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IRRIGATION MANAGEMENT NETWORK

IRRIGATION CHARGES IN THE BARIND INTEGRATED AREA DEVELOPMENT PROJECT: A NEW APPROACH

M Asaduzzaman

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- 89/2d: Tubewell Irrigation in Bangladesh by James Morton
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ISSN: 0951 189X

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**IRRIGATION CHARGES IN THE BARIND INTEGRATED AREA
DEVELOPMENT PROJECT: A NEW APPROACH**

M ASADUZZAMAN

Contents	Page
Editor's Preface	4
1. The Barind Project	7
2. The Derivation and Collection of Charges	8
3. Recovery Levels of Irrigation Charges	14
4. Apportioning and Paying Recurrent Costs	18
5. Conclusions	20
Bibliography	23
Appendix A	24
Appendix B	25
Appendix C	30

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EDITOR'S PREFACE

Cost recovery, water pricing and fee collection systems which encourage financial discipline and operational efficiency have been a regular item of discussion within these IMN papers¹. This paper describes the evolution of charges, collection procedures and their use in the Barind Integrated Area Development Project in Bangladesh (BIADP). These developments are a direct result of dissemination of the debate on irrigation charges. The BIADP started in 1986/87, and has the expansion of a deep tubewell (DTW) programme as a major component. This recent beginning has enabled it to benefit both from discussion in the literature on irrigation charges, and the experience of earlier programmes of irrigation expansion in Bangladesh. The irrigation charges levied in the BIADP were first derived in relation to recovery of the capital costs of irrigation infrastructure, while also being related to the increased incomes available from irrigated production. Charges recovered were repaid to the Government, who in turn released funds for recurrent costs which bore little relation to actual costs. This poor relationship threatened the efficiency of the maintenance service that could be provided, and the commitment of the staff involved. In turn, the farmers were unable to see the relationship between fees paid and the service provided, which lessened incentives to pay charges. These types of problems have been discussed by Sagardoy (1982) and summarised by Tiffen (1985).

The BIADP policies recognise the importance of a direct financial and contractual relationship between "the agency providing the service and the farmers receiving it. The management of BIADP also knows that reliability of supply is critical if farmers are to generate the income to pay for the service, and therefore, it focuses on regular services and prompt repair of pumps.

¹ All related papers are listed in the bibliography.

Procedures have now been changed so that a proportion of the charges collected are allowed to be used to cover Project recurrent costs, leaving a balance that can contribute towards capital costs. The charging system developed has both incentives and penalties linked to timely payment of charges by farmers, and should soon have an incentive system to promote efficient performance by the Project staff. The Project has also increased the involvement of farmers in providing and managing some of the recurrent costs themselves (see Carruthers, 1986).

In Section 2, Mr Asaduzzaman discusses the objectives of the BIADP. Section 3 details the derivation of the irrigation charge and its collection, and Section 4 shows the success of the BIADP in meeting its targets. The performance of BIADP is briefly compared with other irrigation organisations in Bangladesh. Section 5 demonstrates the magnitude of recurrent costs in the BIADP, and the policies now being developed to cover this and encourage an efficient and responsible maintenance service. As yet, the Project is recovering only one third of its target in terms of combined capital and recurrent cost recovery, because irrigated area per tubewell remains considerably below the assumed potential. However, there is a commendably high rate of payment per area actually irrigated. These payments already cover more than the recurrent costs including staff salaries and overheads, so that there is already some provision for depreciation and capital repayment. Moreover, the system set up seems to contain the potential for improvement. In its three year life so far the Project has shown a steady increase in irrigated area per well and a very large increase in production and yields. The latter may eventually permit irrigation charges to be raised and the rate of capital recovery to be further increased. Much has depended on motivating staff; the new system ensures they are paid promptly and it is hoped also to raise salaries by an incentive system. Mr Asaduzzaman concludes with a summary of key differences between the strategy of BIADP and other irrigation organisations in Bangladesh, and prospects for BIADP in the future.

6

We would welcome hearing from other Networkers who have tried out ideas suggested in a Network Paper. We can all learn from your experiences, whether the results were good or bad. Please fill in the enclosed form, or write, if you have an experience to communicate.

*Linden Vincent & Mary Tiffen
Irrigation Management Network*

**IRRIGATION CHARGES IN THE BARIND INTEGRATED AREA
DEVELOPMENT PROJECT: A NEW APPROACH**

M ASADUZZAMAN

1. THE BARIND PROJECT

The Barind Integrated Area Development Project (BIADP), comprises 15 upazilas² of the districts of Rajshahi, Naogaon and Chapai Nawabgonj of the greater district of Rajshahi in northwest Bangladesh. The Project area covers about 1900 square miles. Geomorphologically the area is a terraced landscape representing a series of fault blocks, crossed by the border of India and Bangladesh. The elevation ranges between 40 feet to 150 feet above mean sea level.

