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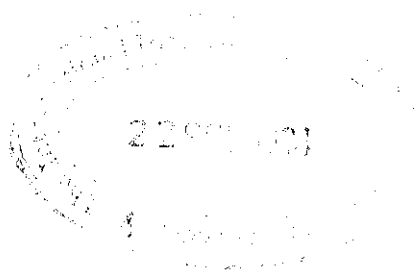
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Analytical

Farmer Management of Groundwater Irrigation in Asia

SH.M. No.	R
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*Selected Papers from a South Asian Regional Workshop on
Groundwater Farmer-Managed Irrigation Systems and
Sustainable Groundwater Management,
held in Dhaka, Bangladesh from 18 to 21 May 1992*



Editors: M. D. C. Abhayaratna, D. Vermillion, S. Johnson and C. Perry.

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INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

Farmer-Managed Irrigation Systems and Sustainable Groundwater Management: An Endeavor of Proshika Target Groups⁶ to Ensure Sustainability of Groundwater Management

S.C. Sarker⁷

ABSTRACT

PROSHIKA MANOBIK UNNAYAN KENDRA, a nongovernment rural development organization in Bangladesh, initiated its irrigation program based on groundwater in 1980. The projects are being implemented by landless and marginal farmer groups. The major objectives of these projects are to establish rights on groundwater resources, to develop a sustainable alternative project management system in the irrigation sector, to create a bargaining situation between the landless and landlord farmers, to transfer ownership of the irrigation equipment to the target groups and to promote irrigation project management by women groups as a significant and prospective counterpart in groundwater development.

To achieve these objectives in particular, and to ensure the attainment of the goal of rural development in general, Proshika endeavors sustainable groundwater management through rural target groups. Attempts made to realize the objectives outlined above are diverse in nature. This paper focuses on some specific interventions by Proshika with reference to two case studies; i.e., (i) where beneficiaries have adopted management innovations successfully in Bastail—a village in Tangail District, and (ii) where the target group has failed to manage the tubewell in Baoni—a village in Gazipur District.

INTRODUCTION

Bangladesh is one of the least developed countries in the world. The estimated current population of the country is 108.8 million and it is expanding at a rate of 2.17 percent per year (Statistical Year Book 1991). The sex ratio of the population is 106 males per 100 females. The literacy rate is 24.8 percent for the population of 5 years and above. About 85 percent of the total population lives in the rural areas and 80 percent is engaged in agricultural professions. Basically, the

6 Landless and marginal peasants.

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country's economy is predominantly agrarian, the cultivable land and the water resources are the principal assets of the country.

The total cultivable land in the country is 903,000 hectares (ha). There are three main rice crops cultivated in the country, which are aush, aman and boro. The boro rice is cultivated in the drought season, that is in between the period of aush and aman. These three rice crops cover an area of 222,189 ha and the crops other than rice cover 516,644 ha. The groundwater irrigation facilities were supplied by 22,510 deep tubewells, 81,511 shallow tubewells and 123,051 hand tubewells in 1990/1991, covering approximately a total area of 1,020,000 ha.

This paper attempts to present a synthesis of the experiences of both Proshika and of the groups of rural poor involved in groundwater irrigation management. It outlines the total mechanisms of the implementation processes including the management system through which the groups have been sustaining themselves over the last decade.

Proshika and its Experience

Proshika Manobik Unnayan Kendra is a National Nongovernment Organization in Bangladesh. Since 1976, it has been involved in organizing both the urban and rural poor for development through education, training and support services including credit. From 1989, a similar process has been initiated in the urban areas to provide development services to the urban poor. From its inception it has incorporated a sustainable development approach which is economically viable, ecologically sound, socially just and culturally appropriate.

Over time, Proshika's development activities have extended to 3,415 villages of 429 unions under 70 upazillas in 26 districts. Presently, the total number of groups are 23,252 of which 11,615 are male and 11,637 are female. It is notable that each group consists of 15 to 20 members.

