



16th WEDC Conference  
Infrastructure for  
low-income communities  
Hyderabad, India 1990

### Minor irrigation: access to small farmers

M Asaduzzaman

#### INTRODUCTION

The economy of Bangladesh is mainly based on agriculture and it will be a dominating sector in the economy for the years to come. Introduction of irrigation and the associated technologies is the prominent step initiated by the Government to change the socio-economic structure of the rural people. It has been found that only irrigation can increase agricultural production from 25 to 40% and it can be multiplied several times if the associated technologies like seed, fertilizer, pesticide, etc. could be practiced (13).

Before the introduction of lowlift pumps, traditional means of irrigation have been in use in the country. The use of ground-water for irrigation has been widely started in 1967. Its use rose sharply in 1982 when the use of lowlift pumps reached its potential capacity. However, no single system of irrigation could prove its absolute superiority over the others.

#### SMALL FARMERS

The farmers in Bangladesh are classified as small, medium and large, according to land holdings. (3) Small farmers hold from 0.25 to 2.49 acres; medium farmers from 2.5 to 7.49 acres; and large farmers hold over 7.5 acres. The number of farmers, area in acres and the average area under each class of farmers in Bangladesh are shown below:

Class	Number (%)	Area (acres)	Ave. acres
Small	7066000 (70%)	6573000 (29%)	0.9
Medium	2483000 (25%)	10226000 (45%)	4.1
Large	496000 ( 5%)	5879000 (26%)	11.8
Total	10045000	22678000	2.25

Source: Bangladesh Bureau of Statistics

This paper intends to deal with the small farmers who are the highest in number in the country and who occupies 70% of the total farmers, but holding only 29% of the available land.

#### MINOR IRRIGATION

In India, until 1978, minor, medium and major irrigation projects were classified as per cost of the project, i.e. less than 2.5, from 2.5 to 5.0 and above

50 million rupees, respectively. Since 1978, the above classification is based on the coverage of the commanded area such as less than 2000, from 2000 to 10000 and above 10000 hectares as minor, medium and major irrigation projects respectively (12).

However, in Bangladesh the minor irrigation projects are based on traditional water lifting devices: lowlift pumps, hand and shallow tubewells and deep tubewells (15)

#### TRADITIONAL WATER LIFTING DEVICES

The traditional water lifting devices such as swing basket and hinged channel and counterpoised lift can lift to a height of 2 to 6 ft. respectively from the surface of water and estimated to cover around 0.49 million hectares in the country. These are very efficient manual devices.

#### HAND TUBEWELL

The farmers found that the hand tubewells supplied by the Department of Public Health Engineering assisted by UNICEF for domestic purposes are equally good for irrigation. These are called MOSTI, i.e. Manually Operated Shallow Tubewell for Irrigation.

MOSTI can sustain a discharge of 9.6 imp. gallon per minute at a static suction head of 17 ft. and requires 0.05 water horse power or 38 watts (15). Much of the pumping is done by the village women and the children, having an efficiency of around 60%. Normally, a MOSTI can irrigate about 0.33 to 0.5 acres of land and presently, around 255560 MOSTIs are being used in the country (10).

#### ROWER PUMP AND TREADLE PUMP

These two types of pump are very recently put to use for irrigation purposes. The suction lift of rower pumps and treadle pumps are 25' and 16' respectively and the discharge is about 0.76 and 1.0 litre per second respectively, and both the pumps can be installed in combination with bamboo and PVC (11).

### LOWLIFT PUMPS

Normally, a lowlift pump is a unit of a centrifugal pumps directly coupled to a diesel engine of 5 to 18 horse power and used to lift water from a river or open water surface having a discharge of one and two cusec of water working against the total head of 40 ft.(15).

### SHALLOW TUBEWELL

A shallow tubewell is usually a combination of G.I. or PVC pipe of 110 to 150 ft. length, having blind pipe and strainer of 4 inch diameter each. The pumping unit consists of a centrifugal pump of capacity of 0.75 cusec discharge and is directly coupled to a diesel engine or an electric motor. The total working head of the pump is around 30 ft. and the suction lift is very effective upto 18 ft. Presently, about 250000 shallow tubewells are working in the field (10).

