWs, given the high land fragmentation. In addition, the small size of STWs makes it easy to move them to places that are most suitable.

During the 1994-95 irrigation season, GKF provided loans to buy STWs for the fust time. Three male groups and two female groups received loans for this activity.

Although the following case study illustrates that management of a STW is not without problems, GKF has planned to expand the number of STWs run by female groups to 40 during the 1995-96 irrigation season. Reasons are that it is the most suitable and flexible irrigation technology and

offers many opportunities for irrigated crop production as well as selling water to other farmers. Based on the study fmdings, GKF intends to undertake the following measures for increasing the success of STWs: (1) provision of training on STW maintenance and repair, (2) inclusion of diesel in the input loan package, and (3) adoption of the rule that only members of landowning households are eligible for this activity.

One of the female groups managing a STW was studied closely for this research. The following case study describes its experiences.

Case Study 5: Ghosalpur, Kaharol Unit, Dinajpur Region

A female group in Chosalpur managed a STW in the 1994-95 irrigation season. The female group members are all Muslim. The group chairman is a widow and the others are married. They irrigated their own fields and sold water to other fanners.

They obtained a loan of Tk 15,000 for a period of two years to buy the STW. On the total loan they pay a 20 percent service charge, amounting to about Tk 3,000 in two years time. The weekly installment is Tk 30 (Tk 6 per member). After the harvest of dry season (boro) paddy, they will repay Tk 5,000. After the harvest of monsoon (aman) paddy, a smaller amount of Tk 2,500 will be repaid, as only supplementary irrigation is provided and thus income from water sale is less.

The total command area irrigated with the STW was 8.1 acres. They sold water to fanners for a total of 6.7 acres of land. The group members own *4.37* acres of land. On 1.4 acres they cultivated boro rice with irrigation from their own STW. The remaining land is more suitable for other crops and was not cultivated in this season.

The fanners paid Tk 600 per acre per season for the water service, while providing diesel for pump operation. The total income from water sale was Tk 4,020. During the season, the group spent a total of Tk 690 on repairs and maintenance.

A few problems that occurred were:

- Farmers paid a low rent (Tk 600 per acre, instead of the usual Tk 800-900), partly because they did not trust the women much regarding their ability to operate the STW.
- Installation of the STW was late due to a delay in the approval of the loan.
- The command area was small: due to the delay some farmers started cultivation under contract with another STW owner, reducing the group's income from water sale.
- The group members lacked the capital to buy inputs like fertilizer and diesel, and their harvest was lower than expected (35 maund per acre, on average).

- Various mechanical problems occurred with **the STW.** First there was some mismatching of parts that delayed the installation by 10 days. After that, there were four major breakdowns (bearing, fly wheel, bearing, and piston ring).

- **Due** to many "hartals" (strikes) transport of diesel was hampered, causing high diesel prices, and sometimes diesel was not available at all.

In solving **the** above problems, the group got a lot of assistance from GKF, like free assistance from the mechanical engineer in repairs and in the replacement of spare parts.

For the group members it was their first experience with running a **STW** on a commercial basis. They have learned many things related to the technical operation and maintenance of the **STW.** The women nevertheless **feel** that they need more technical skills, and have requested additional training on maintenance and repair of their **STW.** In spite **of** the difficulties, the women feel confident about their enterprise. As one clear advantage they mentioned the relatively cheap irrigation for their own fields.

Shaheda Khatun, group chairman. with the shallow tube well purchased with a loan from GKF; Ghosalpur, Kaharol Unit, Dinajpur.

Due to the problems described above they were not able to repay Tk 5,000 after the harvest. Their total income for this season was only Tk 4,020, and minus costs of repair of Tk 690, the net income was only Tk 3,330. The income from their paddy production was low (Tk 275 per member, on average) and they needed this income for their subsistence. As a consequence, the women repaid a smaller amount than stipulated in the contract with GKF.

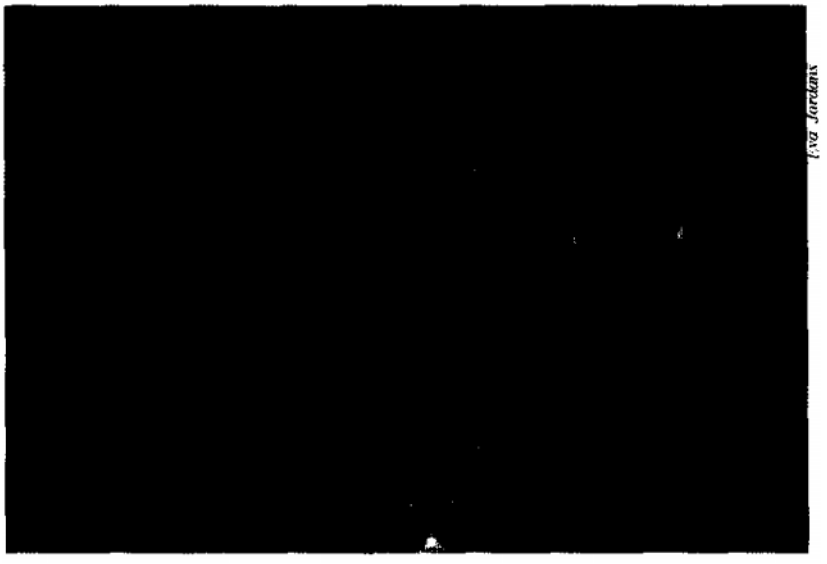
In order to increase their profits, the women intend to try to increase the command area, and increase the rent per acre in the next season. If they fail to make enough profit, they will return the STW to GKF All repayments till that time will be treated as rent for the STW.

Treadle Pump

The treadle pump is a low cost, manual, shallow tube well suction pump. The two bamboo treadles are foot operated. A pump can lift 1-2 liters of water per second, depending on the depth of the water table. On average it can irrigate up to two acres of nonrice crops, and one acre of rice. Because of its limited lift, it can only be used in areas where the water table does not fall lower than 5.5 m (18 feet). The "walking" motion to operate the pump resembles the motion of the *dheki*, the traditional machine used for husking rice that has only one bamboo treadle. It costs around Tk 700. A treadle pump can be used for a period of about five years, so that depreciation costs per year amount to Tk 140.

During the 1994-95 irrigation season, GKF provided loans for treadle pumps for the first time. One male and 14 female farmers took loans for this purpose. The small size of the initial investment and the fact that treadle pumps can be bought and operated individually explain why women were interested. Some of the women who decided to use their loans for purchasing a treadle pump were actually more interested in a STW, but because it was their first loan from GKF they could not borrow enough money to buy a STW.

Irrigation by treadle pump is a profitable activity because cash inputs are very low. However, labor inputs are very high. Most of this labor is provided by women. Returns could be maximized if production is on owned instead of sharecropped land. Also a proper selection of land for boro cultivation and a proper application of fertilizer would increase profits. Although most people use it for irrigating rice, the treadle pump is actually more suitable for irrigation of less water demanding crops, such as wheat or potato. Because of the very small size of their plots, most women only want to cultivate rice. which they consume. They prefer rice because in case of



Monuara, irrigating her rice crop using the treadle pump she bought with a loan from GKF; Choto Paharpur Farm Shancrhat Unit, Rangpur Region.

marketable surpluses, paddy is likely to be much easier to sell than other crops.