The BIADP is one of several development projects in the current third Five Year Plan of Bangladesh. The component objectives and works of the Project are:

- a. the exploitation of groundwater by sinking 3,000 deep tubewells of, on average, 2 cusec discharge capacity;
- b. the augmentation of surface water and development of fisheries, poultry and pisciculture by re-excavation of 14,000 Government-owned khas (ponds) and 305 miles of khari (canals) and dara (water flowing channels), and the development of horticulture on the newly formed banks;
- c. to minimise the cost of lifting irrigation water, and thus the cost of agricultural production, by electrification of irrigation equipment;
- d. to increase the intensity of cropping by diversification of crops and partial mechanisation;

² Local Government unit; lowest administrative unit with about 250,000 people.

- e. to provide marketing facilities and obtain fair prices for agricultural products, and to improve communications by constructing feeder roads.

After implementing the plans of the Project, the benefits will come in the shape of more agricultural growth. This will help the country to reduce its total yearly food shortage and also generate additional employment in rural areas.

2. THE DERIVATION AND COLLECTION OF CHARGES

The aim of this paper is to discuss the functional points of irrigation charges that need to be regulated when putting tubewells and low lift pumps into operation for irrigation purposes. However, in discussing the functional procedures of irrigation charges, the term 'irrigation charge' itself should be made clear.

An irrigation charge may be defined as a charge per unit area of land brought under cultivation by using water from either tubewells or low lift pumps, to be realised from the user of water in a predetermined command area served by particular irrigation equipment. The management of the BIADP guarantees water supply to farmers in return for payment of the irrigation charge. The farmers' group belonging to a tubewell bears the cost of routine maintenance, oil and fuel or electricity consumed by the prime mover of the pump, but the servicing costs are borne by the Project, and the pump belongs to the Project.

The irrigation charges are prescribed and enforced according to the irrigation water rate ordinance of the year 1983, at the following rates:

1. 35 Taka per bigha³ of land for high yielding varieties and local improved varieties of boro paddy (105 Taka⁴ per acre);
2. 30 Taka per bigha for paddy cultivation in the aus season (90 Taka per acre);
3. 20 Taka per bigha for potato or wheat cultivation in the rabi season (60 Taka per acre);
4. 10 Taka per bigha for each transplanted aman⁵ paddy season as supplementary irrigation (30 Taka per acre).

Before starting any irrigation season the farmers pay the irrigation charge to the authorised representative of the Project, through printed and serially numbered money receipts. The Project ensures that the irrigation facilities work by providing free servicing and maintenance through deputing adequate numbers of trained technical hands for a particular area.

For BIADP the irrigation charge per DTW was calculated in the light of two factors:

1. the annual charge should, by the end of the expected lifetime of the equipment, equal the capital cost of the tubewell and spare parts during its expected lifetime of twenty years;

³ Bigha = 0.135 hectares, 0.33 acres (1 acre = 3 bighas, 1 hectare = 7.41 bighas).

⁴ In 1982 the official exchange rate was Taka 32 = US\$1, in 1983 it was Taka 25 = US\$1.

⁵ Boro, aus and aman are seasons for cultivating rice (for months, see pg 11). Rabi is the dry season, November-March.

2. the charge should be related to the additional income the equipment makes possible for the farmer to earn from different crops.

To confirm the viability of the irrigation charge, first we must estimate the probable cost involved for sinking, installation and ancillary works of a tubewell, and the possible additional income generated through its use. We should also analyse what percentage of the additional income generated by the use of tubewells could be paid by the farmers of the Project area as an irrigation charge.

The basis of the calculation is as follows:

- a. the present sale value of a DTW at Taka 175,000, a price established by the Government, and including all ancillary items such as the pump, prime mover and pump house. (The actual cost, without subsidy, of a DTW is around Taka 500,000.)
- b. the present cost of an additional diesel engine of Taka 60,000 since its expected lifetime is normally ten years;
- c. the repair and maintenance cost of the diesel engines for 20 years, totalling Taka 69,000 - the cost of repair per year for the first three years of each of the engines is calculated as Taka 1,000, and for the next seven years is calculated as Taka 4,500 per year;
- d. the service charge of 5%, levied annually on Taka 175,000, or the cost remaining for the DTW after annual repayments of Taka 15,000 per year (see calculation * overleaf), totals Taka 55,500. The salvage value of a tubewell and its engine is fixed at Taka 65,000 by the Government;

- e. Salary and Project costs are not included in this costing, and are referred to later.

Therefore, the total value of the above costs, to be recovered over 20 years through irrigation charges in the irrigated area, is:

$$\begin{aligned} \text{Taka } (175,000 + 60,000 + 69,000 + 55,500) &= \text{Taka } (359,500) \\ - (65,000) &= \text{Taka } 294,500. \end{aligned}$$

Thus, the amount to be recovered in the form of irrigation charge per tubewell per year is (Taka 294,500 ÷ 20 years = Taka 14,725.00), say Taka 15,000.00 *.

