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FOODGRAIN PRODUCTION IN BANGLADESH: THE POTENTIAL FOR WHEAT

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ABSTRACT

Bangladesh has been suffering from a chronic foodgrain shortage. Consequently she has been importing 1.4 to 2.7 million tons of foodgrain annually, 90 per cent of which is wheat. The cost of foodgrain import consumes about 25 to 35 per cent of available foreign assistance. To make the country self-sufficient in foodgrain production the Bangladesh Government put emphasis on the introduction of high yielding varieties (HYV) of rice. But the record of success of HYV rice has been limited due to technical and socio-economic constraints. Since the inputs and water requirements of HYV wheat are lower than that of HYV rice, this paper made efforts to explore the potential of wheat production keeping in view, however, of the limitations in the long term. It also suggested to direct research activities to develop drought resistant food crops.

I. INTRODUCTION

Bangladesh has been suffering from chronic food shortage since the late sixties. The situation has aggravated due to increasing demand for foodgrain from a rising population. The Bangladesh Government planned to attain self-sufficiency in foodgrain supply by the end of the First Five Year Plan (GOB 1973b). However, the rate of progress has been restricted by resource and socio-economic constraints. Consequently, there has been food deficit ranging from 1.4 to 2.7 million tons every year. This deficit has been met by imports, 90 per cent of which is wheat. Thus although wheat comprises 1 to 2 per cent of the total domestic foodgrain production, it comprises as high as 22 per cent of the total foodgrain consumption in Bangladesh. Wheat import takes away 25-35 per cent of annual available foreign assistance. If foodgrain, particularly wheat import could be reduced, foreign assistance could be diverted to other activities or investments for overall development of the country. Domestic production of wheat might provide such an opportunity. In certain parts of the country rate of adoption of

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HYV rice has been very slow. In such areas production of wheat instead of rice may be a more worthwhile development strategy to ease the country's food problem. In areas where HYV rice coverage has been satisfactory, wheat may compete favourably in both technical and economic terms, and thus may add a new dimension to the possible strategy for solving the food problem.

The potential and constraints of wheat production have been examined in this paper. In section II the level of foodgrain production is reviewed along with a brief description of constraints to HYV rice production and the consequent import of wheat. The potential for wheat production is examined in section III in the light of empirical evidence on wheat production in Bangladesh. An effort is made in section IV to assess the potentiality of wheat production in Bangladesh in the long run and finally the implications are summarized in section V.

II. RECENT STRATEGY FOR FOOD SELF-SUFFICIENCY : ACHIEVEMENTS AND CONSTRAINTS

The Recent Production Record

Total food requirements during the FFYP (1973-74 to 1977-78) was estimated on the basis of 15·5 ounces of foodgrain per capita per day.[1] According to USAID and UN estimates, this level of food availability was achieved or almost achieved during most years of the 1960s (Table 1). These levels were not generally reached during the

TABLE 1 PER CAPITA AVAILABILITY OF FOODGRAIN IN BANGLADESH (OUNCES PER DAY) AS ESTIMATED BY DIFFERENT SOURCES

Year	BIDS	USAID	UN
1960-61	13·6	16·4	16·0
1961-62	13·3	15·3	15·6
1962-63	12·7	14·4	15·2
1963-64	15·6	16·6	16·2
1964-65	14·1	15·1	15·7
1965-66	13·7	15·4	15·6
1966-67	13·2	13·8	14·2
1967-68	14·2	15·4	15·3
1968-69	13·8	15·3	15·6
1969-70	14·3	16·2	16·4
Decade Weighted Average	13·9	15·4	15·6

Source : Chen and Chowdhury 1975.

1950s and in the period 1955-56 to 1959-60 it fell drastically as the actual food gap reached critical proportions (Table 2).

There is evidence that during the seventies food availability in Bangladesh has fluctuated from year to year, per capita availability in most years being below 15·5 ounces as reflected in the actual gap figures but the worst years were not as bad as the fifties. In a situation where food availability is low and fluctuating a question may be raised—how has this situation come about ?

