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SOME ISSUES ON IRRIGATION DEVELOPMENT IN THE MONU RIVER PROJECT

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ABSTRACT : Although the Monu River Project (MRP) has been designed to irrigate about 11,500 ha, the irrigated area in 1990, according to the project officials was about 7,700 ha. A questionnaire survey of farmers, carried out in 1990, as a part of an improved management study of the MRP, revealed that, the actual irrigated area is only about 2,000 ha. The reasons behind these discrepancies in irrigated areas were extensively explored and it was observed that, the MRP can not possibly irrigate the designed command area, because, the available supply from the Monu river falls far short of the demand. With the presently available supply, the maximum irrigated area can only be about 5,200 ha, if the modern varieties of rice are grown. The survey also revealed that the MRP had minimal impact on the agricultural productivity of the area, as the cropping intensity increased from a pre-project 126% in 1971 to 150% in 1990. The farmers have shown little interest about irrigation as no formal water users' group exists and no field channel to convey water to the farmers' fields has been constructed. When asked about their constraints to agricultural productivity, the farmers considered credit as a much more important constraint than water, and only about 5% of the farmers expressed that water could increase their agricultural productivity. Thus, further irrigation development in the MRP should be reviewed in the context of these findings.

KEY WORDS : Irrigation development, agricultural development, Monu River Project.

INTRODUCTION

The large scale irrigation projects of Bangladesh have always been under criticism for their huge capital and recurring costs, and large gestation period. Moreover, time and cost overrun have also been endemic with these projects. Until 1985, the investments in these projects amounted to about 57% of the total investments in the water sector (MPO, 1986). But, all these projects together irrigate only about 9% of the total irrigated area of the country (BBS, 1990). Where as, 40% to 100% of the capital costs and 100% of the operation and maintenance costs of the small scale irrigation projects are borne by the farmers,

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water is still delivered free to the farmers in the large scale projects (Lindquist, 1989). In spite of these facts, evaluative studies on how the huge public investment in the major projects have succeeded in achieving their targets are very much lacking. Only 3 out of 18 major projects have been evaluated, but that also, for their physical achievements, and not for their efficiency or overall effectiveness (Quassem, 1988).

It is in these contexts that a study was taken up to assess the performances of six existing large scale irrigation projects of the country and to suggest measures for their improved management. One of the six projects selected for the study was the Monu River Project (MRP). This project was selected because the MRP is the only major project in the north-east region and the only major run-of-the-river type implemented project of the country. The Associated Consulting Engineers (ACE) carried out the feasibility study in 1971, the physical construction started in 1975 and the project was completed in 1983. In the following sections, the physical and the hydrologic settings of the project, the data collection methodology, the analyses and the findings of the study relevant to irrigation development are presented.

THE PROJECT SETTING

The Monu River Project, is a multipurpose (flood control, drainage and irrigation) project covering a gross area of about 22,700 ha and an irrigable area of 11,500 ha. The project has a 59 km long embankment around an area which was traditionally flooded every year to depths below 3.6 m by the Kushiyara river in the north and the Monu river in the west and the south. The foot of the Bhatera hills forms the eastern boundary of the project. The comparatively higher banks of the surrounding rivers and the foot of the Bhatera hills gradually slope down towards the north central part of the project into a natural depression called the Kawadighi Haor. A location map of the project area is shown in Figure 1.

The project has a 1,275 m^3/sec capacity barrage on Monu river near Moulvibazar town with a 15 m^3/sec design withdrawal for irrigation. A 107 Km long canal network has been constructed for water conveyance. Drainage is provided by a pumping plant of 34 m^3/sec capacity through a 16 km drainage canal network.

The soil of the area is composed of noncalcareous grey floodplain deposits of Monu and Kushiyara rivers and also sediments brought in from the Bhatera hills. The mean rainfall in the area is about 2,800 mm and 65% of this is concentrated in the months of May to September. The mean monthly minimum and maximum temperatures are 8.5°C in January and 33.4°C in April (Manalo, 1977). With the deep flooding during the monsoon, only broadcast Aus and Aman rice were grown during the pre-project condition. During the post-monsoon season local Boro was grown on the fringes of the Kawadighi Haor. The pre-project cropping intensity was 126% (ACE, 1971).

