



## Women owners of irrigation pumps in Bangladesh

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REACHING THE PEOPLE whose water needs are still unmet is primarily a question of strengthening their command over water technology that leads water in the quantity and quality needed on the proper moment to the desired place. This implies their full or partial investments in appropriate technology fitting their needs and matching their technical, financial and institutional capacities.

The experiences of female and mixed-sex irrigation groups in Bangladesh are instructive about the scope for women's command over mechanised irrigation pumps and the benefits they derive from this. These experiences highlight strengths and weaknesses of markets, governments and NGOs in reaching resource-poor women (and men) and clarify the meaning of local gender relations and women's organisation. This appears from a study on women's participation in 33 female and two mixed-sex irrigation groups and the impact on women's status. This paper will present major findings of this research. The 33 female irrigation groups are supported by Grameen Bank and four NGOs: Proshika Manobik Unnayan Kendra (or, in short, Proshika Manobik), Proshika Comilla, Shaptagram Nari Swanirvar Parishad (SNSP) and Rangpur Dinajpur Rural Service (RDRS). The two mixed-sex irrigation groups are supported by the Bangladesh Rural Advancement Committee (BRAC). Here, an irrigation group is defined as female if loans are taken in women's names, and as mixed-sex if loans are taken in both men's and women's names. Group participation implies managerial contributions (labour, control over the pump, decision-making), financial contributions (capital and operational costs) and sharing in the income.

This research project was carried out jointly by the Department of Irrigation of Wageningen Agricultural University, The Netherlands, and the Bangladesh Institute of Development Studies (Koppen and Mahmud, 1996). The project was funded by the Special Programme Women and Development of the Netherlands Ministry of Foreign Affairs. Field work was done in 1993 and 1994. Group participation and economic benefits at group level were studied in all 35 groups. Intra-household contributions and division of benefits and the impact on women's economic and non-economic status were studied in four groups in which women participated actively.

### Reaching the resource-poor: markets for appropriate technology and water

The functioning of NGO-supported irrigation groups should be understood against the background of the

rapidly increasing availability and installation of mechanised irrigation pumps in rural Bangladesh. Abundant ground water and surface water facilitate this type of irrigation in the dry winter season. This irrigation water has been the leading input for an explosive growth in paddy production in the last three decennia. Initially Deep Tube Wells (DTWs) and Low Lift Pumps (LLPs) were installed. The government provided strong support, as will be elaborated in paragraph five. But in the 1980s the private market took over: importation was liberalised and import duties decreased. Especially the Shallow Tube Wells (STWs) from Japan and, more recently, the smaller and cheaper Chinese STWs have become extremely popular. The number of STWs has increased to 350,000 in 1992/1993, while the numbers of LLPs and DTWs are more or less stable at 52,000 and 26,000 respectively (IIMI, 1995). By now technical skills for boring, maintenance and repair exist in most villages and the spare parts of especially the Chinese STWs are widely available. Bamboo pipes and filters, wrapped in old fertilizer sacs, reduce investment costs further.

STWs are more popular than DTWs because they are better adapted to fragmented land tenure and the water market in Bangladesh. 70 per cent of the landed rural households cultivate less than 1 ha, and the average farmer cultivates eight to ten plots in one or more villages (IIMI, 1995). The nominal water discharge of STWs of 14 - 20 l/s allows to irrigate, say, 6 ha of paddy fields. This discharge is still more than a farmer needs for his own plots. The excess water is sold to neighbouring farmers. This unique combination of technical properties of modern technology and characteristics of land tenure has created a farmer-managed water market.