Proshika's work priorities are defined by themes that refer to some of the topical concerns in rural development. And, the priorities cut across its programs, projects and activities in alternative development endeavors which can be grouped into several major areas. These are as follows: (i) organization of the rural poor, (ii) development education, (iii) employment and income generating activities, (iv) rural health infrastructure, (v) social forestry, (vi) ecological agriculture, (vii) Urban Poor Development Programme, and last, (viii) disaster management.

PROSHIKA'S ENDEAVORS TOWARD SUSTAINABLE GROUND-WATER MANAGEMENT BY THE RURAL TARGET GROUPS

Context

Groundwater Irrigation Project Management by the target groups as water selling enterprises, is an alternative development approach, because the members of the groups sell irrigation water to the fields of landlords under some agreed terms and conditions. But the tradition is, the landowners possess the equipment and use irrigation water to their agricultural land. In some cases the landowners sell water to other fields so that any losses from their own fields can be compensated by the additional income derived. The ultimate aim of the involved groups in groundwater irrigation management is to balance the social inequality between the rich and the poor.

Thus, Proshika Irrigation Programme forms a cycle of beneficiaries, starting with the landless who earn an income through the selling of irrigation water to the land owners, who in turn, are making a profit by raising the productivity of crops which again benefit the economy of the country.

CASE STUDIES

The following two case studies will help to illustrate the total implementation processes starting from initiating a proposal for a project up to its closing. These include group selection, farmers' motivation, credit support, training, technical assistance, share fixation and collection, marketing, etc. The first case study is one of success and the second is a story of mismanagement.

First Case Study

Bastail is a village of Mirzapur Upazilla in Tangail District, where a Bastail *Bhumihim Samity* (landless group) was formed 3 years back. The group consists of 30 members and they hold meetings twice a month. During the last three years they had been utilizing their own savings satisfactorily.

There was an old deep tubewell (DTW) installed in 1974 within the periphery of the residences of the group. The *Krishak* (landowners) Group could not operate the tubewell satisfactorily from the beginning as the manager was functioning individually, taking the full responsibility on his shoulder. He was facing credit, technical assistance and water charge collection problems without any consultation with the group. Three years after its commencement, the project ceased to operate. In 1985/1986, Bangladesh Agricultural Development Corporation (BADC) issued a circular allowing the sale of all the old deep tubewells to the formal/nonformal groups or individuals.

Depending on the above circular the landowning farmers requested the group to take the responsibility of the said deep tubewell project. The group then expressed its desire to Proshika of undertaking the maintenance of the abandoned DTW in their locality. The respective animator who organized the group and the Irrigation Technical Worker (Irrigation Engineer) discussed with the group members in a formal meeting the social, financial and technical advantages and disadvantages, obligations of the group members and the farmers toward the project, Proshika credit norms, etc. The group was hopeful and ensured their sincerity and confidence. They also conducted a group feasibility survey through indepth discussions to judge the uniformity of the group by class and by profession, age of the group members, amount of savings of the members and the performance of their own savings management, etc., and found the group to be feasible to operate the particular irrigation project. The Irrigation Technical Worker then conducted a technical feasibility survey along with the group leaders and the farmers, and found the command area of more than 45 ha to be most suitable.

Then, Proshika, the group, the ex-farmer's group and the Bangladesh Agricultural Development Corporation held a formal meeting where all four parties agreed to transfer the said DTW to the newly formed group on a cash sale basis. Subsequently, former group members and present farmers sat together for share fixation and agreed to fix up a crop share of 33 percent, and both parties concluded a sales agreement. The farmers could use irrigation water for five years with renewal of agreement every year. The group then purchased that DTW for taka (Tk) 52,800⁸ (US\$1,364) in cash. When all preparatory work was accomplished a seven-member management committee was formed by the group and the members were sent to receive training on irrigation project management in the local Area Development Center (field office). At the same time, an engine and pump operator and a water distributor were employed by the management committee and they were sent to receive training on engine and pump operation and water distribution at the

8 US\$1.00 = Tk 38.70.

Proshika Central Training Center, Koitta, Manikgonj. During the first year, the command area was restricted to 18 ha and an operational loan of Tk 50,000 (US\$1,292) was given to cover costs of fuel and oil, spare parts, wages, etc. After completing the first year of operation successfully, the group earned Tk 87,192 (US\$2,253). They sold rough rice to cover the total loan received from Proshika and whatever that was left was evenly distributed among the group members.