TABLE 2 YEARLY PRODUCTION AND ACTUAL FOOD GAP (RICE AND WHEAT) IN BANGLADESH

Year	Population (million)	Foodgrain requirement (m. tons)	Target net production (m. tons)	Actual net production[a] (m.tons)	Target food gap[b] (m. tons)	Actual food gap (m. tons)
1955-56/ 1959-60[c]	51.4	8.11	n.a.	5.80	n.a.	2.31
1960-61/ 1964-65[c]	59.1	9.33	n.a.	7.95	n.a.	1.38
1965-66/ 1969-70[c]	68.5	10.81	n.a.	8.98	n.a.	1.83
1970/71	72.3	11.41	n.a.	9.97	n.a.	1.44
1971/72	72.4	11.42	n.a.	8.90	n.a.	2.52
1972/73	74.4	11.74	12.00	9.02	(-)0.26	2.72
1973/74	76.2	12.02	11.30	10.61	0.72	1.41
1974/75	78.2	12.34	13.13	10.11	(-) 0.79	2.23
1975/76	80.4	12.70	12.86	11.50	(-) 0.16	1.20
1976/77	82.7	13.05	13.04	10.65	0.01	2.40
1977/78	85.0	13.42	13.25	12.00	0.17	1.42

a. Gross production less 10% for seed, feed and wastage.
b. (-) figure indicates targeted surplus. c. Five year average.
Source : Alamgir and Berlage 1973 ; G.O.B. 1973b.

The answer at the most general level is clear. Net food production in Bangladesh has failed to keep pace with the growing food requirements of a rapidly growing population (Table 2). Furthermore the net production was fluctuating from year to year. The net production in 1976/77 was almost equal to that of 1973/74 and it was only 7 per cent higher than the 1970/71 net production level. Only in the year 1977/78 the level of net production was quite high - still it was 11 per cent below the estimated level of food requirement (Table 3).

The dependence of Bangladesh agriculture on the vagaries of nature is one of the most important reasons why output fluctuates from year to year. To attain self-sufficiency in food grain production during the FFYP, the Government of Bangladesh put emphasis on introducing HYV rice and raising multiple crops by bringing more land under mechanical irrigation during less hazardous or risky winter season. It was planned that by 1977-78, the terminal year, the total area under HYV rice would be 6.15 million acres producing 6.73 million tons of output. As against this, roughly 3.0 million acres or nearly 16 per cent of the net cultivated acreage is currently under irrigation.

Consequently nature still plays a dominant role in crop production. If the weather is favourable, there is the prospect of a good harvest. During a year of unfavourable weather, on the other hand, there is the risk of grain shortage.

Foodgrain Deficit and the Amount of Wheat Import

In the earlier section it was observed that despite recent efforts to increase foodgrain production to meet the country's food requirement the outcome was not satisfactory. Due to increase in population there were large deficits in recent years. To avoid mass starvation the growing gap between food production and requirement has been met increasingly by imports (Table 4). During the fifties and early sixties, imports of food typically were less than 10 per cent of net available foodgrain. During the seventies food imports have constituted between 7 and 24 per cent of net available foodgrain (Table 3).

During years of low domestic production and increased imports to off-set this low production, the increased imports were not always sufficient to meet the estimated food requirements. Despite increased imports net food availability generally fell short of total requirements when net domestic production fell (Table 3).

Recently most foodgrain imports have been wheat. The contrast with domestic production is marked. Domestic production of wheat is usually less than 1 or 2

TABLE 3 IMPORT OF FOODGRAIN AND SHARE OF TOTAL IMPORTS IN NET AVAILABLE FOODGRAIN

Year	Foodgap (mil. tons)	Wheat imports (mil. tons)	Rice imports mil. tons)	Total imports (mil. tons)	Total imports as % of net available foodgrain
1955-56/ 1959-60a	2.31	0.120	0.282	0.402	7
1960-61/ 1964-65a	1.38	0.417	0.129	0.546	6
1965-66/ 1969-70a	1.83	0.77	0.370	1.140	12
1970/71	1.44	0.80	0.460	1.26	11
1971/72	2.53	1.02	0.670	1.69	16
1972/73	2.72	2.43	0.310	2.74	24
1973/74	1.41	1.58	0.060	1.64	14
1974-75	2.23	1.90	0.360	2.26	20
1975-76	1.20	1.05	0.370	1.42	11
1976-77	2.40	0.60	0.210	0.81	7
1977-78	1.42	1.31	0.330	1.64	13

a. Figures are the annual average over five years.
Sources : GOB 1978a ; Alamgir and Berlage 1973.