GKF has planned to expand the number of treadle pumps operated by female group members to 400 during the 1995-96 irrigation season because it is a technology that requires only a small investment and involves no risk, and allows women to cultivate irrigated crops.

Case Study 6: Choto Paharpur Farm, Shanerhat Unit, Rangpur Region

In the Shanerhat Unit, three group members bought a treadle pump with the help of GKF. They all irrigated boro rice with the pump on sharecropped land that they took on a *50150* basis. The members obtained a seasonal loan of Tk 900, to be repaid over a period of six months, in *26* weekly installments of Tk **14,** and one final repayment of Tk **372.**

On average one woman pumps 7-8 hours a day, for **3-4** days a week. Children and sometimes husbands assist them. The women earned around Tk 1,000 , and were

able to repay their treadle pump loan in one season. They were proud of their production and the income to the families.

The average yield was **34** maund per acre, which is quite poor. Yields could have been higher if prescribed amounts of fertilizer were applied. The poor quality of the irrigated land, which **was** very sandy, also explains the poor yield.

Hand Tube Well

The most commonly used hand pump in Bangladesh is the **No.6** Pump. It is a shallow tube well suction pump made of iron. **A** single pump can lift around 0.5 liter of water per second. Its operational range is from **3** to **26** feet (1 to **8** m). It costs around Tk ***2,000.*** The design is specifically suited for domestic purposes. The pumping action of the **No.6** Pump is tiring over longer periods, which reduces its suitability for irrigation. The pump can nevertheless be used for irrigating a tree nursery or a homestead garden.

When the need for easy and reliable access to drinking water is more pressing than the need for increasing agricultural production, hand tube wells (HTWs) are selected by women for installation instead of, for example, a treadle pump or a STW. Although less suitable for irrigating crops, and a much smaller area is irrigable, it has the benefit of direct access to drinking water. Other irrigation equipment does not offer this advantage. To make the HTW more suitable for irrigation, some women connect additional **PVC** pipes or a split banana stem to it, to direct the flow of water to a nursery or a vegetable plot.

The present policy **of** GKF is to only provide loans for HTWs when they are intended for commercial purposes, like a tree nursery or vegetable gardening. This policy will be changed so that in future loans will also be made available for HTWs that are solely intended for domestic use.

During the year 1994-95, 42 male group members and **42** female group members took loans for hand tube wells. GKF has planned to expand the number of hand tube wells distributed among female group members to **360** during the year 1995-96.

Case Study 7: Somachaluna Farm, Gorea Unit, Thakurgaon Region

In the Gorea Unit, one group member obtained a loan to buy a hand **tube** well, to irrigate her tree nursery. Formerly irrigation was done by lifting the water from a nearby pond using a *golchi,* the traditional water **jug,** which was very time consuming and strenuous. The same water was also used as drinking water.

Eva Jordans

Anwara, a GKF group member, irrigating her coconut nursery and vegetable garden on her homestead with water from a hand tube well, using a "golchi;" Bromonpur Farm, Biral Unit, Dinajpur.

The fact that she could earn some income from the tree nursery made her decide to apply for a loan of Tk *2,000* for a hand tube well. She was able to expand the tree nursery and to start vegetable cultivation near the homestead. She repaid the loan in weekly installments over a period of one year In addition, she paid a service charge.

Her tree nursery does not require additional capital inputs as she collects the seeds herself. For example, she started a nursery of jack fruit trees by collecting 500 seeds from jack fruits her family had consumed. Almost all seeds developed into healthy saplings, which at the age of 3.5 months could he sold for Tk 5 each, making a profit of Tk *2,500.* She has also collected seeds of a neem tree, and of various timber trees in the area.

The tree nursery has been successfully expanded, and her income has increased. From the profits of the tree nursery, the loan for the hand tube well can be repaid easily in one year. The family is also enjoying easy access to drinking water.

CREDIT DISTRIBUTION

Since March 1995, in addition to the direct supply of inputs, GKF started providing loans for agriculture-related income-generating activities. These

loans are distributed among GKF group members only, who can receive this cash credit parallel to an input loan. The rationale behind the introduction of the credit program is the need for supplementary income for marginal farmers. To maintain a household year-round by agricultural production alone, it is estimated that a least one acre of land should be cultivated. Among the GKF members there are many households who cultivate less than one acre, and need additional sources of income. These same households often have too much land to be eligible for credit from NGOs, while being unable to secure loans from commercial banks.

Experiences of GKF in working with resource-poor fanners showed that the absence of a proper credit system often is one of the main obstacles for productive self-employment. Marginal farm households often cannot afford to invest their own capital resources, because they need these for subsistence. Another reason for the credit program is that in farming there are no immediate returns to labor investments. Most poor households do not have enough savings to bridge the resulting temporal gap in income. Besides, income from agricultural labor is very seasonal, distributed over a few peak times.

Increased income for the family is the most obvious effect of the credit program. The program also improves family food security, especially during the yearly lean seasons. Income is used for food, repaying debts, and the education of daughters. Savings are mostly invested in livestock. Interestingly, access to capital for crop production has caused some female farmers to increase their access to land, mortgage or lease or sharecrop. They have done this through their own arrangements.

Repayment of the loans is generally over one year, in weekly installments of 2 percent of the total value, with a service charge of *20* percent. An exception are seasonal loans, which are repaid after the harvest. The GKF credit program follows the same rules and regulations as those of the Grameen Bank.

Although targeting both male and female group members, GKF has a clear preference for women in providing loan facilities. *So* far loan disbursement to female group members is 50 percent more than that to male members. The total credit distribution to male group members until September 1995 is Tk 4,322,006, compared to Tk **6,541,514** for female group members (table 12). It was planned that total credit distribution in 1995 would amount to Tk ***20,000,000,*** or US$500,000.

Access to a loan can improve a woman's position in the family, as she literally is adding "value" to the household economy. A few cases were

reported where husbands of newly married couples tuned down dowry demands after their wives received loans. *An* analysis of loan utilization shows that male group members use their loans for the following purposes (in order of preference): (1) crop production, (2) cow/bullock, and (3) goat/sheep. Female group members use their loans for: (I) rice processing/crop production, (2) cow/bullock, and (3) goat/sheep.

Table 12. Distribution of credit (in Tkj until September 1995.

	General loan (Tk)		Input/seasonal loan (Tk)		Tube well/latrine loan (Tk)	
	Male	Female	Male	Female	Male	Female
Total	3,668,725	6,304,400	590,281	173,114	63,000	64,000

Source: GKF monitoring system

Rice processing is a traditional activity of women. It involves the purchase of paddy, the parboiling and drying of the paddy, mechanical husking in a rice mill, and selling the rice in the market. The profit per 40 kg of rice varies, because it depends on fluctuating market prices. Average profit margins are low, around Tk 20-30 per maund. Women can process about 2 maunds per week, resulting in a weekly income from rice processing of about Tk 40-60. Most women use part of their loan for this business and invest the remaining money in crop production. The quick returns of rice processing enable them to repay the weekly installments of the loan, while the rest of the money is used for longer term investment. The following example illustrates the case of a female member using her loan for cultivation purposes.