The expected irrigable area under crops for each tubewell is shown in Table 1:

Table 1: EXPECTED AREA IRRIGATED, BY SEASON, PER TUBEWELL

a. Boro (Irri)	100 bigha from the month of December to March
b. Aus	150 bigha from the month of May to August
c. Potato/Wheat	200 bigha from the month of November to March
d. Transplanted aman	300 bigha from the month of July to November
<hr/>	
Total	750 bigha

Note: It is assumed that the seed beds would be raised in locations other than the command area.

This yearly cost of a well of Taka 15,000.00 has to be realised through irrigation charges from the benefitted area. The average irrigation charge per bigha of land becomes (Taka 15,000.00 ÷ 750 bigha), which equals Taka 20.00 per bigha (the total area of land that can be irrigated through a tubewell per year in different

crop seasons is considered to be 750 bigha). However, we should also consider that the group of farmers under each tubewell bear the cost of routine maintenance, oil and fuel of the diesel engine or electrical charge consumed by the electrical motor, although free servicing and repair is ensured by the Project. The quantity of water required to raise different crops varies, thus the irrigation charge should also vary. Hence, there is provision to pay less irrigation charge for raising crops which require less water under the Project, as follows:

Table 2: IRRIGATION CHARGES, BY SEASON AND CROP

Name of crops	Irrigated area under each tubewell (bigha)	Irrigation charge (per bigha in Taka)	Yearly irrigation charge per well (in Taka)
1. Boro/Irri	100	35.00	3,500.00
2. Aus	150	30.00	4,500.00
3. Wheat/potato	200	20.00	4,000.00
4. Transplanted aman	300	10.00	3,000.00
Total	750 (250 acres)		15,000.00

Note: Irrigation charge at the rate of Taka 20.00 per bigha is payable for any other winter crop and Taka 10.00 for any other kharif crop.

The farmers should be encouraged to raise those crops which involve less expenditure and require less volume of irrigation water such as wheat, potato, barley and pulses etc. The benefits from this are diversification of traditional food habits and less dependency on rice. Further it will enhance per capita income by producing additional output.

It is in fact unrealistic to suppose the farmers can immediately get an average of 2.5 crops per year, as Table 2 might indicate. Currently we are getting about 100 acres per tubewell, including transplanted aman (see Table 3). However, the irrigation charge must be estimated and fixed with active consideration of the

ability of the farmer to pay. The charge is within 1% to 5% of the farmer's additional income through irrigation for different crop seasons, which still leaves a margin for his future needs and investments, and for his own contribution to the running costs of the well. The total cost to the farmer of irrigation water, when these running costs are included, is Taka 200-400 per bigha per season, as can be seen in Appendix C, page 31.

The rules, regulations and practices adopted under this Project to realise the irrigation charge and to implement management are given in Appendices A to C. The Upazila-based Project Implementation and Coordination Committee, of which the relevant Upazila Chairman (people's representative) is the President, demarcates the command area under each tubewell or low lift pump and guarantees irrigation water to this area.

Before the start of any irrigation season the farmers of the demarcated area pay the pre-determined irrigation charge to the authorised representative of the Project through a money receipt. The beneficiaries pay the cost of oil and fuel or charge of electrical energy consumed to run the machines, and the salaries of the group leaders and the pump operator.

The beneficiaries elect one group leader among themselves to organise their group and to act as liaison. The Upazila Chairman, and the Assistant Engineer of the Project posted at each upazila, monitor the payment of irrigation charges by fortnightly reports, and take all necessary steps to achieve the target realisation of irrigation charges. Adequate and prompt arrangements have been made at each upazila to repair the irrigation equipment and guarantee irrigation water as a pre-condition of realisation of irrigation charges.

3. RECOVERY LEVELS OF IRRIGATION CHARGES

We would now like to illustrate the success of the BIADP in meeting its financial and economic targets. In Table 3 we show details of the improvement of irrigation facilities, and of charges recouped between 1986/87 and 1988/89. Available discharge for irrigation has tripled both for tubewells and low lift pumps. The numbers of operating deep tubewells has increased from 594 to 2142. There have been important successes also in closing the gaps between drilled, commissioned and operating tubewells, so that by 1988/89 93% of commissioned deep tubewells were working, and 80% of drilled wells were commissioned. The better performance of wells may be seen in the three-fold increase in irrigated area per cusec of discharge. The number of beneficiaries has also tripled, but irrigated acreage has increased over eight times, mainly for paddy. There have been big increases in numbers of owner-cultivators and sharecroppers. However, owner-cultivators dominate the acreage, and have increased their percentage participation relative to sharecroppers.

However, relative to this article, the most important achievement is in the percentage of costs recouped. We discuss this in Table 4. This sets out the 'accrued' charge levied according to acreage under the various crops, against the 'realised' charges actually collected. These are given for both tubewells and low lift pumps. Unfortunately, details of crops cultivated under the two technologies are not distinguished to illustrate stages in the derivation of the accrued charges. This table shows that collections within the year are running at least 80% of charges levied, and are running at 95-100% when allowance is made for the collection of overdues.

Not a single parallel organisation in Bangladesh has achieved such success so far in securing payment of irrigation charges for irrigation equipment.