per cent of grain production, but its consumption accounted for as high as 22 per cent of net available foodgrain for consumption (Table 4). Just as there has been a strong trend towards increased food imports, there has been a trend towards an increasing volume of wheat imports.

There are a number of reasons why wheat rather than rice is the predominant food import. First, Bangladesh obtains wheat as grants or concessional loan under food-aid, particularly from the United States. Secondly, most of the grain-surplus countries are wheat exporters. Thirdly, wheat is much cheaper than rice in the international markets.

TABLE 4 IMPORTS AND DOMESTIC PRODUCTION OF WHEAT AND THEIR SHARE IN NET AVAILABLE GRAIN AND WHEAT

Year	: Wheat import : as % of : total import :	: Total : wheat as : % of total : available : grain	: Net : domestic : production : of wheat : (mil. tons)	: Wheat : production : as % of net : available : wheat
1955-56/ 1959-60a	29.85	2.44	0.022	15
1960-61/ 1964-65a	76.37	5.50	0.33	8
1965-66/ 1969-70a	67.54	8.77	0.062	8
1970-71	63.49	8.18	0.099	11
1971-72	60.35	10.71	0.102	4
1972-73	88.68	22.15	0.081	6
1973-74	96.34	13.99	0.098	5
1974-75	84.04	17.34	0.103	16
1975-76	73.94	9.89	0.193	14
1976-77	74.07	3.98	0.093	19
1977-78	79.87	12.43	0.315	14

a. Figures are the annual average calculated over five years.
Source : Alamgir and Berlage 1973 ; GOB 1973a ; GOB 1975.

The increased food imports have been a heavy drain on foreign exchange (Table 5). It appears from Table 5 that there has been balance of payments deficit every year. It also appears that food imports consumed 25 to 35 per cent of the total foreign assistance to Bangladesh during the period 1971-72 to 1975-76. Only in the year 1976-77 was the figure relatively low with 18·5 per cent of the total foreign aid.

Thus it appears that although the current production of wheat is small, its impact on the balance of payments situation means that increased domestic production of this

crop may play a crucial role in the Bangladesh economy in diverting resources for development by reducing the country's dependence on imports.

Constraints and Potential of Rice Production

The Bangladesh agriculture sector enjoys relatively low investment. Conventionally **the allocation** in the agriculture sector also includes the allocations for Rural Development, Flood Control and Irrigation. Furthermore expenses incurred as food and fertilizer subsidies are also included as expenses under agriculture sector.

TABLE 5 TREND OF FOREIGN TRADE AND FOREIGN AID BREAK-DOWN IN BANGLADESH

A. Trend of Foreign Trade (Million dollars)

Year	Export	Import	Balance
1969-70	510	640	- 130
1973-74	372	915	- 543
1974-75	383	1276	- 893
1975-76	381	1363	- 982
1976-77	413	960	- 547

B. Yearly Foreign Aid Break-down by Category (per cent)

Year	Food	Project	Non-project Aid	Cash Grants	Total
1971-72	25·0	31·8	43·2	-	100
1972-73	28·9	35·1	36·0	-	100
1973-74	27·0	39·5	33·5	-	100
1974-75	34·9	31·8	32·2	-	100
1975-76	26·4	35·4	38·2	-	100
1976-77	18·5	36·9	36·0	8·6	100

Source : GOB 1978b.

A close examination of the agriculture sector expenditure, therefore, raises question about the seriousness of commitment to agricultural development, because only a small portion of the development expenditure of this sector is likely to have had direct impact on production (Clay 1978, p. 120). Indeed the sluggish performance of agriculture in recent years can be partly explained by the relatively low level of public investment in agriculture and its slow growth (Hossain 1980, p.23).

