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FARMERS' PREFERENCES FOR DIFFERENT VARIETIES OF AMAN PADDY AND THE USES OF PRODUCTION INPUTS IN AN AREA OF BANGLADESH

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ABSTRACT

This paper presents an investigation of the farmers' varietal preferences, the factors causing the adoption of high-yielding varieties of *aman* paddy (HYVs), the per acre uses of seeds and chemical fertilizers for producing different HYVs and traditional varieties of *aman* paddy (TVs) in an area of Bangladesh. Three selected indicators were used for measuring the degrees of farmers' varietal preferences. Degrees of adequacy In the use of production inputs were estimated by comparing the levels of application with recommended doses per acre. The result of the analysis suggests that the farmers had strong preferences for TVs over HYVs. The high-yield per acre was the most important factor causing the adoption of HYVs while the absence of government assistance was one of the major factors responsible for retarding the adoption of HYVs. The levels of different input uses per acre were higher for HYVs than those for TVs, and they were economically justified. The results o the analysis further reveal that the farmers used high-yielding and traditional variety seeds adequately, while the degrees of adequacy in the use of chemical fertilizers ranged from about 4 percent to 17 percent for different varieties of *aman* paddy.

I. INTRODUCTION

Diffusion of high yielding varieties of paddy in Bangladesh is extremely important as a matter of policy for attaining an increase in foodgrain production. Initial diffusion of high-yielding varieties of paddy has largely been limited to *boro* season. Expansion of *boro* acreage in Bangladesh is greatly constrained by the availability of irrigation water and therefore, has distinct limitation. In recent years, adoption of high-yielding varieties of *aman* paddy (HYVs) under rainfed condition is gaining considerable importance in Bangladesh. The Two-Year plan aims at achieving an increase in *boro* acreage under high-yielding varieties from the benchmark level of 13.38 lakh acres in 1976-77 to 16 lakh acres in 1979-80. On the other hand, *aman* acreage under HYVs and local improved varieties is planned to increase from 10.46 lakh acres in 1976-77 to 21 lakh acres in 1979-80 (Bangladesh 1978, p. 79).

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However, the success of such a programme for an expansion of *aman* acreage under different HYVs will largely depend on the farmers' varietal preferences.

The purpose of this paper is twofold. First, to determine and compare the degrees of farmers' preferences for HYVs and traditional varieties of *aman* paddy (TVs) and to identify the factors responsible for the adoption of HYVs in an area of Mymensingh district. Second, to estimate and compare the per acre uses of inputs for producing different HYVs and TVs and to measure the degrees of adequacy in the use of inputs like seeds and chemical fertilizers.

Section II presents the sources of basic data used in this study. It also mentions the methodology used for achieving the objectives of the study. Section III contains an analysis of the results. Conclusions of the study are presented in Section IV.

II. DATA SOURCE AND METHODLOGY

Data used in this paper were obtained from a field survey conducted on a cross section sample of forty farmers over the period from September 1976 to January 1977. Farmers producing only TVs were eliminated from the sample and a simple random sampling technique was used. Data were collected through direct interviews with farmers. The area selected for investigation is located about 5 miles south of Mymensingh town and comprised of the village Beltali under Bhabakhali Union council in Kotwali thana of Mymensingh District. The study area belongs to the Brahmaputra alluvial soil tract of Mymensingh zone. The soil of the village is clay loam. The study area usually remains unaffected by flood, and produces different varieties of *aman* paddy under rainfed condition.

It was assumed that the farmers were operating under similar agro-climatic conditions, and therefore, the same production alternatives were available to each of those farmers. An assumption was also made to prevent the inclution of unattainable preferences so that the cultivation of a particular variety would reflect the farmers' preferences for the variety. Degrees of farmers' preferences for different varieties of *aman* paddy were estimated by applying three alternative criteria. First criterion was the proportion of total *aman* acreage devoted to the production of different varieties expressed in terms of percentages. Second criterion measured the percentages of growers of different

varieties to total sample farmers. The first and second criteria will be termed as acreage and grower criteria respectively. The third criterion was used for HYV growers only. The criterion referred to the length of adoption period (excluding *aman* season in the year of investigation) expressed as the percentages of HYV growers to total sample farmers.