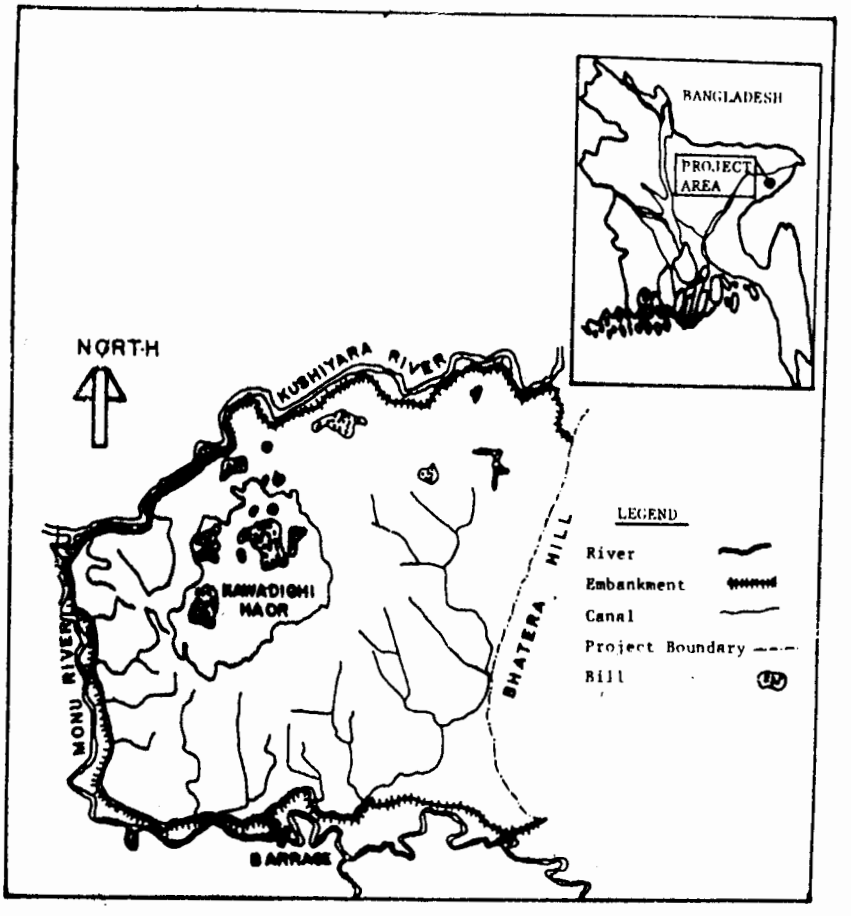

Fig 1. Location map of the Monu river Project

DATA COLLECTION

In order to assess the performance of the project in irrigation development, a questionnaire survey was conducted during the February-July period of 1990, on 200 farmers representing the four farmer groups (large, medium, small and landless) and the three canal reaches (head, middle and tail). A farmer possessing more than 3 ha of cultivable land was considered as large farmer, between 1 to 3 ha as medium farmer, between 1 to 0.02 ha as small farmer and less than 0.02 ha as landless farmer (BBS, 1990). The questionnaire was framed not only to assess the land use and agricultural productivity of the project, but also, to ascertain the farmers' perception on the extent and adequacy of the project in providing irrigation. In addition, the project officials were also requested to respond to a separate set of questionnaire on their own assessment about the performance of the project.

Interviews with the farmers and the project officials, conducted during the field visits also revealed many pertinent details about the performance of the project. The collected data were analysed by a statistical package (SPSS) using the IBM main frame computer. The details of the questionnaire, the sampling techniques and the findings have been presented in a separate report (IFCDR, 1991). The pertinent details relevant to the irrigation development in the MRP is presented here.

AGRICULTURAL IMPACT

From the questionnaire survey it was observed that, the MRP had very little impact on the agricultural productivity of the area. The farmers have not taken the full advantage of flood control and irrigation, and the cropping intensity has increased marginally, from about 126% in 1971 to about 150% in 1990. Rice has remained as the primary crop and is grown in about 60% of the cultivable land during the Aus and Aman seasons, and in about 32% of the cultivable land during the Boro season. The survey also revealed that, except rice, no other crop of significant acreage is grown in the project area. The shift from local varieties of rice to modern varieties has been one of the major objectives of the project, but the proliferation of the modern varieties has been very slow. The maximum area under modern varieties is during the Aus season and covers about 28% of the rice cropped land. The Aus and Aman rice are not irrigated and only about 32% of the Boro rice is irrigated. The area under different rice varieties during the different seasons are given in Table 1.

The MRP has also failed to boost up the yield of rice in area. Moreover, the farmers complained that because of decrease in soil fertility due to flood control, the productivity of both the local and modern varieties of rice has decreased from that of the pre-project condition (early 1980's), both during the Aus and the Aman seasons. The yields of rice during the different seasons are given in Table 2.