Table 3: STATEMENT OF IMPROVEMENT OF IRRIGATION FACILITIES UNDER BARIND PROJECT AREA, RAJSHAHI

	1986/87	1987/88	1988/89
1. DEEP TUBEWELLS (DTW)			
a. Nos of DTW sunk	1347	2102	2856
b. Nos of DTW commissioned	998	1361	2300
c. Nos of DTW operating	594	1245	2142
d. Total cusec of discharge utilised	1443	2420	4084
2. TOTAL NO. OF LOW LIFT PUMPS FIELDDED (LLP)			
a. 1 cusec capacity	21	74	188
b. 2 cusec capacity	38	67	80
c. Total capacity, cusec	97	208	348
3. IRRIGATED AREA WITH STATUS OF BENEFICIARIES			
a1 Nos of owner-cultivators	17697	43214	71376
a2 Irrigated area (acres)	16648	53841	86298
b1 Nos of share croppers	12783	25050	34573
b2 Irrigated area (acres)	7613	19366	44406
c1 No of contract cultivators	1073	1847	1907
c2 Irrigated area (acres)	347	1741	1833
4. TOTAL NO. OF BENEFICIARIES	31553	70111	107856
5. TOTAL IRRIGATED AREA (ACRES)	24608	74948	212564
a. Paddy	21772	67481	203240
b. Wheat	2049	7248	8240
c. Others	787	219	1084
6. TOTAL PRODUCTION (METRIC TONS)	42201	349934	584103
a. Paddy	37333	344059	575515
b. Wheat	1522	5434	6928
c. Others	3346	442	1660
7. APPROX VALUE OF PRODUCE	2297+	19050+	31541+
8. IRRIGATED AREA PER DTW (ACRES) (Assuming 2 cusec discharge)	39	56	62 99*
9. IRRIGATED AREA PER LLP (ACRES) Per cusec of discharge	16	28.51	32.45

+ in 100,000 Taka, @ Government procurement price.

* Includes 80027 acres of irrigated transplanted aman

Table 4: POSITION OF IRRIGATED CHARGES ON THE BARIND PROJECT AREA, RAJSHAHI

	1986/87	1987/88	1988/89
DEEP TUBEWELLS			
Accrued charges	2,050,534	5,584,310	14,386,712
Realised charges (as %)	2,005,246 98%	4,585,227 82%	13,224,144 92%
Non-realised charges	169,093	997,583	1,124,568
LOW LIFT PUMPS			
Accrued charges	229,225	521,600	1,085,500
Realised charges (as %)	229,225 100%	482,000 92%	948,600 87%
Non-realised charges	-	41,000	136,900
TOTAL			
Accrued charges	2,279,759	6,105,910	15,472,212
Realised charges (as %)	2,234,471 98%	5,067,227* 83%	14,172,744 92%
Non-realised charges	169,093	1,038,583	1,261,468

* This sum has since been augmented by Taka 1,022,424 collected as overdue payment. This brings the actual realisation for 1986/87 and 1987/88 to 99% of the total.

It is not possible for this paper to describe in detail the investment and cost recovery strategies of other irrigation organisations. However, we would like to end this section by comparing our performance in cost recovery with that of the Bangladesh Water Development Board (BWDB), to emphasise the differences in our strategy and how these contribute to improved collection of charges.

The BWDB first gave irrigation facilities free of cost up to 1975/76, but then imposed irrigation charges which were higher than those of BIADP, because these charges were fixed supposedly to cover operational costs (salaries, fuel, electricity, etc), though in practice real operational costs may be as high as Taka 834 per acre. In comparing them with the BIADP charges shown in Table 2 it should be remembered BIADP farmers are responsible for fuel, etc.

The charges levied by BWDB are:

- a. kharif - 1 crop (March-June) - Taka 150 per acre (50 per bigha);
- b. kharif - 2 crop (July-October) - Taka 50 per acre (16.6 per bigha);
- c. rabi crop (November-February) - Taka 150 per acre (50 per bigha).

Table 5: COLLECTION OF WATER CHARGES BY BANGLADESH WATER DEVELOPMENT BOARD

Name of major project	Total amount assessed from 1976 to April 1983 (million Taka)	Total amount collected from 1976 to April 1983 (million Taka)	Percentage of realisation %
1. Ganges Kobadak Project	15.748	0.335	2.12%
2. GWD Project and LLPI schemes in Northern district including Buri-Teesta	5.691	0.214	3.76%
3. DND Project	4.608	0.131	2.84%
4. Durang Irrigation	0.405	-	-

We show the actual state of collection of these charges in Table 5; they are currently only 2-3%. Collection has been the responsibility of the Revenue Department.

Another important irrigation organisation is the Bangladesh Agricultural Development Corporation (BADC). They have experimented with the supply of irrigation equipment in return for payment of a pre-determined yearly rent, a system which proved unviable due to large amounts of over-due, unpaid rent. The system was discontinued and replaced by a 'sales' system run in conjunction with the Bangladesh Rural Development Board (BRDB) and scheduled banks. The

banks lent farmers grouped in cooperatives money to purchase equipment. However, default on repayments on irrigation equipment have jeopardised the chances for the agricultural cooperatives concerned to obtain other loans. The bank system has also had intricate procedural formalities for loans which deterred farmers. As a result, around 15,000 imported DTW have been lying idle in different BADC stores for the last four years.