Cultivation of HYV rice demands irrigation facilities to bring more areas under controlled and regulated water supply. Uptil now it has been possible to bring not more than 16 per cent of the net cultivated acreage under irrigation. Moreover, the already available limited facilities are operating far below design capacity. Capacity utilisation of deep Tubewells (DTW) is below 30 per cent. The low lift pumps (LLP) and shallow tubewells (STW) are doing a little better ; still their capacity utilisation does not seem to be higher than 50 per cent (Alam 1976).

There are regional differences in the performance of HYV rice. Although the modern rice technology programme has attained limited success, in some areas the HYVs of rice have been found to perform much better. In Chittagong district about 50 per cent of the cereal crop land has been brought under HYV rice by 1977/78, and a growth rate of 4.1 per cent per annum was attained over the period 1965-78. In Noakhali and Mymensingh districts also the growth in cereal production outpaced the growth of population. On the other hand, in the districts of Rajshahi and Khulna Divisions, cereal production has grown at a much lower rate.[2] The high incidence of share tenancy and a high degree of concentration of land in these districts are major socio-economic constraints to increase area under modern irrigation, the use of chemical fertilizers and spreading of HYV rice (Hossain 1980, p. 38).

Cultivation of HYV rice created income inequality in the impoverished rural economy.[3] The inputs of the new technology are highly subsidised, and these are enjoyed by the owners of land and the participants in rural development programmes, not the cultivators and labourers. It is also apprehended that the profit margins obtained from growing HYV rice by surplus farmers might lead to the adoption of labour substituting technology in a society where large number of agricultural labourers are landless (Stepanek 1979).

There is an element of risk in growing HYV rice because of climatic factors such as flood, drought and uncertain rainfall. Therefore, even if modern inputs are made available it is unlikely that the cropping intensity will equally increase in all parts of Bangladesh. Furthermore, the HYVs of rice are liable to a greater incidence of pests

and plant diseases (Islam 1977). Added to this is the post-harvest problem of threshing and drying in the rainy months of June-July (Harris 1978).

HYVs of rice are very environment specific ; hence location specific. To date all the HYV rice used in Bangladesh have been dwarf transplanted varieties unsuitable for flood prone areas. Also HYV rice cannot be grown without water.

Degeneration of seed also seems to be a problem. The yield rate of HYV rice either declined or remained static over the years. To get maximum yield perhaps newly developed HYV seeds are required. Since the existing irrigation facilities are operating much below capacity, without ensuring capacity utilisation of existing facilities further expansion of capacity may not be desirable simply because it will mean waste of scarce resources and higher costs.

There may be physical limitation to further expansion of irrigated area. Low-lift pumps (LLP) using surface water has already reached the saturation level. The only possible area of expansion is the ground water lifting system. The potential for expansion in this case is not fully known but does seem to be limited. Even if this limited potential is to be harnessed it will involve heavy investment.

Farmers are generally given incentive to grow HYV rice in terms of subsidised services and inputs. The expansion of area under HYV, therefore, largely depends on the allocation of funds to these activities by the Government. In a recent study it has been calculated that if a 5 per cent growth rate in foodgrain production is to be maintained during 1980-85, a total sum of Taka 8563 million will have to be allocated from the Government fund (at constant 1977/78 cost) for the year 1985 alone. This implies a rate of growth in investment of about 11 per cent per annum, which is a high rate compared to past rate of growth of investment in agriculture (Hossain 1980, p. 29).

One possible approach to get out of this situation is to export some rice for which price is higher and import large amount of wheat which is cheaper in the international market. The scope of this alternative is limited by the extent of the market. Most food defict countries like Bangladesh try to import wheat rather than rice.

The viable solution to this problem seems to be the domestic production of wheat. Although wheat has been grown in this country for many years as a minor crop, it is only recently that increased emphasis has been placed on this crop. The potential for expanding production of wheat is examined in the next section.