Case *Study 8: Fatima Begun, Ghumaron Bimsitola Farm, Rajerhat Unit, Kurigram*

Fatima Begun, a Muslim widow living in Kurigram, has been a GKF group member for one year. She owns 0.45 acre of land. She obtained an agricultural loan of Tk 1,000 from GKF for dry season paddy cultivation. She spent Tk 550 for fertilizer, while the fuel for irrigation water cost her Tk 450. Her only son is still young and goes to school, so she did most of the work herself. She repaid the loan in weekly

installments of Tk 40. She obtained another loan for wet season paddy production and has managed to lease 0.25 acre of land from a villager and cultivate it as well. The loan enabled her to increase her agricultural production by investing in the lease of land and inputs

Many loans are used to buy livestock. Profit margins on livestock are quite low, as livestock is kept very extensively. Purchase of livestock is a saving strategy, rather than a productive investment. Some products of livestock keeping are especially beneficial for women, such as the cow dung used as fuel and the milk that can be consumed or sold.

In order to optimize the profitability of loan use, GKF organizes training in new and appropriate agricultural technologies. The following training needs of women have been identified seed production, livestock keeping, poultry vaccination, and irrigation equipment maintenance and repair. Training is given as much as possible to members who obtain a loan for that type of activity, aiming to make their loan utilization more profitable.

During first discussions with women groups, most of the members were particularly interested in activities that fall within the traditional domain of women, such as rice processing or goat rearing. After receiving information on all possible activities and comparison of profitability, some women became interested in nontraditional activities. However, in some cases, it was found that the anticipated amount of control over the loan determines a woman's preference for loan utilization, rather than absolute profitability. This was, for example, the case with Hamida in Kurigram, who had chosen to do rice processing. When discussing her preference for this activity, she said she was aware of the fact that other activities would give higher returns, but the risk of not being able to control the resulting income had made her choose rice processing. In discussions with group members, GKF staff try to encourage women to have greater control over loan utilization.

The household being very much a joint venture and the task of marketing being mostly done by men, it is virtually inevitable that women's loans will be used jointly by themselves and productive men in the household (Goetz and Gupta 1994).[12] The phenomenon of male appropriation of

[12] The analysis of Goetz and Gupta (1994) in a study of four credit programs revealed that, on average, women retain full or significant control over loan use in 37 percent of the cases, while nearly 22 percent of respondents were either unable to give details of loan use, or were unaware of how their husbands or other male household members had used loans, and were not themselves involved in the productive process. The remaining 41 percent had limited control over loan use (N was 253).

women's loans has been documented by various authors (Rahman 1986; Jiggins 1992; Goetz and Gupta 1994). Real problems arise where husbands refuse to repay, invest credit badly, consume the money or abscond with the money. The pressure to fmd repayment funds remains with the women, as they are the ones who took the loans.

With respect to GKF loans, the interviews showed that the amount of control women have over the use of loans depends mostly on the type of activity. As an indicator of the degree of control, a woman's knowledge about details of the investment and final profits of the loan was used. ***Traditional activities of women,*** such as livestock farming, including goat rearing, vegetable gardening, and rice processing showed the highest amount of control by women. These activities share the following features: low risk, low inputs, and low outputs. Even though men are often involved in marketing the produce, women are able to determine the use of the income to a great extent. However, even when using a loan for a traditional activity, a husband does sometimes influence loan utilization. An example is that of a group member in Rangpur Region, Rohima, who had given her loan of Tk 1,000 to her husband to buy paddy in the market, which she intended to process. Instead of purchasing the requested paddy, her husband came home with one adult goat and two small goats, for goat rearing.

Nontraditional activities, such as setting up tree nurseries, operating treadle pumps, and field crop production show a varying degree of women's control over loan use. In some cases, women hand over the loan to their husbands who utilize and consequently controls the loan and also the income. Other cases showed a high involvement of women in the actual activity and management of a loan. These cases also showed a higher degree of loan and income control, suggesting a relation between degree of involvement in the activity and actual control over the loan. One strategy adopted by many women to ensure a higher degree of control over their loans, and the resulting incomes, is to ask other male family members (fathers, brothers or sons) for assistance, instead of asking their husbands.

Experience with ***group-wise utilization of loans,*** like in crop production or STW management, indicate that women in these cases have the most control over their loans, and over the resulting incomes. Although husbands are sometimes requested to contribute some labor, it is difficult for them to take control as, besides their wives, here are other female group members involved.

CHAPTER 6

Conclusions and Discussion

GENDER RELATIONS AND IRRIGATED AGRICULTURE

The study fmdmgs reveal that in spite of the predominant gender ideology in Bangladesh, which discourages women to work in field-based stages of agriculture, poor rural women increasingly assume field-related tasks including the task of irrigation. Women in the GKF working area are engaged in various types of field activities in crop production. They work (a) as co-farmers in male-headed households on family land, or sharecropped land, (b) as agricultural wage laborers, (c) in groups cultivating jointly leased or sharecropped land, and (d) as female heads of households on owned or sharecropped land. The highest involvement is by women in landless and marginal fanner households, by female heads of households, and by women from Hindu households.

The fmdings of this study show a remarkably high degree of involvement of women in field-related tasks when compared with fmdings from other studies, which aim to analyze gender relations or the position of women in rural Bangladesh. This can be explained by the fact that the GKF working area is one of the poorest regions of Bangladesh, and by the high proportion of women heading their households among the respondents. However, the fact that none of the other studies mentions any involvement of women in irrigation (while this study reveals that the task of irrigating is, in almost 50% of the cases, done by women) is probably the result of an a priori assumption that irrigation is a male affair.

Women themselves repeatedly referred to the change in traditional purdah norms, and many of them seem happy with the increased freedom of mobility they enjoy as a result of it even though it initially implies a loss of social status. In the fmal analysis, most poor women interviewed for this study are of the opinion that the loss of social status is compensated by an increase in household income. Especially if women themselves have earned the additional income and manage to control its use, they feel very proud of

themselves and enjoy their new status as income earner and (co-) provider. At the same time, many women continue to aspire greater wealth for their families, which would eventually allow them to retreat back into their homesteads and homes.

The analysis shows that the impacts of irrigation development are different for different socioeconomic categories. Those households with reliable access to land and agricultural inputs benefit most directly from access to new imgation technologies and irrigation water, whereas the most important direct benefit for land-poor households are the increased opportunities for wage employment. Female wage labor opportunities have increased most sharply.

GENDER STRATEGY OF GKF

The GKF approach to irrigation development is unique in that it systematically and explicitly aims at poverty alleviation and empowerment of women, while at the same time attempting to manage its activities on the basis of financial profitability. Unlike many other instances of planned irrigation interventions, GKF attempts to link increases in production and productivity with reduction of income inequality and empowerment of the poor and women.

When starting its DTW irrigation program, GKF did not have a clearly articulated and thoroughly thought out strategy on how to achieve its ambitious objectives. In the fust years of being in operation, while being seriously committed to assisting poor rural women, the GKF gender strategy was confined to traditional activities for women and a relief program. These activities, although successful in their own terms, were not contributing much to structural poverty alleviation or reducing gender inequality. Through the experiences in working and communicating with rural women, accumulated over the fust years, the GKF staff gradually realized that the most crucial constraint to achieving structural poverty alleviation was the lack of access to and control over resources (land, water, agricultural inputs, and capital) for group members, especially for women.