Cost recovery is not only important for funding future investments, as Mr Guohua Xu (1986) pointed out so clearly. It has current implications throughout rural development initiatives, both by affecting maintenance and operation for irrigated production and the operation of loan programmes for other rural programmes.

4. APPORTIONING AND PAYING RECURRENT COSTS

The BIADP has begun with a very encouraging level of performance in collecting charges, but we remained concerned that failure to dovetail actual recurrent costs in the Project with funds released by the Government would rapidly reduce both irrigation output and fee recovery. The BIADP initiated discussions with the Government on the allocation of a proportion of fees collected for its own recurrent costs, and since 1989 we have been permitted to use the money collected for the payment of salaries and general infrastructural maintenance (canals, pumpsets, etc). The balance of charges collected is banked by the Project, where 13.5% interest accrues. We are thus hopeful that fees collected will not only cover recurrent costs but make a substantial contribution to capital recovery (their original purpose).

We are also trying to develop an incentive scheme to benefit the field staff teams who secure the payment of all the charges in their locality, similar to schemes in the Philippines. Table 6 shows the incentive scheme we are trying to develop.

Table 6: PROPOSED INCENTIVE SCHEME FOR BIADP

Percentage of realisation of irrigation charge	Proposed percentage of incentive on the realised amount
100%	10%
90-99%	7%
80-89%	5%
70-79%	2%
60-69%	1%
100% of backlog	2%

As shown in Section 2, the BIADP has a multitude of responsibilities. If we apportion the overhead costs relating to the DTW programme, this works out at about Taka 1096 per DTW. In 1988/89, general repairs and maintenance came to around Taka 1559 per DTW. Thus our recurrent costs are around Taka 2655 per DTW. For brevity we cannot include all related calculations here, but these are available from the author.

The charges collected (Taka 13,224,144 from DTWs in 1988/89, as shown in Table 4), are not the only income for the Project. Miscellaneous earnings for the BIADP, such as the sale of fuel to farmers, generate in total around Taka 913,000. This gives a total of Taka 14,137,144 in 1988/89, or around Taka 4947 per DTW. Thus our system of using charges collected to pay recurrent costs is currently taking about 53% of charges paid. Our proposed incentive scheme will increase this proportion. However, this still enables us to repay some component of capital costs, especially with the interest paid on balances. The Project management is making every effort both in collecting charges and in efficiently controlling recurrent costs. Our hope for the future is that these recurrent costs will be kept within one third of the income of BIADP.

In conclusion it could be noted that a good level of realisation of irrigation charge per irrigation equipment is an indication of achievement of good command area per such equipment.

5. CONCLUSIONS

Given the data on the performance of the three agencies just discussed, let us return to the original point of discussion on the viability of any investment. In any economic enterprise, if an investment fails to recover funds for further reinvestment within an acceptable time limit then it will contribute to economic stagnation within the national economy.

The procedures of collecting the irrigation charge used by the BWDB and by BADC have differences which provide an excellent example. Who is responsible for the failures in collecting the irrigation charge or recovering the cost of machineries, and for such huge sums of public money remaining unrecovered? Revenue boards, banks or governmental policy? In relation to this affair, we quote Svendsen (1986), "poor collection rates are more a function of irrigation departments' unwillingness to collect than of farmers' unwillingness to pay". Now if we research the causes of unwillingness to collect the irrigation charge then we can understand weaknesses in the policy for its collection.

In the case of BWDB, the responsibility for collecting the irrigation charge lies with the Revenue Board, which has no connection with the management of irrigation, except that the farmers come to its office to make the payment.

The same thing has happened in the case of BADC and BRDB. Here it was agreed that the banks would collect the dues from the farmers, but the banks remain idle after disbursing loans to the farmers, as the banks are not disadvantaged by irrigation problems. So no direct relation develops between the farmers and the banks. It is seen that in both the cases those who collect money from the farmers are not engaged in providing an irrigation service. They are related to farmers for collecting money only; they neither act to ensure maximum utilisation of irrigated land nor take steps to increase production through bringing more land under irrigation.

As the farmers do not get any direct service either from the Revenue Office or the banks related to irrigation, the relation between the farmers and the revenue office or bank, i.e. payer and payee, deteriorates. In BIADP it was very important to make those who are operating irrigation services and working in related irrigation departments, from whom the farmers do get services, responsible for collecting money from the farmers. The responsible irrigation departments should have duties to make the farmers keen to increase the total area of irrigation under each irrigation facility, and to ensure maximum services to the fields of the farmers. But the BWDB, BRDB and BADC have failed due to complexity in procedures and management of irrigation.