III. THE POTENTIAL FOR WHEAT

Agronomic Potential for Production

Wheat has long been considered as a minor crop in Bangladesh. In the face of chronic food gap and increased imports, however, its production has increased in recent years. The total acreage and production of wheat in 1968/ 69 were 2.90 lakh acres and 92 thousand tons respectively. In 1977/78, the figures were respectively 4.50 lakh acres and 3.51 lakh tons (Table 6). Total production exceeded 4.80 lakh tons in 1978/79 and the estimated production for wheat in 1979/80 is 12.0 lakh tons. The target of wheat production for 1980/81 has been initially fixed at 15 lakh tons.

The increase in total production has mainly come from two sources ; yield and acreage. Between 1968 and 1978 the average total yield increased by 146 per cent of which 91 per cent of productivity growth has been contributed by yield increase alone and the remainder 55 per cent by acreage increase. Per acre yield has increased owing mainly to the introduction of HYV wheat (Table 6). Of the total wheat acreage, HYV wheat has increased from 7 per cent in 1968/69 to 89 per cent in 1977/78. The share of HYV wheat in total production, on the other hand, has increased from 13 per cent in 1968/69 to 96 per cent in 1977/78.

The agronomic potential for wheat production may be seen in Table 7. The area classified as suitable for growing wheat in Bangladesh amounts to 66 lakh acres and another 62 lakh acres of land has been classified as probably suitable for wheat production subject to agronomic trial[4]. Thus the prospects of increasing acreage under wheat cultivation seems to be good in the foreseeable future. However, wheat will be net crop for that part of the 'suitable' land which currently remains fallow during winter and an estimated 3 million acres of such land is available. For the remaining 'suitable' land, wheat will replace the crops now being produced in winter. The crops likely to be replaced are pulses, sugarcane, oil seeds, potato and rice.

TABLE 6 AREA AND PRODUCTION OF WHEAT IN BANGLADESH

Year	Area (000 acres)			Production (000 tons)			Average yield/ acre (lbs)			HYV as % of total wheat acreage	HYV wheat as % of total wheat production
	LV	HYV	Total	LV	HYV	Total	LV	HYV	Total		
1968-69	269	21	290	80	12	92	666	1280	710	7.24	13.04
1969-70	274	23	297	90	13	103	735	1266	777	7.74	12.62
1970-71	278	33	311	91	19	110	732	1289	793	10.61	17.27
1971-72	278	37	315	93	20	113	749	1211	804	11.75	17.61
1972-73	243	53	296	66	24	90	608	1014	681	16.82	26.66
1973-74	233	72	305	68	41	109	654	1215	800	23.60	37.61
1974-75	236	82	318	68	47	115	645	1283	810	25.78	40.86
1975-76	153	218	371	45	170	215	658	1747	1298	58.76	79.06
1976-77	107	288	395	30	226	256	628	1757	1451	72.91	88.28
1977-78	50	400	450	15	336	351	672	1882	1747	88.88	95.72
1978-79	n.a.	n.a.	n.a.	n.a.	n.a.	480[a]	n.a.	n.a.	n.a.	n.a.	n.a.
1979-80	n.a.	n.a.	n.a.	n.a.	n.a.	1200[a]	n.a.	n.a.	n.a.	n.a.	n.a.

a. Estimated

Sources : GOB 1978[a] ; Clay 1978 ; GOB 1980.

TABLE 7 AREA SUITABLE FOR WHEAT PRODUCTION IN BANGLADESH

Region	Area suitable for Wheat (Lakh acres)	Additional suitable area subject to agronomic trial (Lakh acres)
1. North-West (N.W.)	25.84	23.48
2. Central (C)	18.95	14.66
3. South-West (S.W)	-	16.21
4. East (E)	22.35	7.29
Total	66.34	61.64

Source : GOB 1975

Eocnomic Potential of Wheat

There are a few economic studies on wheat production in Bangladesh. Biggs and Clay (1975), Islam and Hussain (1975) and Ahmed (1976 and 1977) studied economic aspects of wheat production. All these studies show a reasonable profit margin for the cultivators.