During this period the pump broke down three times and was repaired by the mechanics from BADC along with the Irrigation Technical Worker. For better implementation of the project, the group followed the procedures indicated below. The management committee was expected to hold weekly meetings to approve the expenditures already incurred and to give prior approval for forthcoming expenditures. The management committee had to present all the expenditures incurred during last four weeks and raise other relevant crucial management issues in the general group meeting for approval and rectification, respectively. The above systems were followed regularly for controlling operational expenditures, conflict minimizations amongst the groups and the farmers pertaining to irrigation water distribution, etc. During share collections, the group was subdivided into 4 or 5 sub-groups with management committee members as the team leaders. Each individual sub-group was responsible for the successful collection of shares and for making the accounts available to the group on a regular basis. This system committed them to a serious obligation which led to successful share collections. Another important factor is that the system helped the group to maintain group solidarity which paved the way for democratic leadership rotation among the group members. During the season, they sat twice along with the Proshika personnel for mid-term and final evaluations of their project. During the ongoing operational period, the Irrigation Technical Worker and other related Proshika field personnel provided close monitoring.

In this way, the group operated their irrigation project of 30 ha and earned Tk 119,200 (US\$3,080) in 1986/1987, of 25 ha and earned Tk 121,100 (US\$3,129) in 1987/1988, of 31 ha and earned Tk 124,033 (US\$3,205) in 1988/1989. The project got an electric connection in 1989 and the group immediately responded by decreasing the share rate from 33 percent to 25 percent, an action by which the group won the added confidence of the farmers. As a result, the command area increased to 33 ha in 1989/1990, and to 55 ha in 1990/1991, raising the earnings to Tk 206,032 (US\$5,324). This year too, the group has planned to irrigate 55 ha of land with an agreed crop share rate of 25 percent.

Second Case Study

Baoni is a village of Sreepur Upazilla in Gazipur District, where a *Jonodorodi Samity* (comprising 26 members) was organized in 1982. This group functioned with regular meetings, managing its own savings, and participating in the social activities. Similar to the first successful case discussed above, the group got the project and started operation with a command area of 16 ha in the year 1985/1986.

When the group's feasibility was examined, all the group members were found to be belonging to the same category in terms of class and profession with the exception of one member named Abdul Malek. Proshika advised the group to terminate the latter's membership from the group because he possessed 6 ha of land under the scheme, thus making the group heterogeneous in category. Accordingly, the group requested Malek to withdraw his membership from the group. But Abdul Malek had been rendering services voluntarily, staying outside the group during the season, and in this way he had made the group members become obliged to him. He utilized the absence of group members at meetings (as many of them very often had to go elsewhere in search of jobs) to his own advantage. Besides, he also created conflicts among the group members and the farmers without their knowledge, and subsequently, he himself mediated in resolving such conflicts. As a result, the group felt that Abdul Malek was indispensable to the group and to the

smooth functioning of their project. Accordingly the group convinced Proshika field personnel that Malek should be included in the group.

Abdul Malek diplomatically created frustration among the majority of the group members by convincing them that the project was a failure. As a result, many group members were alienated from the project. The main intention of Abdul Malek was to cultivate his land without paying a share and he was successful in doing so. On the whole, misappropriations and the blackmailing strategies of Abdul Malek disheartened the group members to a great extent. Ultimately the project had to be terminated after running for 4 years after reporting severe losses, though the general opinion of the group as well as the farmers is that the project did not incur losses. The group then took a decision to sell the DTW and pay the outstanding loan to Proshika.