### DEEP TUBEWELL

A deep tubewell is generally installed in a drilled hole between 150 to 300 ft. having 14 inch expanded top and 6 or 8 inch dia blind pipe and strainer. Turbine pump is set at 50 to 90 ft. depth and driven generally by diesel engine through a right angled gear having discharge between 1.2 to 2.0 cusec. About 30000 deep tubewells are working in the field. Total withdrawal of ground water equals to 12754 Mm<sup>3</sup> against the estimated value of 18966 Mm<sup>3</sup> (10).

### EQUITY IN IRRIGATION

Irrigation injects a thriving resource in the rural economy of Bangladesh. But the outcome does not reflect the proportional growth of wealth of the rural people to the land they possess. The effect of irrigation on the growth of wealth depends mainly on the availability, management and distribution of irrigation equipment.

A small farmer may not have the financial back-up to possess the less costly rower pump or treadle pump of his own. Similarly, the rate of irrigation water charged or the initial payment for the purchase of a shallow tubewell makes him unable to participate in such scheme. Largely, the small farmers are not getting access to irrigation.

In practice, the large and medium farmers dominate the management of lowlift pumps and deep tubewell schemes, the inclusion of small farmers in those schemes is either by the location of the land or by good management which is rare. The study made by Quadir, Emmert, et al (1978) show that the deficit farmers become self-sufficient

after being included in the scheme area. So, it is desirable to maximize the inclusion of such farmers in the potential commanded area of the above equipments.

A study of 100 deep tubewell schemes and the number of small farmers included is shown below:

<u>No. of case study</u>	<u>No. of small farmers</u>	<u>No. of medium farmers</u>	<u>No. of large farmers</u>
100	2517 (66%)	1236 (32%)	91 (2%)

It is seen that access to irrigation by small farmers is greatest provided full command area is served. The socio-economic distribution effect of different irrigation technologies such as lowlift pumps, shallow and deep tubewells are studied by Hamid, Mukharji, et al (1982), Hamid, Azharuddin, et al (1984) and both the studies showed a tendency of greater benefit for large and medium farmers than small farmers (6).

### DEEP TUBEWELL POLICY OPTION

Access of the small farmers to irrigation mainly depends on proper siting of deep tubewells. Various systems of installation and operation of deep tubewells are practiced by different organisation such as:

#### A. The Bangladesh Agricultural Development Corporation

This corporation has introduced initially the "rental system" of sinking and operation of deep tubewells and continued the system upto 1979-80. In this system, oil and fuel and managerial costs are borne by the farmers. After 1980, the "sale system" of sinking and operation of deep tubewells was introduced by the corporation at the desire of the donor agency. Here, presently, only formal groups can purchase deep tubewells.

According to the irrigation water rate ordinance 1983, "irrigation charge system" has been introduced in the "Barind Integrated Development Project". The realization position of "irrigation charge" was more than 90% for the last three years (1).

#### B. Bangladesh Water Development Board

Bangladesh Water Development Board has introduced "tax-free" system in 1964-1965 in the Thakurgaon deep tubewell project and discontinued the system of realizing water tax at the rate of 3% of the additional crop. After 1984, this water tax system was replaced by the tax system on crop basis. The Board bears the cost of energy consumed and the salary of the drainman. But the

realization position of tax is very poor and which is only 3 to 4 % (2).

In conclusion, it may be said that the donors prescribe the agricultural policies of Bangladesh and the government tries to implement such policies without counting the outcome of it.

#### COST OF PRODUCT

Normally, the net earning per acre of land through irrigation comes for paddy to around Tk. 2,409 (US\$ 69 - conversion rate of US\$1 equals Tk. 34.9) when the irrigation charge of Tk. 13,500 is considered as in the Barind Project. But for a deep tubewell under the sale programme, the same comes to Tk. 1,458 (US\$ 42), after paying the initial installment of Tk. 40,000. Further, the small farmers here is forced to sell out their products just after harvest to meet the loan an other family requirements when the price level of crops remain at the lowest. Sometimes, the cost of product is lower than the cost of production. At other times, crops may fail due to mechanical problems or conflicts within the groups, bringing misery to the small farmers. The effects of such hazards can be minimized with crop insurance, price protection system or community storing facilities (2).