Rahman (1978) conducted a study with farm data of 1974/75 from Rajshahi district, in which three categories of wheat farms were specially studied to measure their relative productivity.

The categories are

i) LV without fertilizer and water
ii) LV with fertilizer but no water
iii) HYV with, among others, fertilizer and water.

To measure production efficiency the Cobb-Douglas production function was fitted using yield per acre of individual farm as the dependent variable and human labour, animal labour, seed, manure and fertilizer per acre as independent variables. Results are presented in Table 8.

In short the results of the study suggest that the LV farms which used human labour, animal labour, seed and manure in common but did not use fertilizer have the following characteristics :

(i) greater degree of variation, i.e., production functions do not fit well ;

(ii) the production elasticities are lower ; and

(iii) only the human labour coefficient is significant.

The second group, LV farms using fertilizer appear to be closer to the HYV farms. They have the following characteristics :

(i) the production function fits the data better ;

(ii) the production elasticities tend to be higher than LV farms which do not use fertilizer ; and

(iii) a final test (Chow test) shows that all co-efficients except fertilizer are the same as those using HYV wheat.

The third group is farms growing HYV wheat (users of irrigation). They have higher production function coefficients :

(i) all the coefficients are higher than the LV with or without fertilizer group ;

(ii) the value of the $\overline{R^2}$ is the highest, i.e., the production function fits the data better ; and

(iii) all the coefficients have the expected sign.

The aggregate analysis of LV and HYV farms reveals meaningful findings. The cost per acre of growing LV is much lower than that of HYV due to low level of input use. It is also important to note that the highest level of cost per acre for LV farms is the lowest level of cost of producing HYV. Even at this cost the yield of HYV farms is 50 per cent higher than that of LV farms.

In short, the findings of the production function analysis suggest that there is considerable scope for the introduction of HYV wheat and in fact rapid progress has taken place over the last 4-5 years in this crop.

Another recent study conducted in Pabna and Khushtia suggests that there were wide range of differences in costs of production under impoved (HYV) and traditional (LV)

TABLE 8 ESTIMATED VALUES OF COEFFICIENTS AND RELATED STATISTICS FOR WHEAT PRODUCTION FUNCTION[6]

Variety and Equation	Constant in log	b_1	b_2	b_3	b_4	b_5	d_1	d_2	R^2	N	F	Reg SS	Error SS
LV without fertilizer	-0.5617	0.160** (0.063)	0.110 (0.130)	0.200 (0.160)	0.007 (0.009)				0.18	50	3.64	-	-
LV with fertilizer	-0.8814	0.390 (0.093)	0.015 (0.032)	0.350 (0.109)	0.090 (0.054)	0.085 (0.033)			0.68	40	18.17		
Pooled LV farms	-0.1449	0.242** (0.051)	-0.009 (0.037)	0.325** (0.106)	0.077 (0.009)	0.016 (0.002)			0.72	90	47.21	-	-
Pooled data with dummy	-0.460	0.292** (0.03130)	0.019 (0.02722)	0.382** (0.0545)	0.010 (0.0074)	—	0.064** (0.0085)	0.149 (0.0048)	0.97	178	1189	8.169	0.195
HYV farms	-0.604	0.303** (0.03676)	0.032 (0.0499)	0.374** (0.0555)	0.059** (0.0227)	0.160** (0.0302)	-	-	0.88	88	133.09	0.437	0.053
LV with fertilizer dummy	-0.231	0.253** (0.05169)	-0.007 (0.0379)	0.330** (0.1088)	0.007 (0.0091)		0.072** (0.01144)	-	0.71	90	45.04	0.359	0.134

**Significant at the 1% level. Figures in the parentheses indicate standard errors of the estimates.

Source : Rahman 1978.

practice (Table 9). Cost of production per acre for improved practices was almost double the cost under traditional practice in Pabna. The yield was more than double under improved practice compared to traditional practice. The high-yielding farmers made 2.5 times more net returns (867 Taka per acre) than the traditional farmers. The gross costs and returns were observed from the point of view of shadow price. There was no difference in the gross costs and net return when calculated at shadow price (family human and bullock labour and animal manure shadow priced at 50% market rate). The traditional farmers, however, received higher net return relative to direct costs compared to the HYV farmers. This implies that (i) traditional farmers utilized more family inputs (seed, human and bullock labour and animal manure) and that (ii) there was very little or no application of chemical fertilizers, pesticides and irrigation under traditional farming.