SOME MAJOR FINDINGS OF THE ABOVE TWO CASE STUDIES

Conditions Necessary for Success of Project

First, the selected group must be free from heterogeneity (in terms of class and profession), and the leadership should follow a democratic process so that each group member can get the opportunity to exercise his responsibility. Second, the organization should pass through a reasonable span of time for strengthening the unity of the members and there should be enough evidence to show successful savings utilization. Third, project expenditures must be reviewed periodically and any problems should be solved immediately as they occur. Fourth, there should be no confusions regarding ownership of the project. Fifth, maximum participation must be ensured and the involved group members should not be kept unnecessarily busy all the time for official purposes. Sixth, the project benefits must be distributed evenly among the group members and impartial attention must be given to the interests of the group and the farmers. And finally, accountability and obligations toward the project are to be enhanced through an appropriate training process.

Promotion of Irrigation by the Rural Poor

Irrigation water is as important a resource as land for agricultural production. The mainstream government strategy for agricultural development is to support those who have land to acquire ownership of irrigation resources as well. This has led to further social and economic polarization and made the landlords "waterlords" as well, while making the conditions of the rural poor more vulnerable. This unbalanced resource endowment in favor of the rural elite has not led to better and efficient management of irrigation systems. In fact, there are countless examples of unsuccessful irrigation projects owing to factors such as small command areas, faulty and biased water management, corruption, etc. In order to address the issues of equity and better management, Proshika undertook a pioneering irrigation strategy through which the rural poor are assisted to acquire control and manage irrigation resources enabling them to contribute to increased productivity while enjoying a fair share of the benefits. This has led the rural poor to wield more social and economic power simultaneously improving the management of the water resources without Proshika credit.

Proshika has supported 744 groups with credit, training and extension services so that they can sell irrigation water to landowners. Around 80 percent of the projects are successful from an economic, social and managerial point of view. Out of those projects, 78 have become completely self-reliant requiring no further credit and training support from Proshika (Table 2.1). However, some technical assistance is provided and communication is still maintained by the field workers

for the further development of such projects. Table 2.1 also shows 13 shallow tubewells which were expanded from the income of the group members without Proshika credit.

Female Groups Involved in Groundwater Management

Participation in post-harvest technologies by the female laborers is commonly found in Bangladesh, while female participation in the crop production sector is rare. But Proshika has the following experience: It initiated an irrigation program by the landless female groups in 1987 at Madaripur. Subsequently, five projects were implemented in the districts of Manikgonj (upazillas: Saturia and Ghior); Tangail (upazillas: Mirzapur and Nagarpur); and Gazipur (upazilla: Kaliakoir); by female groups. Out of the five projects one ceased to exist for the following reasons:

Table 2.1. List of projects which have become completely sustainable.

District name	Area Development Centers (field offices)	Technologies		Time required in years for reaching sustainable stage		Expansion by group without Proshika credit	
		STW	DTW	STW	DTW	STW	DTW
	Name of upazilla						
Dhaka	Dhamrai	2	-	2	-	-	-
Madaripur	Madaripur	3	-	3	-	-	-
Do	Kalkini	1	-	2	-	1	-
Keshoregonj	Bhairab	2	-	2	-	-	-
Do	Kuliarchar	1	-	3	-	1	-
Manikgonj	Ghior	20	-	3	-	-	-
Do	Horirampur	2	-	2	-	1	-
Do	Singair	2	-	2	-	1	-
Do	Doulatpur	5	-	3	-	1	-
Tangail	Mirzapur	2	1	4	5	-	-
Do	Basail	2	-	2	-	-	-
Do	Sakhipur	2	-	3	-	-	-
Bogra	Sibgonj	5	-	4	-	2	-
Do	Gabtali	9	-	3	-	7	-
Sirajgonj	Serajgonj	8	-	3	-	-	-
Do	Roygonj	5	-	2	-	-	-
Faridpur	Bhanga	4	-	4	-	-	-
Gapalgonj	Muksudpur	1	-	2	-	-	-
B. Baria	B. Baria	1	-	1	-	-	-
		77	1	50	5	14	-

Notes: STW = Shallow tubewell. DTW = Deep tubewell.

- Traditional social problems, security and managerial problems.
- Misappropriations by the hired male group members in accounting and marketing, etc.