The author believes the Barind Integrated Area Development Project is trying to overcome the above problems. The achieved target in irrigation charges under the Barind Project is satisfactory because here the Project authority is securing payment of the irrigation charge from the farmers directly, by guaranteeing the water supply and providing a good irrigation service. No other agency or organisation stands between them, so communication between the farmers and the field workers of the Project is direct. The concept makes the engineers and other professionals much more accountable to the clients they serve.

At the beginning of any irrigation season the Barind Project Authority know that the farmers will not pay an irrigation charge unless it ensures the irrigation water supply to the farmers; similarly the farmers feel that unless they pay the irrigation charge they will not get irrigation facilities and cannot make the Project personnel responsible for repairing the irrigation equipment. As a result everybody is clear about his duties and responsibilities. Key differences in the strategy of BIADP have been:

1. to make the farmers responsible for some of the operational costs such as routine maintenance, oil, fuel or electricity and the salaries of the group leader, operator, and drainman;

2. to set up a collection system with clear responsibilities for payment, including incentives and penalties;
3. to use the charges collected to cover salaries and maintenance needs so that farmers see immediate results for their payments, and employees are able to keep their systems running efficiently and are paid regularly and appropriately;
4. to have Project staff responsible for collection of charges rather than Revenue or bank representatives;
5. the BIADP charges are based on crops grown, not just time of year, and are thus more related to income generated. They may also act as an incentive to reduce cultivation of crops with heavy water requirements.

We know that the management of the irrigation development in the Project is not free from faults, but there is time to rectify the observed defects. To overcome any problems of irrigation management an Upazila Coordination Committee is constituted so that no so-called "water lord" can materialise. This committee is charged with the task of appointing a drainman, operator and group leader, etc, for efficient distribution of irrigation water in the demarcated command area under each tubewell. The maximum realisation of irrigation charges from each irrigation facility comes through planning for maximum utilisation from each facility. Thus it is possible to increase the revenue raised by increasing the area under irrigation, and that will make the total amount of irrigation charge adequate for future re-investment. All efforts are being exerted by the Project Management to keep the Project economically viable and stable, through realising the irrigation charges which will cover recurrent costs and a certain percentage of the capital costs, even if this percentage is only a part of the total investment.

The author wishes to thank Mary Tiffen for her help in initiating these ideas and investigations, and Linden Vincent for her editorial comments.

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APPENDIX A

REBATES AND PENALTIES

Regulations on water rates, rebates and penalties are covered by the provisions of the Bangladesh Irrigation Water Rate Ordinance. Rules 10 and 11 state:

10. Rebate: There shall be allowed a rebate of water rate at 20% of the rate payable if the payment is made within the period of 30 days from the date it becomes due. The rebate shall be reduced to 10% if the payment is made within a period of 45 days.
11. Interest for default: a. In the case of any default on the part of the assessee in making payment of water rate, the defaulter shall be liable to an interest at 15% of the water rate for payment after the due date including the grace period specified in rule 10; b. In case of any default for making payment of water rate of a particular crop season before the next same crop season commences, the assessing authority may, without previous notice, stop the supply or regulation of water in the land of the defaulter and no loss or compensation can be claimed for the damage, if any, of the crop that may remain standing in such field at the time of such stoppage.

These rules are being implemented in the field and it is decided to fix the 'due date' as 31 December of each year.

It means that any farmer who pays his irrigation charge by 31 January is eligible to get 20% rebate, and from 31 January to 15 February the farmers will get 10% rebate. If the farmer does not pay by 15 February then he will be charged an additional amount of 15% from the 16 February. For practical purposes this overdue charge is determined as an additional Taka 3/- per acre per month or fraction of a month.

APPENDIX B

DEED OF AGREEMENT

A Deed of Agreement is made between the Barind Integrated Area Development Project - BADC and the Barind Deep Tubewell Water Users' Association for each deep tubewell scheme. The Deed of Agreement is executed giving due consideration to the relevant rules notified by the Government from time to time. The language of the Deed is in Bengali. The relevant portion of it is translated into English and given below. The Deed is registered in the court to give it legal status. This agreement enables the beneficiaries to purchase the deep tubewell at the initial stage on cash payment, or through a bank's loan sanction provision, or if they continue on the irrigation charge basis, they can purchase through depreciated cost after the experience of a few years of operation. In fact, a wide range of options has been developed for farmers.

DEED OF AGREEMENT

1. Barind Integrated Area Development Project - BADC: 1st party.

and

2. Barind Deep Tubewell Water Users' Association: 2nd party.

1. We, the 2nd party hereto, agree to pay Taka 175,000 only towards the cost of a Deep Tubewell which has been sunk by the Authority of the Barind Integrated Area Development Project either in cash or subject to the receipt of Bank loan.

2. An amount of Taka 29.17 for each decimal of land would be collected from the owner of land within the minimum command area of the said deep tubewell of sixty acres as demarcated by the Barind Integrated Area Development Project - BADC and We

the second party will pay the cost of the Deep Tubewell having a capacity of discharge ranging from 1.2 to 2.0 cusec.