The findings indicated that a farmer practicing improved cultivation could break-even at Taka 51 per maund of wheat including transportation cost ; for traditional farmer it was Taka 63.00 per maund. This considered the operating costs for all items (including own and purchased) at market prices. Considering the market cost only, a traditional farmer could sell one maund of wheat at less than Taka 20.00 per maund at no loss, no profit. The price should be about 50 per cent more for a high yielding farmer for no loss, no profit at purchased cost.

TABLE 9 COSTS AND RETURNS OF WHEAT IN KUSHTIA AND PABNA

Technology/price assumption	Gross costs Taka/ acre	Net Return		Benefit cost Ratio	Break-even price Taka/ maund
		Taka/ acre	% of cost		
Improved Practice (yield 26.2)					
a. at market price	1332	867	65	1.7	51
b. at shadow price	1101	1098	99	2.0	42
c. direct cost	731	1468	3.0	28	28
Traditional Practice (yield 12.0)					
a. at market price	765	322	42	1.4	63
b. at shadow price	547	540	99	2.0	45
c. direct cost	230	757	329	4.7	19

Source : GOB 1978

Since the production of HYV wheat involves the use of highly subsidised modern inputs, an effort was made to find costs and returns of wheat cultivation under subsidised and non-subsidised situation (Table 10). In this case an analysis of total cost was made assuming :

a. profit maximization is the objective of the producer.

b. all operational expenses are paid at market rate

TABLE 10 COST OF PRODUCTION OF SONALIKA WHEAT WITHOUT SUBSIDY

(In Taka)

Rates of calculation	*Kushtia*		*Pabna*	
	Per acre	Per maund	Per acre	Per maund
Market/Official Price				
Cost incurred	1445	54	1054	33
Subsidy involved	274	10.2	183	5.7
Total cost (unsubsidised)	1719	64.2	1237	38.8
All at shadow price				
Cost incurred	1210	45	768	24
Subsidy involved	390	14.5	295	9.2
Total cost (unsubsidised)	1600	59.5	1063	33.2
Market/shadow Price				
Cost incurred	1445	54	1054	33
Subsidy involved	390	14.5	295	9.2
Total cost (unsubsidised)	1835	68.5	1349	42.2
Purchased/shadow Price				
Cost incurred	809	30.0	490	15.3
Subsidy involved	390	14.5	295	9.2
Total cost (unsubsidised)	1199	44.5	785	24.5

Source : GOB 1978

c. all inputs are purchased by the farmer at cost price (imported cost shadow-priced at Taka 20.00 per US dollar).

It appears from table 10 that even in the case of market/shadow price where family inputs are priced at the market rate and foreign exchange component (FEC) of subsidised inputs at shadow price (1 US dollar=Taka 20), the per acre cost were Taka 1835.00 and 1349.00 in Kushtia and Pabna respectively.

One important point that emerges from this study is that the cost of production of Taka 1500.00 per ton without subsidy is much lower than the international market price of Taka 2200.00 per ton taking 20 taka to a dollar. If this evidence is valid, production rather than import of wheat is profitable.[7]

IV. WHEAT IN THE LONG RUN

High yielding rice varieties are not suitable for all seasons or all areas of Bangladesh. Furthermore HYV rice are very expensive in terms of irrigation requirements. Consequently, all the emphasis on production for future food requirements should not be placed on the introduction of the high yielding rice varieties.

In the dry months there is scarcity of irrigation water throughout most of Bangladesh. An alternative crop such as wheat, which may cover a wider area with a given amount of water, may be more suited to some areas.

The introduction of HYV wheat, however, is not likely to have a significant outcome in all parts of Bangladesh. Where rainfall is adequate rice is the preferred crop. However, in the Northwest of Bangladesh in particular, low rainfall, fertile soil and availability of land suggest that the introduction of HYV wheat there in winter may go some way to increase food production in Bangladesh.