Particular measure of adequacy levels in the use of seeds and chemical fertilizers was as follows :

$$\text{Degree of adequacy} = \frac{\text{Input used per acre}}{\text{Input recommended per acre}} \times 100$$

Data on recommended doses of seeds and chemical fertilizers per acre were obtained from a secondary source (EPADC 1971, p. 3).

III. RESULTS AND DISCUSSION

Farmers' Varietal Preferences

Degrees of farmers' preferences for different HYVs and TVs measured by selected indicators are presented in Table 1. It appears that about 70 percent of total *aman* acreage was engaged in the production of different TVs, while the rest 30percent was devoted to the production of different HYVs. The result of the analysis suggests that the farmers had strong preferences for TVs over HYVs. It was observed that 40 percent of farmers produced one HYV and 57 percent of farmers produced two HYVs, while none of the farmers produced all the three HYVs. It appears from Table 1 that differences in the farmers' preferences for each of different varieties of *aman* paddy were also substantial. Acreage criterion reveals that the degrees of farmers' preferences ranged from about 1 percent for *Lakshibilash* to 21 percent for *Porabinni.* On the other hand, the grower criterion discloses that the degrees of farmers' preferences varied from about 3 percent for *Lakshibilash* to 68 percent for Pajam-2. The length of adoption period by HYV growers ranged from 1 to 8 years. Table 1 indicates that the percentage of farmers adopting HYVs for more than 5 years was considerably less than that of the farmers having 1 to 2 or 3 to 5 years of adoption. The rankings given by 1 to 2 years of adoption favoured Pajam-2 while rankings given by 3 to 5 or 5 to 8 years of adoption were the highest for IRRI-20. Table 1 also shows that Pajam-2 growers constituted about 68 percent in the year of investigation as against 55 percent in previous years which implies an increase

of Pajam-2 growers by 13 percent in the year of investigation. On the other hand, the percentages of IRRI-20 and IRRI-5 growers in the year of invetigation decreased by 15 and 8 percent, respectively.

Factors Affecting the Adoption of High-yielding Varieties of Aman Paddy

Factors affecting the adoption of HYVs were classified into facilitating and retarding factors. The relative importance of different factors affecting the adoption of HYVs is given in Table 2.

Table 2 reveals that the high-yield per acre was the most important factor influencing the adoption of HYVs, while the absence of government assistance was one of the major factors responsible for retarding the adoption of HYVs. Table 2 shows that only 10 percent of farmers were encouraged by the low unit costs of production of HYVs, whils 43 percent of farmers disfavoured the adoption of HYVs because the production costs per acre of HYVs were higher than TVs. The results of the analysis indicate that the food habit of the farmers was not an important factor affecting the adoption of HYVs in a wider scale. Table 2 shows that 50 percent of farmers did not produce HYVs in a larger area for non-availability of seeds and 30 percent of farmers disfavoured the cultivation of HYVs because the attacks of insects were geater for HYVs than for TVs.

Production Input Uses and Degrees of Adequacy

Table 3 shows that the levels of different uses per acre, in general, were higher for HYVs than those for TVs. The per acre use of human labour for IRRI-20 and IRRI-5, and the per acre uses of insecticides for IRRI-20, IRRI-5, and Pajam-2 were significantly higher than those for TVs. Differences in the per acre use of animal labour between HYVs and TVs were not substantial and the per acre use of seeds was higher for TVs than that for HYVs. Table 3 also shows that IRRI-20 growers used greater quantities of different inputs except seeds than IRRI-5 or Pajam-2 growers ; while IRRI-5 growers used larger quantities of human labour, manures, fertilizers and insecticides per acre than Pajam-2 growers. The per acre application of seeds was higher for Pajam-2 than that for IRRI-20 or IRRI-5, but the differences were not significant.