3. There will be no hindrance be placed by us, the 2nd party for constructing a drain (underground/surface channel) through any plot of land within the command area for distribution of irrigation water from the Deep Tubewell and it will not be accepted by any Court of law if there be any such objection raised therein.
4. Primarily there will be an arrangement of 360 shares in total and the owner of each 17.0 (seventeen) decimal (one half bigha) of land within the predetermined command area of the Deep Tubewell will be a shareholder entitled to purchase the Deep Tubewell⁶. There will be a provision for one share for those farmers who have land less than 17.0 (seventeen) decimal. Those farmers who have more than 17.0 decimal of land will get one share for each additional 17.0 decimal of land.
5. A shareholder will have right to cast his vote to determine the management and operation of the Deep Tubewell on the basis of number of shares he holds in the "Barind Deep Tubewell Water Users' Association", as follows:

A shareholder with two shares will have right to cast two votes in the case that the Users' Association have made cash purchase of a deep tubewell. But a share holder will have no right to cast more than one vote irrespective of the number of shares he holds when the the deep tubewell is operated under the irrigation charge basis.
6. The cost of oil, fuel, electricity, spare parts and the salary of the drainman, operator and the group leader for the operation of the deep tubewell will be borne by the owners of

⁶ 60 acres is 180 bignas, or 360 half bighas. One half bigha is 0.17 acres.

land under the command area of the deep tubewell in proportion to the land the owner possesses.

7. The above conditions No. 3, 4, 5 and 6 hereto stipulated are also applicable for ownership, management and operation of a deep tubewell purchased under a bank loan.
8. The "Barind Deep Tubewell Water Users' Association" has agreed and herein it is obligatory to them to pay the irrigation charge as fixed by the "Barind Integrated Area Development Authority" as per Irrigation Water Rate Ordinance 1983 (Ordinance No.31) as formulated by the Government of the People's Republic of Bangladesh and as per the rate fixed by the Gazette notification of the 18th January 1984 and notification of the 2nd February 1987. The above mentioned interim arrangement is made in order to use the deep tubewell just after its sinking, in case there be any delay in purchasing the deep tubewell either in cash or through a bank loan. Any later formulations of law or ordinance relevant to this matter will be obligatory to both the parties herein.
9. As per clause number 10 and 11 of the Notification of the Irrigation Water Rate Ordinance the irrigation charge is fixed as follows for tubewells with and without a constructed distribution system. The due date for payment of the irrigation charge is 31st December of each year, i.e. on expiry of 45 days from 31st December the beneficiaries are to pay Taka 3/- per acre as penalty. The farmers will cease to have the right to irrigation facilities in the next irrigation season if they are in continuous default.
10. It is obligatory for the Water User Association to follow any directive made by the Assistant Engineer/Executive Engineer of the Barind Project or canal officer of any other rank as per the Irrigation Act, 1876 as amended on the 31st May 1977 for the better operation and management of the irrigation system.

IRRIGATION CHARGE: WITHOUT WATER DISTRIBUTION SYSTEM

	Discharge of the well (cusec)	Minimum command area (acre)	Applicable irrigation charge (Taka)	Applicable irrigation charge. Up to 31 Jan incl. 20% rebate	Applicable irrigation charge. Up to 15 Feb incl. 10% rebate	Remarks
1	2	3	4	5	6	7
1.	1.20-1.50	45	10,135/-	8,100/-	9,121/-	at the
2.	1.51-1.75	54	12,150/-	9,720/-	10,935/-	rate of
3.	1.76-2.0	60	13,500/-	10,800/-	12,150/-	Tk. 225/- per acre

IRRIGATION CHARGE: WITH WATER DISTRIBUTION SYSTEM

1.	1.20-1.50	60	13,500/-	10,800/-	12,150/-	at the
2.	1.51-1.75	80	18,000/-	14,400/-	16,200/-	rate of
3.	1.76-2.00	100	22,500/-	18,000/-	20,250/-	Tk. 225/- per acre

Note: The irrigation charge is fixed by Government decision and in practice if the command Area of a deep tubewell increases then the amount of irrigation charge also increases in proportion.

11. The group leader can under no circumstances collect or receive a larger irrigation charge than that fixed by the Project Authority. If he does such an act then it will be punishable under the penal code. It is obligatory on the part of group leader to submit the balance sheet of income and expenditure as per the by-laws of the association at the end of each year.

12. If the cost of repair exceeds 33% of the deposited amount of the irrigation charge of a deep tubewell operated on the irrigation charge basis, then the Barind Deep Tubewell Water Users' Association must bear the extra cost of repair above 33%. The cost of spare parts supplied by the "Barind Integrated Area Development Project" will be considered within

the 33% of the amount of irrigation charge deposited. The second party will be held responsible for any theft of engine, pump, gearhead, motor or its spares from the installed and operating deep tubewell.