At the moment the Government is incurring a heavy cost in the form of consumption subsidies to rice and wheat at a rate of 57 per cent and 38 per cent of the respective import prices. This subsidy which is mainly enjoyed by the urban population has resulted in inequity at the cost of a huge drain on Government funds. It was observed in the earlier section that cost of locally produced wheat is lower than the price of imported wheat. Hence the Government can remove the subsidies and direct the resources to various development projects by increasing the country's foodgrain production. It can be accomplished by placing a greater emphasis on wheat production and in the long term to reduce food prices by increased farm productivity rather than

direct consumption subsidies. In the meantime, however, Bangladesh should diversify its food habits and direct research activities to develop high yielding varieties of not only rice and wheat but also of maize, potato, soybean and other food crops suitable for production under conditions of drought or dryland farming. The comparatively dry areas of Northwest Bangladesh and the hilly areas of Chittagong Hill Tracts may be suited to the production of crops generally cultivated under drought conditions.

V. CONCLUSIONS

Rice is one of the costliest foodgrains in the world. The geography of Bangladesh, however, fortunately favoured the production of this food crop for centuries. In recent years the total production of LV and HYV rice cannot meet the demand for food from a rapidly growing population. Since the input requirements of HYV rice are higher than that of HYV wheat, the production of this crop may be encouraged in some parts of Bangladesh in winter. The recent records and evidences of wheat production indicate that the crop may make a headway in the next few years. Production of wheat in large scale in the long run, however, appears to be beset with similar set of problems like the HYV rice. Research activities should, therefore, be directed well in advance to develop newer food crops suitable to be grown under conditions of drought or dryland farming.

Notes :

1. Per capita availability of foodgrain is simply an arithmetic mean. It does not indicate the distribution of foodgrain among the various sections of the population. In the year 1974-75, for example, the per capita availability was higher ; but many people died of starvation in the famine.

2. The per acre return of the share-croppers will be lower. Since the owners do not share input costs other than land, a rise in the general price level results in the low return of the share-croppers. Large-scale expansion of either wheat or Boro is, therefore, beset with the problem of loss to the share-croppers.

3. The oportunity cost of food subsidy is high in Bangladesh ; subsidy cost exceeded a billion taka mark in 1975-76. Although poverty is more widespread in rural than in urban areas, the country's 9 per cent urban population shared 66 per cent of the subsidised foodgrains in 1973-74 (Ahmed 1978, p. 1).

4. The suitability of land for wheat cultivation includes only land generally suitable for wheat cultivation. Areas south of 24° N are not good for wheat production. So the total area suitable for wheat has to be ascertained by agronomic trials.

5. Chow test was performed to investigate whether the differences between production functions are significant. The F-ratio was computed as follows :

$$F=\frac{Rp-(Ra+Rb)/K}{(Ra+Rb)/(Na+Nb-2K)}$$

Where,

Rp is the Error Sum Squares (ESS) of the pooled equation.

Ra is the ESS of the first equation (group).

Rb is the ESS of the second equation (group).

K is the number of variables including the intercept.

Na is the number of observations under first group.

Nb is the number of observations under second group.

The null hypothesis is that there is no difference in the coefficients of the variables that are common to both sets of data. The calculated ratio is compared with the tabulated value of fo.05 with Va=K and V_2=(Na+Nb—2K) degrees of freedom, which is the expected value for F if the null hypothesis were true.

6. The coeffiients b_1, b_2, b_3, b_4, and b_5 represent the exponents of human labour, animal labour, seed, manure and fertilizer respectively ; d_1 (LV with fertilizer=1 ; otherwise=0) and d_2 (Actual fertilizer for HYV per acre ; all other farms=1) are fertilizer dummies.

7. The views held by Ahmed (1978) should be taken with a note of caution. Ahmed viewed the foodgrain supply situation from the point of rationing system. If rationing system has to be maintained, he observes that import rather than domestic production of wheat is a more worthwhile strategy.

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