IRRIGATION DEVELOPMENT

A prime objective of the MRP was to bring under irrigation about 11,500 ha of the 19,300 ha of cultivable land. During the field visits made in May, 1990, the project officials reported that the irrigation coverage for that year was 7,640 ha. But, the field survey of farmers carried out at the same year showed that, the actual area irrigated by the farmers was about 32% of the Boro cultivated land, and amounted to about 1,980 ha. This area is only about 17% of the designed irrigation coverage of the MRP and about 26% of the area reported to be under irrigation by the project officials. Thus, there is a huge discrepancy in the amount of irrigated areas reported by the farmers and the project officials. But even then, the project officials' estimated area is also only about 66% of the designed capacity. The reasons behind this under utilization of the irrigation capacity were explored in detail and the relevant issues are discussed in the following sections.

Table 1. Modern variety and irrigated rice areas in the MRP during the different seasons.

Season	Total Area[1] (%)	Modern Variety[2] (%)	Irrigated[2] (%)
Aus	56	28	-
Aman	59	20	-
Boro	32	18	32
1: % of total cultivable land; 2: % of respective rice growing land			

Table 2. Yield of rice (t/ha) before and after the implementation of the MRP.

Season	Variety	Pre-project	Post-project	
			Irrigated	Non-irrigated
Aus	Local	2.88	-	2.37
	Modern	3.68	-	3.04
Aman	Local	2.91	-	2.42
	Modern	3.68	-	2.90
Boro	Local	2.51	2.77	2.22
	Modern	-	3.65	-

Water Availability

It has been mentioned earlier that the head regulator of the MRP was designed considering a withdrawal of 15 m^3/sec. It was assumed that the peak diversion requirement of 11.7 m^3/sec would occur in the month of March and the available supply from the Monu river at that time would be 13.7 m3/sec (ACE, 1971). In calculating the diversion requirement it was assumed that during the post-project condition, apart from rice other upland crops would also be irrigated. In fact, neither the farmers' survey nor the project officials reported of any irrigated upland crop in the project area. Moreover, the diversion requirement for rice was under estimated in the feasibility report, because, without considering the seepage and percolation loss (S & P) in the irrigation requirement, an overall efficiency of 60% was assumed. For irrigated rice, if the S & P is not considered in the irrigation requirement, then irrigation efficiency can be at most about 40%.

Analyses of available supply from the Monu river from 1965 to 1987 (as presented in Table 3) for the month or March showed that the 75% dependable flow in the month of March is only about 7 m^3/sec. It should be pointed out here that, the combined flow of the Monu and Dhalai rivers was used in the analyses. Th Dhalai river meets the Monu river before the barrage and there is no discharge measuring station after the confluence and before the barrage. It is not clear why the available

supply was over estimated in the feasibility report. Such over estimation is possible due to the use of short duration (few years) data in the frequency analysis. Moreover, it is alleged that the discharge of Monu river has decreased in the recent years due to upstream withdrawal in India. Analyses of the demand of the water for the month of March showed that, the diversion requirement would be about 15.7 m^3/sec, if the designed command area of 11,500 ha is irrigated. Even to irrigate the 7,640 ha reported to be under irrigation by the project officials, the available supply would have to be about 10.5 m^3/sec (a flow expected once in about five years). Thus, if only irrigated rice is grown in the MRP, as is grown now, then the designed command area of the MRP can never be irrigated with the available supply. Considering the presently available supply, the maximum rice grown area that can be irrigated is about 5,200 ha, and this should be the new irrigation target of the MRP. The details of the irrigation requirement calculations are given in Appendix A.

Momtazudding (1988), in a Similar analysis of the MRP also observed that, the available flow from the Monu river was much lower than the demand for most of the irrigation season. During March, with an assumed overall irrigation efficiency of 38%, the available supply fell short of the demand by about 60%.

Table 3. Combined discharges (m^3/sec) of the Monu and the Dhalai rivers in March during 1965 - 87 period.

Year	Manu	Dhalai	Combined	Probability of Exceedence (%)
1965	10.40	1.98	12.38	9.5
1966	5.94	1.73	7.67	61.9
1967	9.25	0.06	9.31	23.8
1968	6.24	2.18	8.42	42.9
1969	6.20	2.43	8.63	38.1
1970	3.93	1.08	5.01	95.2
1971	4.47	1.53	6.00	81.0
1972	-	-	-*	-
1973	3.40	1.98	5.38	85.7
1974	6.51	1.36	7.87	52.4
1975	3.42	1.67	5.09	90.5
1976	6.25	1.44	7.69	57.1
1977	6.37	2.26	8.63	33.3
1978	5.89	3.31	9.20	20.6
1979	4.53	2.94	7.47	66.6
1980	6.06	1.02	7.08	71.5
1981	7.81	-	-*	-
1982	5.59	-	-*	-
1983	11.60	1.82	13.42	4.8
1984	5.97	2.13	8.10	57.6
1985	8.29	2.55	10.84	19.0
1986	5.00	1.81	6.81	76.2
1987	8.43	3.24	11.67	14.3