13. For those tubewells operated on the irrigation charge basis, it is obligatory on the second party to deposit the handle and spicer shaft of the deep tubewell to the relevant Assistant Engineer (Zonal Office) at the end of irrigation season. If the Water Users' Association fails to deposit the handle and spicer shaft in time then the second party will not raise any objections when the Authority of the Barind Project dislodges these accessories. The second party can receive the handle and spicer shaft from the office of the Assistant Engineer after paying the due irrigation charge before the next irrigation season starts.
14. If due to wrong operation or indiscriminate use of the deep tubewell the engine, pump, gearhead, motors, etc, are damaged beyond repair by the Barind Deep Tubewell Water Users' Association or its representative then 35% of the cost of such damaged parts or accessories will be borne by the Association.
15. The second party may pay the depreciated cost of a tubewell operated under an irrigation charge basis, when purchasing either in cash or through a bank loan.
16. If we, the second party deviate or fail in the above noted stipulations then the Authority of the Barind Project herein the first party or relevant authority has the right to take appropriate measures as provided in the PDR act (Public Demand Recovery Act) or has right to take measures under any relevant law in order to realise the cost of the deep tubewell or the irrigation charge.

17. Attached to this deed of agreement is the description of plots of land of the members of the "Barind Deep Tubewell Water Users' Association" described in 'Form A', and a copy of its by-laws. All these papers are considered to be the part of this deed of agreement. Subject to the above legally binding obligations, we the second party on behalf of the "Barind Deep Tubewell Water Users' Association" put our hand and seal on this Deed or agreement in order that Cooperative Society is registered.

Signature

1st party

2nd party

Witnesses

- 1.
- 2.
- 3.

APPENDIX C

IRRIGATION WATER RIGHT CARD

Dear Sir

You are one of the farmers of the Project of BIADP/ BADC as described before. You are a claimant for irrigation water throughout the year for various crops under different seasons as per rules and regulations described hereto. You are welcome as one of the model farmers, entitled to irrigation water from your Deep Tubewell sunk under BIADP, on condition of observing the rules and regulations listed below. The rules and regulations are subject to variation by the competent Authority.

Project Director
BIADP, Rajshahi

REGULATIONS

1. The irrigation charge fixed per bigha of land is to be deposited with the group leader at the beginning of each cropping season who shall give a receipt for the money.
2. The fixed yearly allowances for the group leader, tubewell driver and drainman shall be deposited once at the beginning of the Boro/Irri season along with irrigation charge to the group leader in return for a money receipt.
3. The cost for diesel, lubricant, grease, gear oil etc, shall be deposited with the group leader in advance.
4. The irrigation charge per bigha of land for the different seasons, the maintenance cost of the tubewell (diesel) lubricant, gear oil, etc, shall be paid at the rates as given below:

Rate per bigha	Rate fixed according to crops			
	Irri/ boro	Irri/ aus	T.Aman	Wheat potato others
Allowances for staff	67/-	-	-	-
Maintenance cost (diesel, lubricants, grease, etc)	298/-	170/-	80/-	98/-
Irrigation charge	35/-	30/-	30/-	20/-
Total amount fixed per bigha	400/-	200/-	90/-	188/-

Remarks: The above rates are established assuming the total command area under one DTW is 60 acres. The rate will be reduced or increased if the command area is increased or decreased.

5. It is compulsory to purchase diesel and lubricants from BADC's store in return for a money receipt.

6. BADC will not either maintain the engine and pump or guarantee the irrigation water until a minimum of Tk. 6000/- (six thousand) is deposited by the farmers from a tubewell as irrigation charges for one year. So at the beginning of each cropping season the irrigation charge is to be deposited. For non-payment of irrigation charge the spicer shaft of the engine will be disconnected.
7. The Government of the People's Republic of Bangladesh has paid a large subsidy to the cost of the deep tubewells in order to develop the Project area. Thus to keep the land under the Project idle is a crime. The main duty of the group leader is to supply water for irrigation after paying the necessary irrigation charge, the allowances and the maintenance cost. It is the right of all the farmers in the command area of a tubewell to use the water for irrigation. This tubewell is not anybody's personal property.
8. Every farmer under the command area of a tubewell should know that:
 - a. The allowance of a group leader is Tk. 1200/- per month, but he is not entitled to more than Tk. 5000/- per year. The group leader is elected by the votes of the farmers of the command area, and he may be removed from his charge if he is not re-elected;
 - b. The monthly allowance of a tubewell operator is Tk. 1000/- but will not exceed Tk. 4000/- per year. The tubewell operator will be appointed by the farmers of the command area from amongst their dependants. The educational qualification of a tubewell operator is to be a minimum of Class VIII;
 - c. The monthly allowance of a drainman is Tk. 700/- but will not exceed Tk. 3000/- per year. All these appointments are to be made by the Upazila Project Committee on the recommendations of farmers of the command area.

9. Those farmers who do not possess this card or who have not paid the dues or irrigation charge, will not be entitled to irrigation water from the DTW.
10. Please contact the officer of BIADP, BADC located at the Head Quarters of each upazila under the Project for more information.

DESCRIPTION OF YOUR LAND UNDER THE COMMAND AREA OF DTW

No.	Plot No.	Area of land in bigha	Remarks
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Total land in bigha. 3 bigha = 1 acre.