Resource-poor farmers are well integrated in this water market. Pricing arrangements crystallise more or less per region. The most current system is payment of crop shares varying between three sixteenth to one third. This serves resource-poor farmers. They do not need to invest during the season and share the risks of crop failure or low paddy prices with the pump owner. Further, this system stimulates the pump owner to deliver water properly. Payment can also be fixed beforehand either in cash or in kind. Moreover the installation of multiple pumps prevents the monopolisation of equipment by richer landlords-cum-waterlords. Tail-enders can shift to alternative water sellers if water delivery performance is weak. Water prices decrease and water delivery performance improves. Under these water market relations more and

more resource-poor farmers and sharecroppers took up irrigated agriculture. In fact, this wide-spread access to irrigation water is the very reason why the Green Revolution in Bangladesh has been especially beneficial to small farmers (see also Hossain, 1989).

Besides having access to water as clients, more and more small farmers and sharecroppers also become themselves owners of the relatively cheap pumps. The equipment market offers them better access to appropriate equipment than any of the governmental institutions have done before. Moreover, new opportunities open up for the landless: organised in groups they can invest in a pump and sell the water as entrepreneurs. For an individual STWs are too expensive.

Mainstream credit institutions have never been interested to support the resource-poor, even though their loan repayment rates have widely been proven to be superior to repayment by the better-off. Therefore, since the 1980s NGOs started to stimulate pump ownership for small and marginal farmers and the landless. First experiences of Proshika Manobik are documented by Wood et al (1990). In 1992 20 NGOs and Grameen Bank were found to have irrigation programmes for the resource-poor. These agencies monitored 1500 groups, which does not include the enterprises that functioned already on its own. Almost 40 per cent of the aggregate number of these irrigation group members were women (BIDS and WAU, 1992). The six agencies with the most important women's programmes were selected for the research.

Below, the main variables influencing women's participation in irrigation groups and the impact on their status will be described first. Then, in the next paragraph major findings in the 33 female irrigation groups are presented briefly. DTW development in general and BRAC's approach are quite specific and will be elaborated separately in paragraph five.

## Reaching women: NGO approach and group characteristic

### NGO approach and concept of the household

All five NGOs and Grameen Bank start by organising the resource-poor into groups of varying size, often about fifteen members. These groups are exclusively male or female. After some experience with group activities and after reaching a certain level of group cohesion and maturity, one of the options offered to such a group is to purchase and manage an irrigation pump collectively. This collective pump can be used for irrigating own household land and/or water sale. In most cases a feasibility assessment is carried out. Technical, managerial and social support is given. All NGOs offer this support only during a certain period and stimulate the enterprise's independency as soon as possible.

Some NGOs determine the type of pump beforehand. RDRS for example only works with small Chinese STWs. BRAC has developed its irrigation programme exclu-

sively with DTWs. Because of this expensive technology BRAC has adopted a form of co-management. BRAC's male and female members can become shareholders in the DTW enterprise and thus form a new mixed-sex group of shareholders. This will be elaborated further in paragraph five.

The difference in the NGO approach that influences women's participation and the impact on their status most strongly is the differing concept of the household and way in which intra-household relations are taken into account. On the one hand there are NGOs with an individual approach in which members of one household are seen as distinctive NGO members. Their own economic and social empowerment is the NGO's aim and NGO resources and training are channelled to these individuals. These NGO realise that male resistance might arise when women's empowerment is pursued and are, in principle, ready to support women in such problems. Proshika Manobik and Proshika Comilla and SNSP have adopted this approach that can be called the *individual empowerment approach*.

The other organisations, RDRS, Grameen Bank and BRAC focus on the household that is conceived as a unity. This can be called a *household approach*. Any household member is considered to represent the interests of all other household members. And any household member who becomes member of an NGO-supported group can and should act as an intermediary to channel the external NGO resources to all his or her relatives. Trickle-across of project's benefits among household members is assumed and intra-household hierarchies and negotiations between household members are not considered to need special arrangements. The primary aim of Grameen Bank, for example, is the profitable use of credits by the resource-poor in order to increase their incomes, whether men's or women's. Gender considerations should not put this profitability at risk. In the target group criteria of RDRS it is even forbidden for other family members to become RDRS member too once one household member has joined RDRS. In this way RDRS avoids the concentration of its members in a few households only.