Yet, four irrigation schemes are still functioning after overcoming the above constraints. Proshika has learnt a lot from the failures of the above schemes. During the ongoing irrigation season, 14 irrigation schemes have been running with more participation by the female group members. They participate in engine and pump operation, water distribution and channel construction. Since DTW management is rather more complicated than shallow tubewell management, two DTW schemes are run jointly by the male and female groups. The management committees have been formed in such a way that the female groups can exercise more control over the project.

Further, in terms of sustainability of the projects, Proshika has observed that the female groups are doing better, because the female group members are found to be comparatively more sincere, careful and economically motivated than the male group members.

Group Members' Training as Engineers and Pump Mechanics

Mechanical knowledge for engine and pump servicing and overhauling is vital for the successful completion of an irrigation project. It also requires the dependable and sincere support of a mechanic. Proshika experienced that group-based mechanics function very effectively, particularly because they render their services to their individual group projects with an obligation. Since Proshika trained mechanics every year, a single group may have more than one mechanic who helps the irrigation group to get support immediately after any mechanical trouble.

Based on the above experience, Proshika started training projects in engineering and pump mechanism in 1981. Over the last decade Proshika has trained 270 group members as mechanics. Among them, 221 mechanics have been working very efficiently for the last few years and have been earning a significant income every year. The remaining 49 mechanics have abstained from work due to the following reasons: (i) lack of opportunity to exercise their skills, resulting in the discontinuation of work, and (ii) inability to sell technical skills on a competitive basis, a factor which is responsible for lower incomes. These situations diverted their attention elsewhere compelling them to go for jobs outside their own field.

There is a policy for participant selection. Accordingly, an interested group member who wants to be a mechanic, must be nominated by the group for training. Experience on irrigation water distribution and engine and pump operation are pre-conditions for such selection. Formal educational qualifications are not essentially required for the participants. However, the nominated group member must have commitment and enthusiasm for training. After completion of training, the group usually provides a loan to their member mechanic to purchase important tools and, if needed, Proshika also provides credit support through the group. Prior to the commencement of the season, all mechanics sit together to allocate the working areas and to fix up the seasonal charges, so that the irrigation groups may not face any mechanical problems. There is also a standing policy that the mechanic cannot claim charges for work in his own project. Besides, the new mechanic is not expected to engage in major overhauling activities. He will have to work at least for one season under an experienced mechanic. The policies which are discussed above are set forth just to fix up the accountability and obligations of a mechanic to his primary group.

The mechanic's activities are solely monitored by the irrigation technical workers. Training of the mechanics are often conducted by the trained mechanics of Proshika. Proshika hires them whenever their services are required as resource persons, and has been following this policy for a long period.

CONCLUSION

Proshika's endeavor of ensuring the sustainability of the groups engaged in groundwater management is a continuous process. It requires a dynamic and an appropriate policy on the project implementation process and Proshika accomplishes this with policy adjustments every year with the participation of the group members and the Proshika field-level workers. Proshika pays close attention to social, financial and technical aspects, so that the projects achieve a high rate of success. Perhaps the irrigation water selling concept by the rural poor may be a way of solving the complex problem of equity and productivity.

Bibliography

Ahmed, Q.F. 1989. Socialization of minor irrigation: A strategy for growth and equity. Seminar on colloquium on how to reach the poor through groundwater irrigation, Washington.

Bangladesh Bureau of Statistics. 1991. Statistics Division, Ministry of Planning.

Rahman, R.S. Praxis participatory rural development, Proshika with the prisoners of poverty.

Khan, I.A. Socioeconomic and environmental effect of chemical agriculture and its alternative: A micro case study of Bangladesh.

Wood, G.D.; Q.F. Ahmed; A.S. Mandal and S. Datta. 1982. The water sellers: A cooperative venture by the rural poor.

Ahmed, M. and M. Karim. Role of Bangladesh Agriculture Development Cooperation in irrigation sectors of Bangladesh. A paper presented on 28 December 1991 in a seminar organized by the Engineers Society.

Annual Activity Report of Proshika from July 1990 through June 1991.