The above analysis of the uses of production inputs should be qualified with comparative estimates of yields and returns. The yields and returns of different HYVs and TVs are given in Table 4.

Table 4 reveals that the per acre yields and returns of HYVs were significantly above those of TVs. Table 4 also shows that the per acre differences in yields were not substantial among different HYVs or different TVs. While the return to 1 Taka's worth of operating capital was slightly lower for IRRI-20 than that for *Neizershail*, the return to operating capital obtained from producing different HYVs were significantly higher than those obtained from producing different TVs. The results of the analysis, therefore, suggest that the higher levels of input use in the production of different HYVs than TVs were economically justified.

Table 5 compares the degrees of adequacy in the use of seeds and chemical fertilizers for producing different HYVs and TVs. Table 5 discloses that both HYV and TV growers used seeds adequately and the degree of adequacy ranged from 97 percent for IRRI-20 to 165 percent for *Porabinni*. On the other hand, the shortages of chemical fertilizers were acute for different HYVs and TVs. The degrees of adequacy in the use of chemical fertilizers were 17 percent for IRRI-20, 13 percent for IRRI-5 and 8 percent for Pajam-2 ; while the degrees of adequacy of fertilizers for different TVs ranged from 4 percent for *Lalkumari* to 17 percent for *Porabinni*. One of the reasons reported by the farmers as to why they applied such a low level of chemical fertilizers was that they did not possess sufficient means to purchase fertilizers in adequate quantities. Some farmers reported that they did not apply fertilizers because they were satisfied with the per acre yields they obtained from using manures alone. Some farmers held traditional views that the uses of fertilizers were responsible for the deterioation of the soil fertility.

IV. CONCLUSIONS

The foregoing analysis seems to suggest the following major conclusions.

First, given the sampling of farmers exclusive of those producing only TVs, the foregoing assessment of the farmers' preferences for different HYVs is hardly one of moderate enthusiasm. This suggests that before a recommendation for large scale expansion of *aman* acreage under HYVs in Bangladesh is made, the practicality of the suggestion demands further investigations into the farmers' varietal preferences over a period of time with due considerations on "the first, second and third generations of problems" (Falcon 1970).

Second, the farmer's financial constraints and the country's institutional barriers on the adoption of HYVs raise important issues relative to the adequacy

and timeliness of agricultural credit and other input supply programmes, especially for chemical fertilizers, improved seeds, pesticides and training of government personnel, which need a careful appraisal for policy guidelines.

Third, the large number of production alternatives of *aman* paddy and the changing nature of farmers' preferences over time emphasize the need for continuing farm management research to provide information to policy makers on input uses and requirements, resource productivity and production profitability, and to give them better understanding relative to the effects of alternative government programmes on production and resource adjustments. The farmers will also gain an insight in to the questions of their changing ability and position to improve rice farming. "And, most importaat of all, farmers would

TABLE 1 SELECTED INDICATORS OF FARMERS' PREFERENCES FOR DIFFERENT HIGH-YIELDING AND TRADITIONAL VARIETIES OF *AMAN* PADDY

(Percent)

Variety	Acreage criterion	Grower criterion	Length of adoption period [a]		
			1–2 years	3–5 years	Above 5 years
HYVs					
IRRI–20	8·4	57·5	30·0	30·0	12·5
IRRI–5	4·7	20·0	2·5	20·0	5·0
Pajam-2	16·7	67·5	42·5	12·5	—
TVs					
Naizershail	11·0	47·5			
Porabinni	21·1	65·0			
Kasiabinni	7·8	37·5			
Lalkumari	18·0	40·0			
Biroi	3·2	12·5			
Latishail	2·1	15 0			
Chinishagar	1·5	5·0			
Balam	3·5	17·5			
Buroibcha	1·4	7·5			
Lakshibilash	0·6	2·5			

[a] *aman* season in the year of investigation was excluded in the length of adoption period.

have a means through which to give continuing feedback on the programmes that affect them" (Rochin 1973, p. 92).