### Group strength and main aim

Formally groups should have reached some maturity before demanding activities such as irrigation are initiated. But in reality there can be a wide variation in the strength of irrigation groups. Hence, strong and weak groups can be distinguished in terms of group solidarity, external linkages, irrigation knowledge and skills, dynamism in leadership, group activity, etc.

Another relevant group characteristic is the main aim of the irrigation enterprise which can be water sale, both water sale and irrigating own household land, or, thirdly, exclusively irrigating own household land. Rice cultivation in Bangladesh can be classified as a male farming system in the sense that most land, labour and other inputs are all controlled by men, who also decide about

the use of the output (Safilio, 1988). So water for irrigating household land fulfils primarily men's needs. Only in the rare case of women cultivating their own rice, e.g. women heads of households, women need irrigation water themselves. But in most NGO groups these women are the minority and occupy only a small part of the command area.

However, water needs evolve continuously as a reaction on new opportunities for productive water use. Water sale is such an unconventional space open to women groups.

### **Findings: women's participation and impact on their status**

#### **Conditions favouring women's active participation and impact on their status**

The analysis of the 33 female groups country-wide reveals that female groups that succeed best in managing the irrigation enterprise themselves and for their own benefit have the following features. The supporting NGO has adopted an individual approach of women's empowerment, and channels its financial, technical and organisational support directly to the women. The groups themselves are cohesive and aim primarily water sale rather than irrigating own household land.

### **Brac's DTW programme**

**Institutional arrangements of the government and BRAC**  
Strengths and weaknesses of governmental, non-governmental and market institutions in reaching the resource-poor, especially women, appear rather sharply from DTW development in Bangladesh.

Unlike shareholders in the business world BRAC members do not have capital readily available to pay a share. Therefore, BRAC offers five-year loans at the usual interest rate. Since the period is long total interests rise to 50 per cent of the principal loan amount. This capital loan and interests have to be repaid in weekly instalments. In these long term loan arrangements there are no provisions to stop half-way and to leave the enterprise without losing all instalments already paid. It is noted that shareholders sign for this loan but do not get the money in their hands. Instead, BRAC uses this amount of money to pay the DTWs from BADC. In reality donors have provided most of the money for DTWs to BRAC.

For operation during the irrigation season, all shareholders contribute for operational costs, either by taking a seasonal operational loan or out of their own pocket. Then, at the end of the season, the water income is divided among all shareholders.

During the exploratory phase of the research 19 groups were visited country-wide, while two mixed-sex BRAC groups were studied in depth. Both groups have a majority of female members and an elected female manager. The latter is very exceptional for BRAC's DTW enterprises. Both groups had functioned for five years. The

processes within these two groups show how precisely the strength of the NGO in organising the resource-poor and in designing institutional arrangements to bring water infrastructure within their reach turned against them. This is valid for women and men shareholders alike.

#### **Findings: initial enthusiasm**

In both groups initial enthusiasm of BRAC members to become shareholders was great. Only the poorest could not afford to take any additional loans at all. Many of the other members who just have some minimal regular source of income were quite motivated to save money by investing small amounts in a DTW share: "something for the future". The future value of one share was often -but not always- believed to be fabulous. Investing in an irrigation enterprise and sharing in water income paid as crop shares was the more attractive because it is "like having your own land".

BRAC's arrangements fit the needs for investment of women *de facto* and *de iure* heads of household very well. In most male-headed households in which only women are BRAC members, women are also quite motivated and take up the -few- managerial responsibilities. Their husbands or sons contribute financially. In this way women guarantee that men use their income for paddy. Only in male-headed households in which men are BRAC member themselves too, women BRAC members are at best nominally involved.

