

Role of Irrigation towards Achieving Food Self-Sufficiency in Bangladesh

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INTRODUCTION

Bangladesh is a land-scarce country with a high population growth, resulting in an adverse land-man ratio of 0.06 ha at present. Land resources are being squeezed leading to decline in the net cropped area; making it difficult to match the needs of increasing population. Attaining food self-sufficiency and its sustainability is thus a big issue for the agricultural development planners and policy makers of the country.

Of the total land area of 12.31 m ha at present, 7.85 m ha is under agriculture, and crop agriculture alone constitutes over 80 percent. Further, land degradation of various types are active and threatening the agricultural productivity in the country. In Bangladesh, the primary cereal crop, rice, is grown in three crop seasons, while wheat is grown during rabi season. Pulses and oilseed crops are also sown during rabi. Maize is cultivated both in rabi and kharif on a limited scale, while some minor small grain crops are sown in the rabi season. By crop growing season, the kharif season crops are prone to risk of early/late flood, drought and hailstorms. The rabi season is free from such risks, but needs investment in the form of irrigation development for cropping.

FACTS ON IRRIGATION

Present irrigation coverage is over 4.0 m ha and the target by the end of fifth five year plan is 4.86 m ha of which surface water irrigation is 1.338 m ha and the groundwater irrigation, 3.522 m ha. Total area that can be brought under irrigation is 7.56 m ha. However, the potential area that can be brought under irrigation through conjunctive use of surface (28%) and groundwater (72%) is 6.90 m ha. Since 1996/97, annual growth of irrigated area was 4.2 percent on average. Growth rate was higher for groundwater irrigation than for surface water irrigation. Irrigated area of the last 5 years is shown in table 1.

IRRIGATION AND FOOD PRODUCTION

Enhancement of land productivity is the only answer to meet the food and fiber requirement of the country. Currently, over 80 percent of the irrigated land is under rice cultivation with

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Table 1. Irrigated area by mode of irrigation (ha).

Method						
Year	LLP	STW	DTW	FCD/1	Others	Total
1994-95	656912	1543405	668120	159117	402227	3429781
1995-96	677804	1645571	677048	153032	400443	3553898
1996-97	695551	1769454	677974	155986	395084	3694050
1997-98	706594	1936437	674494	162664	371491	3851680
1998-99	715385	2078138	661943	167206	364211	3986883

Source: Statistical yearbook of Bangladesh, BBS 1999.

an irrigation water use efficiency of only 20–30 percent. By area, kharif-II rice (Aman) covers the highest hectareage, though the total production is not much over Boro rice production, although Boro rice area is nearly half of that of Aman. One main reason is that, Boro coverage is over 94 percent by modern varieties (MV) with primary irrigation, while for Aman (T.Aman)—which is mainly rainfed—coverage is only approximately 40 percent. Investment in MV Boro is rewarding, with a highest benefit-cost ratio of 1.47 compared to 1.30 for MV Aus. This implies that, much remains to be done to expand the irrigation facility and to go for MV Boro instead of other two seasons' rice. This statement however should not be taken as a recommendation for growing rice, this is rather to emphasize on the importance and role of irrigation for increasing rice production and thus self-sufficiency.

This is because crops other than rice have much higher benefit-cost ratio, and thus greater comparative advantage; e.g., sugarcane 2.06, mustard 1.55, pulses 1.68, maize

Table 2. Production targets of important crops during the Fifth Five Year Plan (1997-2002) (area in million hectares, production in million tons unless otherwise stated).

Crops	1996/97 (Bench mark)		Target during 2001/2002	
	Area	Production	Area	Production
Rice	10.398	18.823	10.110	23.400
Wheat	0.708	1.450	0.700	1.600
Subtotal	11.106	20.273	10.810	25.000
Other coarse grain	0.100	0.120	0.120	0.120
Total food grain	11.206	20.393	10.930	25.120
Potato	0.150	2.400	0.200	2.431
Sweet potato	0.050	0.500	0.078	0.660
Oilseeds	0.570	0.580	0.700	0.760
Pulses	0.700	0.600	0.778	0.850
Spices	0.170	0.380	0.220	0.500
Vegetables	0.232	2.320	0.300	1.815
Fruits	0.190	2.140	0.260	3.540
Jute (million bales)	0.510	4.870	0.570	7.242
Cotton (million bales)	0.042	0.090	0.105	0.260
Sugarcane	0.175	10.340	0.182	12.371
Tea (million kg)	0.048	54.00	0.050	60.00
Tobacco	0.034	0.035	0.034	0.036

Source: Fifth Five Year Plan document, GOB.

1.55, banana 4.31, onion 2.61. Modern varieties of wheat have the benefit-cost ratio of 1.20, which is lower than all MV rice crops (BRRRI 2001). Vertical expansion, cultivation of low water demanding crops and higher water use efficiency would facilitate to release more lands for non-rice crops resulting in greater returns to the farmers. Production targets of major crops shown in table 2 also justify this argument.

Table 3 shows the area irrigated under different crops for the years 1994-1999.

As of 1999, the BWDB's FCD/1 projects provide irrigation coverage to 1.35 m ha, drainage to 4.22 m ha and flood protection to 3.45 m ha. These, together with the minor irrigation have helped to attain the present self-sufficiency in food grain production in Bangladesh.

Table 3: Irrigated area by crop in Bangladesh (ha).

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
Rice : Aus	124,492	114,887	111,886	105,263	95,951
Aman	321,457	295,682	304,521	338,866	291,903
Boro	2,392,874	2,531,140	2,603,247	2,681,781	2,868,826
Rice total	2,838,823	2,941,709	3,019,654	3,125,911	3,256,680
Wheat	283,147	300,068	320,565	345,757	361,943
Other Cereals	3,840	3,678	4,009	2,834	3,644
Pulses	3,294	1,632	3,159	3,387	3,644
Oilseeds	17,713	18,934	22,002	24,696	29,555
Potato	95,951	100,625	108,612	113,398	121,700
Vegetables	89,117	88,380	93,209	100,034	104,453
Sugarcane	14,058	13,960	15,419	15,910	19,028
Cotton	7,719	8,936	9,215	9,281	6,883
Others	76,120	75,976	98,207	110,471	79,352
Grand total	3,429,781	3,553,898	3,694,050	3,851,680	3,986,883

Source: Statistical yearbook of Bangladesh, BBS 1999.

SUSTAINABILITY OF FOOD SELF-SUFFICIENCY

Recent estimates reveal that, approximately 220 ha of land are going out of agriculture every day. Against this backdrop, and while the yield of major crops are either stagnated or declining, it is imperative that much efforts are given on relatively low risk high yielding Boro rice (average yield of which is nearly double that of T. Aman and almost three times that of Aus rice) cultivation. T. Aman has the highest coverage and is advantageous as it is mostly rainfed and requires little supplementary irrigation. Wheat area though expanding until now occupies only approximately 7-8 percent of the total cereal production. Literally, though food means combination of cereals plus other crop products, by culture and practice, rice is the major food item and the self-sufficiency in food is related to rice.

At present, over 80 percent of the irrigated area is devoted to Boro rice, which has proven to be remunerative. To attain security in food and nutrition, crops other than cereals, animal and vegetable production should be given importance. Irrigation area development thus

shall have to be reoriented in order to harness the benefit of non-rice crops as well. For food self-sufficiency, increased rice production needs to be ensured but not at the cost of other crops. Using the available technology and land suitability information on irrigated crops, current level of production of cereals and non-cereals can be doubled. This will however require pragmatic policy interventions and their field level implementations.