Finally, given the present state of data, the quantative results of the study should be accepted with considerable reservations.

TABLE 2 FACTORS AFFECTING THE ADOPTION OF HIGH-YIELDING VARIETIES OF *AMAN* PADDY

Factors	Percent of respondents
Facilitating factors	
Higher yield per acre	25·0
Lower unit cost of production	10·0
Better to taste	15·0
Retarding factors	
Non-availability of seeds	50·0
Absence of government assistance	62·5
Attacks of insects	30·0
Higher cost of production per acre	42·5
Disliked as food	5·0

TABLE 3 PRODUCTION INPUT USES PER ACRE OF DIFFERENT HIGH-YIELDING AND TRADITIONAL VARIETIES OF *AMAN* PADY

Variety	Seeds (Seers)	Human labour (Mandays)	Animal labour (Days)	Manures (Maunds)	Fertilizers (Seers)	Insecticides (Taka)
HYVs						
IRRI-20	13·1	70·4	15·5	15·6	34·6	26·9
IRRI-5	14·0	57·3	12·4	10·8	26·5	23·0
Pajam-2	15·3	52·7	13·7	8·8	15·5	6·0
TVs						
Naizershail	19·9	46·1	11·9	6·1	11·6	0·6
Kasiabinni	20·2	42·9	12·7	8·4	16·4	0·2
Porabinni	22·3	45·0	13·1	8·3	16·7	0·2
Lalkumary	15·1	48·9	12·2	3·4	3·6	—
Other TVs[a]	19·6	49·8	13·4	8·3	10·1	0·4

[a] Other TVs include *Biroi*, *Latishail*, *Chinishagar*, *Balam*, *Buroaibcha* and *Lakshibilash*.

TABLE 4 YIELDS AND RETURNS PER ACRE OF DIFFERENT HIGH-YIELDING AND TRADITIONAL VARIETIES OF *AMAN* PADDY

Variety	Paddy yields (Maund)	Gross receipts[a] (Taka)	Net returns[b] (Taka)	Returns to 1 Taka's worth of operating capital[c]
HYVs				
IRRI–20	30·4	3119·7	1424·3	0·32
IRRI–5	34·8	3561·2	2081·8	1·59
Pajam–2	30·3	3109·6	1707·9	1·15
TVs				
Natzershail	21·7	2230.1	935·4	0·35
Kastabinni	18·1	1864·4	571·9	−0·17
Porabinni	18·5	1897·0	562·8	−0·23
Lalkumari	21·3	2179·8	889·4	0·30
Other TVs[d]	21·9	2250·9	890·3	0·05

a. Gross receipts per acre are the total value of output of paddy and straw.

b. Net returns per acre are the differences between gross receipts and total costs of production per acre.

c. Operating capital includes the total expenses on seeds, human labour, manures, fertilizers and insecticides. Returns to 1 Taka's worth of operating capital were estimated as follows :

$$K = \frac{R-O}{O}$$

where, K is the returns to 1 Taka's worth of operatting capital, R is the net returns per acre and 0 is the operating capital per acre.

d. Other TVs include *Biroi, Latishail, Chinishagar, Balam, Buroaibcha* and *Lakshibilash.*

TABLE 5 DEGREES OF ADEQUACY IN THE USE OF SEEDS AND CHEMICAL FERTILIZERS PER ACRE OF DIFFERENT HIGH-YIELDING AND TRADITIONAL VARIETIES OF *AMAN* PADDY

(Percent)

Variety	Seeds	Chemical fertilizers
HYVs		
IRRI-20	97·3	17·3
IRRI-5	103·9	13·3
Pajam-2	113·6	7·8
TVs		
Najzershail	147·2	11·6
Kasiabinni	147·2	14·4
Porabinni	165·3	15·7
Lalkumari	111·8	3·6
Other TVs[a]	145·0	10·4

a Other TVs include *Biroi*, *Latishail*, *Chinishagar*, *Balam*, *Buroatbcha* and *Lakshibilash*.

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