#### POLICY OF PRIVATIZATION THROUGH SALE SYSTEM

Professor M.A. Hamid described in his studies the advantages and disadvantages of both the sale and rental system of deep tubewells. He opined that the rental programme is better for productivity, distribution, net return and employment. Further, he preferred the rental system to sale system from the point of attainment of self-sufficiency in food and utilization of irrigation equipments(8).

In fact, "irrigation charge" system as used to be practiced in the Barind project is comparatively more socially acceptable, where the rate of subsidy is less and well accepted by the water users. The policy of privatization encourages the well-to-do farmers to purchase irrigation equipment and behave like water-sellers or waterlords to the small farmers and in turn, they give away to the rate of water the seller charge.

#### STATUS OF AGRICULTURAL CREDIT

Though agriculture is the mainstay and backbone of the economy of Bangladesh, the rate of interest on agriculture credit is 16% per annum, which is second highest to commercial lending of 18%. The interest on agriculture credit is higher than rural housing, working capital on agriculture

product, small cottage industry and urban housing which are 8%, 9%, 10% and 12 to 15%, respectively, per annum (4).

It is better to impose reasonable and realistic interest on agricultural credit, so that the small farmers can participate in the credit facilities and boost up the economy of Bangladesh, instead of trapping them with non-realization of loan and cumulating the loan every year. Till 1988-1989, the amount of "Bad Loans" in the agriculture sector is about 2,35,568 million taka (US\$ 6744 million). The main reason for poor recovery of agricultural loans is the accumulation of the installments which becomes beyond the financial capacity either of the individual borrower or group. In most cases, the loanee believe that these loans, or at least the interests, would be written off at some stage (7). However, very recently, (March 11, 1990), the World Bank President, Barber B. Conable in Dhaka assured farmers with more loans at low interest rates for agriculture development of Bangladesh (14).

In conclusion, it should be remembered that the small farmers are aout 70% of the total farmers of the country and no programme could be made bright and successful if these farmers do not get access to irrigation and agricultural credit.

#### REFERENCES

1. Asaduzzaman, M. Irrigation charges in the Barind Integrated Area Development Project: A New Approach. ODI-IIMI Irrigation Management paper 89/2e(1989)
2. Asaduzzaman, M. Deep tubewell irrigation programme in Bangladesh: The policy options case study report for Ministry of Agriculture, Government of Bangladesh (1990).
3. Bangladesh Bureau of Statistics - Statistical Yearbook of Bangladesh (1989).
4. Bangladesh Bank. Revised Interest Rate Policy and Revised Procedures of loan classification and provisioning (1990).
5. Bangladesh Bank. Annual Report 1988-1989 (Bengali version) (1989)
6. Emmert, Jan Paul, Equity Issues in Bangladesh. A comparative discussion of technologies, organizations and support services - Bangladesh Agricultural Development Services - Consultancy Report (1984)

7. Hamid, M.A. Improving the access of the rural poor to groundwater irrigation in Bangladesh. Some socio-economic issues Prepared for the colloquium on "How to reach the poor through groundwater irrigation" held in Washington, D.C., USA, April 11-15, 1989.
8. Hanson, J.L. Dictionary of Economics and Commerce - London 971
9. Karim, M.A. Groundwater management in Bangladesh. Paper presented in the National Seminar on Water Resource Management of Institution of Engineers, Bangladesh (1990)
10. Karim, M.A. Upazilawise Groundwater to Change Conditions of Bangladesh. Study report Groundwater Circle, BWDB 1987)
11. Lyth Mike -Making manual irrigation available to the small farmer. Swiss Development Co-operation Study report (1985)
12. Michael, A.M. Irrigation Theory and Practice - Vikas Publishers Pvt. Ltd. New Delhi (1983) (a book)
13. Siddique, M.F.A. An infra-structure for development in Bangladesh. Irrigation article from proceeding of the seminar - Integrated Rural Development (vol.1) IEB (1975)
14. The Bangladesh Times - The Daily Newspaper, 12th March 1990.
15. Government of Bangladesh and the World Bank. Bangladesh Minor Irrigation Sector: A joint Review 1982.