* : No data available
Source : BWDB Surface Water Hydrology Directorate

Lack of Field Channels

Although the project authority of the MRP had constructed the main, secondary and tertiary canals, the field channels to convey water from the turnout of the tertiary canal (in few cases from secondary and main canal) were not constructed and were left out for the farmers to construct and maintain. According to the project authority, the farmers in order to be irrigated by a field channel running from a turnout should organize and form water user's associations and construct the field channels and also take control over the turnout gate operation. No such association exists in the MRP and as such no field channel has been constructed. The issue of construction of the field channels by the farmers was investigated in case of other large scale projects, and it was observed that a similar situation also existed in the other projects (IFCDR, 1991). It has been a government policy decision that the farmers should construct the field channels themselves in order to avail the irrigation water.

There are a number of reasons why the farmers have not united to form cooperatives to build the field channels. The MRP was planned, designed and implemented without the farmers' participation. The farmers are now of the opinion that, since the government has made such a huge investment for constructing the project, the government would sooner or later construct the field channels also. Hence, in the minds of the farmers there is a definite lack of belongingness to the project. Moreover, the farmers are not willing to sacrifice their lands for the construction of the field channels without any compensation from the government. Such compensations have been paid in the past for the land acquired from the farmers for construction of the main, secondary and tertiary canals.

As it appears now, the field channels would not be constructed by the project and the farmers will also not come forward to construct them. Considering the huge public investments already made in the project along with the ever increasing recurring costs of O & M being borne by the government, this dismal situation can not be allowed to continue. But, the perception of the farmers about the importance of irrigation on further agricultural development of the project, has made the future of irrigation expansion in the MRP very bleak.

Irrigation and Agricultural Development : Farmers' Perspective

Because of the minimal developments in agriculture and the under utilization of the available irrigation capacity of the MRP in the past, the farmers of the project were asked during the questionnaire survey about the constraints to increased agricultural productivity. It was very

surprising to note from the survey results that, the farmers of the project area did not consider lack of water (irrigation) as an important constraint towards increased agricultural productivity of the project. As shown in Table 4, the lack of capital (credit) was considered as the most important constraint (expressed on average by 94% of the farmers), and lack of water (irrigation) was the least important (expressed on average by only 5% of the farmers).

The very low priority attached to irrigation by the farmers means that, even the construction of the field channels by the project authority in future, may not lead to any further irrigation development in the MRP. A close look at Table 4 shows that, except irrigation all the other constraints mentioned by the farmers are directly or indirectly related to capital (credit). This means that, further irrigation and agricultural development in the MRP may be possible, only if irrigation comes as an integral part of an input package, along with capital in the form of credit, institutional development, extension service, fertilizer, pesticides and marketing facilities.

Table 4. Farmers' response on constraints to increased agricultural productivity in the MRP (expressed as %).

Constraint	Farmer Group				Average
	Landless	Small	Medium	Large	
1. Lack of capital	100	99	96	100	98
2. Lack of land	81	62	32	19	54
3. Lack of draft power and equipment	59	42	28	25	40
4. Labour shortage	38	36	25	19	31
5. Lack of water	3	6	4	6	5

CONCLUSIONS

The future command area of the Monu River Project should be about 5,200 ha and not 11,500 ha as was estimated in the feasibility report. But, even if this new command area is considered, only about 40% of it is presently irrigated. The project had very little impact on increasing the agricultural productivity of the area. The participation of the farmers in the irrigation development process was also minimal. Prospects of further irrigation development in the project is very bleak because of the low priority attached to irrigation by the farmers. Hence, no further expansion of only irrigation facilities, should be planned in the Monu River Project, unless irrigation can be provided as an integral part of an input package comprising of credit, institutional development and extension.

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APPENDIX - A

Irrigation water requirement of rice in the MRP.

Consumptive use of Boro rice in March for Sylhet :

CU = PET * K_c = 4.71 * 1.0 = 4.71 mm/day; from MPO (1984). Irrigation requirement : IR = CU + Seepage & Percolation - Rainfall

Seepage & Percolation = 3 mm/day; from CKC (1977).

Rainfall (80% dependable) = 20 mm in March; from Karim and Akhand (1982).

IR = 4.71 * 31 + 3 * 31 - 20 = 219 mm for March.

With 60% efficiency (CKC, 1977), the area that can be irrigated with the available supply of 7 m^3/sec:

(7 * 1000 * 3600 * 24 * 31 * 0.6) /(219 * 10000) = 51367ha.

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