More important in terms of the evolution of the GKF gender strategy was the gradual recognition of women as fanners by the GKF staff. This recognition prompted GKF to revise its gender strategy. Instead of initiating specific activities for women, the emphasis of the GKF program shifted to

increasing the involvement and participation of women in its core activities: a *mainstreaming* strategy. It was nevertheless realized that this strategy could only be successful when specific constraints of women are removed. Important constraints are social barriers, dependency on male intermediaries, and lack of direct access to markets and information. For female-headed households, their high economic vulnerability poses the most important constraint.

Three crucial underlying notions of the GKF philosophy stand out to explain its first achievements in integrating women in their activities:

1. The extraordinary explicit focus on women, which has become even more articulated through the credit program that primarily targets women: Such an explicit and clearly articulated focus on women is rather unusual in an irrigation and agriculture oriented program such as that of GKF, and probably even more so in Bangladesh.

2. It's flexibility, obvious from the fact that all activities are identified on the basis of members' needs, ideas and wishes: When compared to many programs and projects that are developed and implemented according to detailed planning beforehand, it is striking that GKF operates without many preconceived ideas about the nature and direction of the development it is promoting. Although GKF is hierarchically organized, there is a remarkably good system of communication and monitoring that ensures that ideas and problems in the field are quickly fed back to management.

3. Another crucial element in the GKF mode of operation is the continued presence of GKF staff in the villages. Due to their thorough training and because they permanently live among the villagers, most Farm Managers develop a high degree of understanding of the people they are working with, and many of them are considered as "brothers" or "sisters" by the women whom they work with. They can respond quickly to members' needs and ideas.

So far GKF has been successful in better involving women in their irrigation activities. The study findings and case studies show that poor

women are capable of and interested in using and managing irrigation equipment, provided there is an effective and reliable provision of support services. However, since the *mainstreaming* gender strategy of GKF only really took off in 1995, on a relatively small scale, it is still somewhat premature to predict the longer term impacts of the activities. It remains to be seen whether GKF will be able to continue its support to women over a longer period of time. Also, it is not certain that the program remains effective when implemented on the much larger scale GKF is envisaging.

First experiences indicate that the most obvious direct benefit of GKF activities are higher family incomes and increased family food security. Indirectly, the increased significance of women's contribution to household income may result in a greater say **for** them on what the money is used for. Chances of high female control over income and loan use are higher when women are group members. The combination of group membership, income generation, and agricultural training result in a boost in a woman's self-confidence, and when properly backed up by GKF staff, negative social implications of their increased involvement in field tasks can be minimized.

The potential effect of increased access to and control over resources is empowerment of women. To fully realize this potential, some additional measures can **be** adopted by GKF to further reduce women's dependency on men and increase their decision-making power over use of incomes.

1. Control over credit and incomes: The fact that loans are taken and women earn incomes does not automatically mean that women fully control how the money **is** used. One way for GKF to stimulate greater control over credit and incomes by women is by bringing about attitudinal change through group discussions with women and their husbands. **More** direct assistance to women in marketing and transport of produce is also likely to increase their control over the resulting incomes.

2. Access to and control over land: GKF's efforts at increasing access to land for the group members **are** useful. However, lease arrangements negotiated by GKF are often limited to just one season, and do not offer any long-term security. Efforts should be made to guarantee access to land on a longer term; for example, five to fifteen years instead of one season. Furthermore, GKF **staff** should be made more aware of the specific land control problems women may face, and support them strongly in case of conflicts.

3. Basic literacy and numeracy: Lack of education remains a constraint for women in proper loan utilization and expansion of their agricultural or business activities. It also creates dependency on people in their surrounding who can read, write, and do some basic accountancy. Basic literacy and accountancy lessons, organized either by GKF or another organization, could contribute to an increase of women's control over loans.

DISCUSSION

The information compiled in this report evokes three important discussions. The first is related to the long-term sustainability of the GKF program, the second is the issue of challenging power relations, and the last point is to what extent the GKF approach is replicable elsewhere or under different circumstances.

Sustainability

Sustainability has become an important criterion for the assessment of projects by donor agencies. Apart from environmental sustainability, a major concern to GKF is whether and to what extent it can attain financial sustainability, or ensure that its activities will be institutionalized and continue to exist, even without external funds.

Unlike many other donor-funded development initiatives that are implemented for limited periods of time, GKF has the intention to continue its operations over a prolonged period. GKF aims to become a permanent institution in the areas it is working in, perceiving its role as an agricultural multifunctional service organization.

Although the initial phase and expansion of the program requires capital from outside, GKF has the ultimate aim of becoming financially autonomous. This is one reason for charging, in addition to actual costs, a 20 percent service charge on all services or credit provided to farmers. It is anticipated that this 20 percent will ultimately be sufficient to cover all overhead costs. GKF attempts to keep these overhead costs as low as possible by paying its staff very basic salaries and by economizing on all expenses. GKF realizes that operation and management of DTWs alone will

never become a profitable activity, but it is hoped that other activities (and especially the provision of credit) will eventually result in high enough profits to enable cross-subsidizing DTW operation.

GKF believes that expansion of its working area and the number of groups, as well as an average repayment rate of loans of 90-95 percent, will ultimately lead to a sustainable agricultural service institution. Experiences of GB, which went through a similar process, indicate that attaining financial sustainability might take a period of 10-15 years.

Challenging Power Relations

GKF's explicit objective of poverty alleviation is translated into a strategy of increasing access to and control over resoutces of the target group. In Bangladesh, as in many countries, control over resources, such as land and capital, are the most important bases for power within communities as well as within families. This is why GKF, by changing existing resource distribution patterns, implicitly challenges existing power relations.

Changes in village labor relations provide the most striking example of a shift in inter-household power relations. Middle and large landowning families face increasing difficulties in finding wage laborers, and complain about the rise in wage rates. Increased self-employment by land-poor households has led to a reduction in their dependency on more well-to-do landowners for labor. Their reduced dependency also enables them to effectively bargain for higher wages. In addition, GKF members' direct access to resources and credit decreases their dependency on local money lenders, who often charge very high interest rates. In disasters or emergencies, money lenders used to thrive on the need of the poor for cash and food.

Naturally, rich people do not like their influence being reduced. One strategy GKF adopts to avoid any serious social problems is to maintain good contacts with the affluent people as, for example, when negotiating with them to lease or sharecrop their land. GKF offers agricultural services to rich fanners as well, thus maintaining an economic relation with all classes. So far resistance from landowners and wealthy farmers to GKF has been minimal.

Existing gender relations are challenged by the involvement of women in nontraditional activities, and by increasing women's control over incomes. The activities have already shown an empowering effect on women. Interestingly, many men, especially husbands, value these changes

positively, as it is accompanied by a direct improvement of the family situation. Some men disapprove of the breaking of "purdah" as they perceive this as being against rules written in the Koran. To avoid any serious problems for its members, GKF makes an assessment of local sentiments before they start involving women. When local concurrence for GKF activities is absent, introduction of the program is postponed. GKF waits until interested villagers themselves convince the conservative people of their need to form groups and participate in activities.