#### **Inappropriate technology**

However, this initial enthusiasm if not euphoria disappeared very soon when the enterprises appeared to be unprofitable. The prospects of the feasibility studies made by BRAC turned out to be far too optimistic. In the best performing enterprise of the two case-studies, called enterprise A, there were operational profits, but these operational benefits were not sufficient to repay the capital loan within five years. In the other irrigation group, B, operational costs alone exceeded already the income from water sale.

In fact, these two enterprises were still among the most profitable DTWs of BRAC. If all DTWs are ranked from the highest to the lowest operational profits during the irrigation seasons of 1991/1992 and 1992/1993, enterprise A and B are among the 13 per cent and 36 per cent best performing enterprises (BRAC's 1992 and 1993). Moreover, capital costs were low because both enterprise A and B took over existing DTWs and benefitted indirectly from the higher subsidies under BADC's earlier rental programmes. Both initial command areas were about 16 ha, which is quite normal in Bangladesh nowadays (IIMI, 1995). In enterprise A management is smooth and the pump functions well technically. Enterprise B has some problems and these minor problems were already enough for farmers to start installing their own STWs within the command area immediately. The command area of this DTW is only 12 ha now.

### Loan conditions as a trap

As mentioned above, BRAC as loan provider insists on repayment of the full capital loan and refuses to return any money already put in to shareholders who want to withdraw. This definitely increases loan recovery but is the very mechanism to put the resource-poor shareholders in an awkward situation when the enterprise is unprofitable. For them only two options are left: either drop out by stopping further capital loan repayment and lose the money put in, or continue to pay the whole capital loan and try to sell the share. Moreover, the arrangements put the relatively richer shareholders in a position to take advantage from the relatively poorer. Basically BRAC's institutional arrangements led poor women and men to compete on a commercial water market without benefiting from the most important feature of this market: an optimal technology choice. Although these shareholders cannot be held responsible for the losses in any way, they risk to bear more losses than any farmer ever had to do under the governmental arrangements. The strength of non-governmental agencies, which is their ability to reach the resource-poor, was used for the wrong purpose.

### BRAC's policy change

The above mentioned policy of BRAC was valid during the period that the research project was carried out and when findings were published for the first time. In BRAC's later report on the irrigation season 1994-1995 BRAC concludes, among others, that 76 per cent of its DTW enterprises bear net losses. Therefore BRAC proposes to prevent further losses by selling the DTWs. BRAC intends to "buy back all the shares for these DTWs from the group members. These shares will be bought at the original price.." (BRAC, 1995). Although this original price is more than the commercial market would offer, this arrangement would still imply that BRAC keeps the 50 per cent of interests on the capital loan that shareholders have paid. Further, it is not stipulated if and how the partial ownership rights of drop-outs are recognized.

### Conclusions

Developments on the technology market and irrigation water market in Bangladesh during the last thirty years have brought mainstream irrigation closer to the resource-poor, including women, than subsidized governmental institutions had done before. But in order to reach and organise the resource-poor into groups and provide loans and other support intervention is still needed. NGOs fill this gap. Optimal technology choice and a realistic feasibility assessment are crucial and groups should be well-informed before starting any enterprise. However, risks of investments in water infrastructure remain substantial and risk bearing should receive much more attention.

Experiences of existing female irrigation groups country-wide indicate that resource-poor women only partici-

pate actively in irrigation if the supporting NGO has articulated women's own empowerment by irrigation as an explicit aim and channels its support package directly to them. Moreover, the women's group should be strong and water sale its main aim. But male relatives are still the ones who take financial responsibilities. In groups in which irrigating own household land is an important aim, whether besides water sale or not, irrigation is the affair of the related men who cultivate these lands. This may be reinforced by the weakness of the female group and a supporting NGO that does not pay attention to, or even stimulates, one household member just channelling NGO services to other household members. While women's economic and non-economic status improves in the first case, in the latter case women in male-headed households just sign for the loan. Their own benefits are minimal and mostly indirect. In both types of enterprises women heads of households themselves contribute and gain.

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