GKF has become a new "power" in the villages. GKF and GB are both large and powerful organizations that operate nationwide. GKF and GB both have a respectable image, and its higher management is well known, which obviously contributes to the success of their activities and reduces overt resistance. An important aspect is that they are neutral, neither politically active nor linked to political parties. One can argue that the poor only shift their dependency from the rich to GKF, and women from male intermediaries to GKF. Although this may be true, it is also clear that dependence on GKF has obvious advantages over the traditional dependencies. GKF is a nonprofit organization offering its services at lower prices and more honestly. GKF confines itself to an economic relation with its clients, and bas no interest or intention in abusing its power for political or personal purposes.

Lessons Learnt

The study on GKF has proven that it is feasible for an irrigation program to incorporate gender-specific needs of women, resulting so far in a positive impact.

GKF is not a typical irrigation institution; it is:

- an NGO,
- aiming to become a permanent agricultural service organization,
- using a staff-intensive approach,
- establishing long-term relationships with fanners, and
- very flexible.

One would probably not find the same combination of characteristics in many other irrigation-management organizations. Still, all or some lessons derived from this study can be used to make irrigation programs and schemes more gender aware. Final strategies and activities will have to be shaped according to local specificities in terms of gender and in terms of the social, political, and institutional contexts.

1. The main lesson for other irrigation programs is that meaningful involvement of women crucially depends on the willingness to recognize women as farmers, who are potentially as interested in and capable of participating in irrigation activities as men are. Experiences in many other countries show that the lack of independent titles to land for women reduces their visibility as fanners and restricts the degree to which they benefit from irrigation. Preconceived notions about the intra-household organization of agriculture and gender roles may likewise inhibit perceiving women as farmers. In most countries, women do have a distinct identity as fanners, working as co-farmers on family land, or being agricultural wage laborers, or by working in groups cultivating jointly leased or sharecropped land, or as female heads of households cultivating owned or sharecropped land.

2. A second and related lesson is that women are as (and maybe even more) interested in obtaining the highest possible return to their labor as men. In this respect, it is likely that a "mainstreaming" strategy offers far greater chances of real success in terms of productivity and empowerment than a "WID strategy consisting of separate income-generating activities for women, identification of which is based on a demarcation of specific women's spheres or domains. This may sound self-evident, but the early WID practice in the context of irrigation projects has often been to address gender concerns through the setting up of small separate projects for women. These projects were often approved by "soft" criteria, which ignored market values and prices, or passed the test of economic viability upon the assumption of endless hours of unpaid labor of women.

3. Involvement of women in irrigation programs cannot be expected to happen automatically, because of several gender-specific

constraints. A proper recognition of specific restrictions and constraints for women, and the development of strategies to remove them are important steps in facilitating women's participation. The study shows that, unlike what is often assumed, the biggest obstacle to integrating women is not necessarily attitudinal but may be logistical: access to land, credit, inputs, information, etc.

4. It is often thought that programs involving women necessarily need to be implemented by female staff. The experience of GKF proves that male staff are willing and able to work with women farmers and that women do not have much problems with this. Female staff is therefore not always a prerequisite for involvement of women farmers. A serious management commitment to working with and for women, and an organizational and professional culture that positively rewards "gender achievements" are instrumental in motivating staff (of either gender) to make real efforts to reach women.

5. The fact that GKF does not limit itself to irrigation but instead implements a comprehensive agricultural program, probably considerably increases the scope for effective involvement and participation of women. Irrigation is just one of the inputs necessary for production, besides land, seed, fertilizer and capital. Where women's constraints aie no! (only) directly related to irrigation, just meeting irrigation-specific needs of women may not have any real impacts in terms of raising productivity or empowerment.

6. The GKF approach of working with small groups of five women (or men) has proved to be an effective instrument in reaching women. Being a member of a group helps women to overcome social barriers related to prevailing gender norms, and contributes to greater control of loan use. Organization in groups also facilitates provision of information, credit, and agricultural inputs. The small size of the groups makes it possible for members to collaborate with people they trust, and allows for group meetings to be informal. Especially in areas or regions where women have little previous experience in dealing with outside agencies and

institutions, organizing women in small groups may be an effective way to start working with women.

7. The continued possibility for women to apply for relief support in times of scarcity or disasters, or to supplement incomes through engaging in wage labor or crop processing is crucial. It enables poor fanners to continue farming, where they might otherwise have been forced to lease out or mortgage their land or otherwise give up farming in favor of some activity with faster returns to labor.

Literature Cited

Baden, Sally, Cathy Green, Anne-Marie Goetz, and Meghna Guhathakurta. **1994.** ***Background reporf on gender issues in Bangladesh.*** Briefings on Development & Gender (BRIDGE), Dhaka, Bangladesh.

Bangladesh Bureau of Statistics (BBS). **1993.** ***Statistical yearbook of Bangladesh 1992.*** Thirteenth Edition., Dhaka, Bangladesh: BBS.

Baumann, Erich, and Richard J. Fuller, **1984.** ***Manual of irrigafion in Bangladesh.*** Dhaka, Bangladesh: Swiss Development Cooperation.

Feldstein, Hilary, and Susan Poats (eds.). **1989.** ***Working together: Gender analysis in agriculture.*** Vol.I Case Studies. West Hartford, Connecticut, USA: Kumarian Press

Goetz, Anne Marie, and Rina Sen Gupta. **1994.** ***Who takes the credit? Gender, power and control over loan use in rural credit programmes in Bangladesh.*** Working Paper **8.** Brighton, England Institute of Development Studies.

GKF (Grameen Krishi Foundation). **1991.** ***Memorandum and articles of association.*** Dhaka, Bangladesh: GKF.

Hakim, M.A., and D.D. Parker. **1994.** Grameen Bank tube well irrigation program: A case of management transfer in Bangladesh. In Draft Conference Papers, International Conference on Irrigation Management Transfer, Wuhan, China, **20-24** September **1994,** Vol.2: **97-110.** International Irrigation Management Institute, and Wuhan University of Hydraulic and Electrical Engineering.

Halim, Abdual, and Mahbubul Alam. **1995.** Women in homestead: The south-Asian perspective. In ***Women in agriculture: Perspectives, issues and experiences,*** ed. Samanta R.K., 175-210. New Delhi, India: MD Publications Ltd.

Hannan, F.H., and Bhuiyan A. Hannan. **1993.** Women in agriculture: Silent partners in homestead agricultural production. In *Bangladesh Journal of Scientific Research* 11(1):31-37.

Hartmann, **B.,** and **J.K.** Boyce. **1983.** *A quiet violence: View from a Bangladesh village.* London, England Zed Books.

Jenkins, Mimi. **1991.** *Women and irrigation management in Bangladesh: Some background material for a research project* **(Draft).** Dhaka, Bangladesh: International Irrigation Management Institute (IIMI).

Jiggins, J. **1992.** *Gender issues: A contribution to the BRAC mid-term evaluation report.* Mimeo. Dhaka, Bangladesh: Bangladesh Rural Advancement Committee (BRAC).

Jordans, Eva H. 1991. *Survival at a low ebb: Womenfarmers and water development in Bangladesh.* Wageningen, The Netherlands: Wageningen Agricultural University.

Kabeer, Naila. **1990.** Poverty, purdah and women's survival strategies in rural Bangladesh. In *Thefoodquestion: Profit versus people?* eds. Bernstein, Henry, Ben Crow, Maureen Mackintosh, and Charlotte Martin, 134-148. London, **UK:** Earthscan Publications Ltd.

Mallorie, Edward. **1994.** *Grameen Krishi Foundation, A multifunction organisation.* London, UK: Overseas Development Institute, Irrigation Management Network. (Network Paper **29).**

Mandal, M.A.S., and D.E. Parker. **1995.** *Evolution and implications of decreased public involvement in minor irrigation management in Bangladesh.* Short Report Series on Locally Managed Irrigation, No. 11. Colombo, Sri Lanka: International Irrigation Management Institute.

Paris, Thelma R. **1994.** Obtaining data on gender and intrahousehold issues. In *Tools for the field: Methodologies handbook for gender analysis in agriculture,* eds. Feldstein, *H.* S., and J. Jiggins. 80-88. Connecticut, USA: Kumarian Press.

Rahman, *RI.* **1986.** *Impact of the Grameen Bank on the situation of poor rural women.* Dhaka, Bangladesh Bangladesh Institute of Development Studies.

Safilios-Rothschild, C., and S. Mahmud. **1989.** *Bangladesh Agricultural Sector Review. Women's roles in agriculture: Present trends and potential growth.* Dhaka, Bangladesh United Nations Development Programme (UNDP)/United Nations Development Fund for Women (UNIFEM).

Solaiman, Md. **1988.** *The impact of new rice technologies on employment of women in Bangladesh: A case study.* Kotbari, Comilla, Bangladesh: Academy for Rural Development.

White, Sarah C. **1989.** *Waters of change: A view from a village on (CCDB) Tanore STW/HTW Programme 1985/6,* University of Bath, UK. (unpublished report).

White, Sarah C. **1992.** *Arguing with the crocodile: Gender and class in Bangladesh.* London and New Jersey: Zed Books Ltd., Dhaka: University Press.

World Bank. **1990.** *Bangladesh: Strategies for enhancing the role of women in economic development.* Washington D.C., USA: The World Bank.

Yunus, Mohammed. **1994.** Grameen Bank: Experiences and reflections. In Cultures & *Development,* **11,** No. **19 (1996): 36-39.**

Zwarteveen, Margreet Z. **1994.** *Gender issues, water issues: A gender perspective to irrigation management* IIMI Working Paper No. 32. Colombo, Sri Lanka: International Irrigation Management Institute (IIMI),

Appendix 1

WOMEN FARMERS AND IRRIGATION

A. General background information of women interviewed

1. Location

Farm: .....
Unit: .....
Region: .....

Name(family member)	Age	Relation	Education	Present (Y/N)

5. Female-Headed Households

If a woman is heading the household, tick reason:
*Widow
* Divorced
* Deserted
* Male head sick
* Male head migrated
* Other

Since when is she heading the household? .....years

6. Land position

Total acreage	Cultivated	Share -cropped		Leased		Mortgaged		Homestead
		in	out	in	out	in	out	

Type	No. ownership	No. share-caring
cow		
Bullock		
Buffalo		
Chicken		
Duck		
Goat		

7A. Fish Culture

Access to pond? Y/N, If yes, is fish produced in the pond?

&Off-farm income

Other activities, tick
* working on other people's land
* working in other people's houses
* migration
* rickshaw pulling
* handicrafts
* small business

9. Household work

Average number of hours a day spent on household work .....hours
What kind of activities:

Who is helping with this work:

10. Migration

Migration by household member from the village? Y/N
If yes, who and when?
Why?

B Division of labor

Who is doing what tasks, indicate share of the **work** in **percentage:**

Crop : Rice

Activities	Family labor			Hired labor	
	Male	Female	Children	Male	Female
Selecting seed					
Making seedbed					
Uprooting seedlings					
Land preparation					
Transplanting/ sowing					
Fertilizing					
Spraying					
Irrigating					
Weeding					
Harvesting					
Threshing					
Winnowing					
Cleaning/Drying					
Processing					
Marketing					
Storing					

Crop : Other **crops**

Activities	Family labor			Hired labor	
	Male	Female	Children	Male	Female
Selecting seed					
Making seedbed					
Uprooting seedlings					
Land preparation					
Transplanting/ sowing					
Fertilizing					
Spraying					
Irrigating					
Weeding					
Harvesting					
Threshing					
Winnowing					
Cleaning/Drying					
Processing					
Marketing					
Storing					

Average wage given to male laborers: Tk.....
Average wage given to female laborers: Tk.....
If **different, give reason:**

If seed was bought, who bought it? ..... where?
If fertilizer was bought, who bought it?..... Where?
If insecticide was bought, who bought it?..... Where?

If irrigation/input supply with GKF, who has signed the contract? ....

Existing cropping pattern on the farm, and indicate the profitable pattern:
Kharif - I :
Kharif - II :
Rabi

C. **Participation** in water management: (DTW/STW irrigation)

Is there a Water User Organization? Y/N
Membership **of** Water User Organization?
Attending meetings GKF: Who? .....
How often? .....
Time: .....

Any tasks performed in irrigation management?
* Construction of channels
* Maintenance of channels
* Operation of system
* Given **land** for construction of channels for other fanners

Access to GKF **Farm** Manager: Direct? .....
Through some other person, who? .....

Assess GKF's water delivery capacity on the following aspects: (good, average, bad)
* Quantity of water supplies
* Quality
* Timeliness (land preparation, transplanting, weeding)
* Reliability
* Timing in the day
* Equity

What problems with irrigation last year, and this year?
What solutions implemented? .. Improvements suggested .....

D. Impact of irrigation

1. Tick increase or decrease of different income sources with/without irrigation.

Income source	Increase	Decrease
Crop production		
Off-farm business/Labor		
Animal production		
Labor		

2. Tick increase or decrease of availability of different resources with/without irrigation.

Resource	Increase	Decrease
Landownership		
Land for sharecropping		
Land for lease		
Fodder/Grazing land		
Drinking water		
Credit		
Labor		

Asset	Increase	Decrease
Housing/Sanitation		
Furniture		
Food		
Education		
Wedding presents		

Appendix 2-I

Gender-Differentiated Involvement in Rice Cultivation
(landless to 0.5 acre **of** land)

				Hired labor (%)		Not done	Total
Activity	Male	Female	Children	Male	Female		
1. Selecting seed	41	59	-	-	-		100
2. Making seedbed	50	36	-	5	-	9	100
3. Uprooting seedings	27	68	5	-	-		100
4. Land preparation	52	7	-	41	-		100
5. Trans-planting	34	43	9	14	-		100
6. Fertilizing	59	27	5	9	-		100
7. Spraying	27	-	-	9	-	64	100
8. Irrigating	32	54	9	5	-		100
9. Weeding	14	61	18	-	7		100
10. Harvesting	27	48	7	18	-		100
11. Threshing	20	77	-	3	-		100
12. Winnowing	-	100	-	-	-		100
13. Cleaning/ Drying	-	100	-	-	-		100
14. Processing	-	95	-	-	5		100
15. Marketing	54	41	-	5	-		100
16. Storing		100					100
Total	27.3	57.2	2.7	**8.0**	0.8	4.0	100

Appendix 2-11

Gender-Differentiated Involvement in Rice Cultivation
(ownership of 0.5 to 3 acres of land)

	Household labor (%)			Hired labor (%)		Not done	Total
Activity	Male	Female	Children	Male	Female		
1. Selecting seed	32	59	-	-	-	9	100
2. Making seedbed	48	20	18	14	-	13	100
3. Uprooting seedings	32	36	5	18	9	-	100
4. Land preparation	64	-	9	27	-	-	100
5. Transplanting	30	27	5	20	18	-	100
6. Fertilizing	59	23	18	-	-	-	100
7. Spraying	36	-	-	18	-	44	100
8. Irrigating	43	39	9	9	-	-	100
9. Weeding	39	36	5	11	9	-	100
10. Harvesting	32	25	5	25	13	-	100
11. Threshing	21	44	5	18	12	-	100
12. Winnowing	9	75	-	-	16	-	100
13. Cleaning/ Drying	-	84	-	-	16	-	100
14. Processing	23	68	-	-	9	-	100
15. Marketing	73	27	-	-	-	-	100
16. Storing	-	100	-	-	-	-	100
Total	33.7	41.6	4.8	10.1	6.4	3.4	100

N= 12; among these 3 were female-headed households.

Appendix 2-III

Explanation of Activity-Wise Division of Labor

Appendixes 2-I and 2-II present the involvement of family and hired labor in the different activities for rice cultivation in landless and small (Appendix 2-I) and middle farmer households (Appendix 2-II). The data reveal the following activity-wise division of labor in the research area.

Seed selection and preservation is predominantly the women's responsibility and their traditional skill. However, when seed is bought in the market, their involvement is limited.

Seedbed preparation for the rice seedlings is mainly a male task, as it involves mainly land preparation. Women are responsible for the germination of the seeds in the homestead. Seed is soaked for a few days, then only the germinated ones are broadcasted on the seedbed.

Involvement of female household labor is higher than male household labor for *uprooting the seedlings.*

Land preparation is not a purely male activity as in landless households some involvement of women was recorded. These are women heading a household, who could not afford to rent plough animals for sufficient land preparation, and therefore did part of the land preparation by hand. Overall this task shows the highest involvement of hired male labor.

Transplanting of the rice seedlings is an activity equally shared by household labor (males, females, and children) as well as hired labor.

Applying fertilizer is still a predominantly male task. The few women who spread fertilizer themselves are all heading their households. The same is true for ***spraying insecticide,*** which is only done by men. Due to the absence of real harmful pests in rice, almost half of the respondents did not spray or use insecticide at all.

Contrary to findings of earlier surveys (e.g., Safilios & Mahmud), which report that only 1 percent of irrigation-related tasks are done by women, this study shows that involvement of female household labor in ***irrigation*** is quite high, and for landless and small farmers it is higher than that for male household labor. Women supervise the water delivery or actually distribute the irrigation water by opening and closing the bunds between plots. Their involvement stems partly from the fact that one irrigation water application takes about one hour, once every two to six days. Often male household members are absent because of work or activities elsewhere, so the women take up this responsibility. Men always supervise the night irrigation though. Women heading their households always perform the irrigation task.

Weeding and simultaneously *mulching* are mostly done by female household labor, and hued female labor. In Kurigram, it was observed that female laborers did not get paid for this work, but instead were remunerated by being allowed to take the weeds home for use as cow fodder.

Harvesting is mostly done by men, household as well as hired labor. Especially in Dinajpur, it was observed that female household as well as hired labor are increasingly involved in harvesting. ***Threshing*** is a task mainly done by female household labor, although there is some involvement of men.

The crop processing tasks, such as ***winnowing,*** *cleaning/drying,* ***processing,*** and *storing/drying* are all traditionally done by women of the household. Women from middle farmer households employ some hired female labor for these tasks.

Marketing is a predominantly male task, as women's access to local markets is restricted. Only women heading their households are involved in marketing, selling their produce to wholesalers at their homes. They may also engage some male person to sell their harvest in the market, in exchange for a dinner or a small amount of money.

Women's involvement appears to be higher for more labor-intensive activities, like transplanting, weeding, harvesting,, and processing. This is especially true for the landless/small farmer families. Few of these households can afford not to use female household labor for these tasks, saving expenditures for hued labor.

Appendix 3

Practical Guidelines on Women and Irrigation

WOMEN AND IRRIGATION

Practical guidelines for successful implementation of activities supporting women fanners in irrigated agriculture.

30 October 1995

GRAMEEN KRISHI FOUNDATION

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A. INTRODUCTION

1. Women Farmers in **Rangpur** and Dinajpur Districts

Traditionally women from farm households do not work much in the fields. They are responsible for all the work around the homestead, l i e vegetable gardening, livestock keeping, and household work.

However, these days this system has changed. This can be noted in the GKF area, Rangpur and Dinajpur districts. Many women can be seen working in the fields, either along with their husbands or in a group of women. The old system has changed because of poverty; many farmers cannot pay for laborers any more. If women from the family work with them in the fields, they have to pay **less** labor costs and can increase the family profit. **Also** there are now many households that are headed by a woman, mostly a widow or a woman who is divorced or deserted by her husband. These women need to feed their families, and they do so by working on their own land or as daily laborers.

Women perform all kind of activities, like selecting seeds, germinating them, making seedbeds, uprooting seedlings, transplanting, irrigating, weeding, harvesting, etc. Women's involvement varies, in general, as follows:

* in poor, small landholding families, women are more involved than in richer households;
* women do relatively more tasks in cultivating nonrice crops like potato, wheat, and vegetables, than in cultivating rice;
* women who are heading their families do most of the work themselves in the field;
* women from tribal and Hindu families are a bit more involved than women from Muslim families.

2. Women Support Programme

One of the objectives of the Women Support Programme is to support women to expand and improve their activities in irrigated agriculture so that

they will learn new techniques and their agricultural activities will be more profitable. This may result in an improvement of their position in the family and the society.

Target groups are the female group members, female landowners and other women interested or active in agriculture.

3. What Kind of Activity?

Individual versus group activities

In many farms, female groups have received training and are recognized as GKF groups. The group members utilize credit mainly individually, for example, for rice husking or goat rearing. There are also groups that cany out activities together, like commercial maize production on 2 acres of land or running a shallow tube well. An advantage of joint activities is that women can support each other, solve problems together, and exchange labor. It is seen that they feel more confident in a group than alone. However, one precondition is that the group is strong and well organised; otherwise joint activities can create various kind of management problems.

GKF can start or expand the following activities to support women farmers in irrigation activities.

(a) Agricultural Input Provision

The GKF Farm Manager can supply women group members or women farmers with various kinds of inputs needed for crop production, like seed, fertilizer and water from a deep tube well or shallow tube well. These "input loans" are especially for women and the loans are very useful and effective. Compared to men, they have less access to money lenders to borrow money, or to markets to buy inputs. The group members or farmers repay these "input loans" by giving a fixed share of the harvested crop to GKF. A big advantage is that no weekly instalments need to be paid.

Under this system, women group members cultivated maize, boro rice, wheat, soybean, and potato. Also, they produced seed of aman rice, wheat, and soybean. One of the positive side effects is that women can use the straw and leaves as fodder and fuel.

(b) Creditfor Agricultural Production

Women group members can also obtain cash credit, mostly a "general loan" or "seasonal loan," for agricultural production. They may need, for example, money to buy necessary inputs for crop production, to buy saplings for a tree nursery, to pay for lease/mortgage of land or pay laborers for their work.

(c) Creditfor Irrigation Equipment

General or seasonal loans are also given to female group members to buy a shallow tube well or a treadle pump so that they can produce crops and vegetables in the *dry* season, and **sell** irrigation water to other farmers. **Also** "hand tube well loans" are given to women who want to produce vegetables, or start a nursery near their homesteads. By selling the vegetables or saplings they can pay back the loans in instalments.

Sometimes, credit is given to a GKF group to rent and operate a GKF deep tube well. Women groups can also engage in this activity if they show their interest and are confident that they are able to do this.

B. **WORKING** METHOD

1. Group/Center Discussion

This discussion phase is really important as some of GKF activities will be new to women. The GKF programme certainly will provide new ideas and open up possibilities for them. Women farmers and female group members tend to choose, in the first instance, traditional low-risk, low-output activities like rice husking or goat rearing. However, experience has shown that if they have more information, confidence, and support from GKF, they are very interested in new and nontraditional activities like crop and seed production and irrigation.

The Farm Manager should also create interest among the women to start these activities, creating more independent sources of income for them.

First discussion

A start should be made with a thorough discussion in the centre or group meeting. The Farm Manager should explain all possible activities as described above. The following questions should be discussed

* What kind of activity do they want to do? (mention all possibilities)
* What is needed for each activity; land, inputs like seed, fertilizer, water etc.?
* Do they want to join a group for a certain activity, or do it individually?
* Who will do the work? How are they going to organise it?
* What problems do they expect, and how can these problems be solved?
* What do they already know, and what additional information or skill is needed?
* Who among the group members has land that can be used?
* Are there other people in the village who are interested in sharecropping or leasing their land to the groups?

Note down who is interested in what activity.

Second discussion

Most of the time it is necessary to discuss the activities again in the next meeting, as some women need to think about them more, some want to discuss with their husbands the possible activities, or need their approval. If possible, or needed, the Farm Manager can also discuss them with the husbands, or invite them to the meeting.

Starting of nontraditional activities really needs some motivation by the GKF Farm Manager.

At the final discussion, the decisions will be made by the women themselves, if possible in the presence of the Unit Manager.

2. Access to Land

The Farm Manager should look around in the area for any land for leasing or sharecropping for the group members. Negotiations with the landowners should be started. Landowners will have more confidence in a profitable production when GKF is supporting the group, than when the group members work alone.

Try to secure long-term leases or sharecrop rights; for example, *2-5* years.

If a member of the households has some land, but this land is already utilized by the husband, than this land is not very suitable.

Another possibility is to get the mortgaged land of selected members released under the Release of Mortgaged Lands Programme, and then they can utilize this land.

3.A. Crop Selection

In the GKF area, women have been involved in the production of all kind of crops (like rice, wheat, maize, soybean, and potato), either as fanners in their own fields, or as laborers. They can learn to cultivate new crops.

Discuss what will be the best crop, depending on the soil, the season, the market prices, etc.

Discuss with the group members costs of inputs, amount of work needed, expected income, share to GKF, and special risks like storms, insects or theft.

Final crop selection will be made by the group members themselves.

3.B. Irrigation Equipment Selection

After the crop and the land have been selected, it needs to be decided what kind of irrigation source is needed. In general the following rules are applied

Irrigation equipment	Command area (acres)	Water table (feet)	Crop
DTW	50-60	90	Rice
STW	10-20	19-23	All craps
Treadle pump	1-2	18	Rabi crops/rice
Hand tube well	0.I	3-26	vegetables, nursery

Depending on the area that needs to be irrigated, the depth of the water table and the kind of crop, irrigation equipment can be selected. **Also,** fmd out what kind of equipment is commonly used in the area.

In many areas, women use the treadle pump to irrigate boro rice. Explain to the group members that when the soil is sandy, or sandy loam, it will be very time consuming to pump water (almost **8** hours a day). They might consider growing another crop that requires less water, like potato, wheat or vegetables.

GKF can either supply the members with water from its own deep tube well or from a shallow tube well under the input loan system. **It** is also possible to give loans to the members so that they can **buy** or rent the equipment themselves.

4. Preparation **of** Loan Proposal

After the activity, the land, the crop, and type of irrigation equipment have been decided, the required loan proposal should be prepared.

Discuss whether a general loan, a seasonal loan, an input loan or a hand tube well loan should be given.

See **if** there are other loan repayments still outstanding. Look at the members' repayment history and decide how a new loan can be combined with an outstanding loan. Follow, if applicable, the rules and regulations for the loan utilization of the Women in Development budget.

Take special care when giving a loan for irrigation equipment. The group member should be given a separate input loan, **or** have enough money

left to buy other necessary inputs, like seed, fertilizer, and diesel. If there is no money left to buy good seed, or apply proper fertilizer doses, crop production will be lower than expected and problems may arise with the repayment of the loan.

Discuss the different loan proposals with the Unit Manager, and send the final proposal to the Unit Office.

5. Distribution of Loan/Inputs

Once the loan proposals are approved, loans can be disbursed.

It is important to remember that loans or inputs should be provided in time, well in advance of the season. If this is not the case, production and final profits may be low or fail altogether.

If necessary, arrange for training or demonstrations.

6. Monitor Crop Production and General Performance

Visit each of the activities regularly, and note down progress and problems.

Monitor the crop production during the season. Give advice on possible improvements and, if there are any problems, try to assist the group members in finding solutions.

The Farm Manager should pay special attention to the input supply, especially irrigation water, to female landowners in the DTW or STW command area (who may or may not be group members). Sometimes, these women do not get irrigation water in time, and need some support from tbe Farm Manager.

Discuss progress in the weekly centre meetings, and collect the loan repayment instalments.

7. Include All Data in Statements

Record necessary data on particular activities. Take care that all these data are included in the statements that are sent to the Unit Office, and later to Regional and Head Offices.

8. Assistance to Marketing/Share Collection

In Bangladesh, it is difficult for women to sell their products in the market, as the local "hats" are mainly visited by men. Try to assist the female group members if they indicate that selling their harvest is a problem for them. Sometimes it is possible that GKF will directly buy the produce. If that is not possible, arranging for a reliable trader to buy the produce from their homes might be helpful. Assist in negotiating a fair price for the members

Arrange for the share to GKF to be given properly.

9. Discussion on **Next** Cropping Season and Arrangements

Well before the next cropping season starts, discuss plans, partly based on a review of the last season's performance and profit.

C. Other Activities

Apart from the above possibilities to support women in irrigated agriculture, GKF can also involve women through engaging them in:

* Channel construction/labor

In the construction of improved earth channels, group members can be engaged **as** laborers, women as well as men. **This** work is a good source of additional income as it is done in December and January, the months of scarcity. Group members can be engaged in other types of labor as well, like crop processing.

The aim should be to pay male and female laborers the same wage for the same type of work **and** productivity. **Also,** it is possible to pay a lump sum for the wholecontract, not defining the number of days (contract system).

* Irrigation water distribution

During the irrigation season, the Farm Managers organise meetings with the farmers in the DTW command area to discuss the distribution of water. Female farmers and landowners

who receive water from the GKF DTW should be encouraged to participate in these meetings.

In many farms, it has been seen that men are often involved in business or work elsewhere, and that they assign their wives the task of making sure that their land gets the right amount of water at the proper time. These women can do this task more easily if they have the proper information from the Farm Manager. For this reason, it may be wise to invite them also to the water distribution meetings.