



Input Pricing and Utilization Status for Boro Rice Cultivation: Do Farmers Benefit from Input Liberalization System?

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Abstract

A survey based study was conducted in three districts of Bangladesh to understand the mode of input pricing, problems of timely availability of inputs and the existing input subsidy scenario of Boro rice. Applying the conventional descriptive statistics, the study revealed that there are three major modes of payment for irrigation charges prevailing all over the study areas and it varied from location to location. In Satkhira, irrigation cost appeared to be 75% higher compared to that of Bogra under power operated schemes in cash payment system. Similarly, it was much higher in Satkhira under crop sharing payment system compared to that of cash payment system. Although irrigation cost stands low (Tk.5518/ha) in case of power operated scheme but frequent load shading and low voltage were considered as the major hindrance to the timely supply of irrigation water. The price of Urea fertilizer was 44% higher in Satkhira compared to that in Bogra, probably because of both reduced supply and creation of artificial crisis. The analysis further revealed that rice farmers were very hardly aware of the government subsidy on production inputs. Deep tube- well owners commonly known as water lords were found deriving the benefits of irrigation subsidy. Inadequate monitoring on fertilizer pricing and distribution led to price distortion in almost all over the study areas.

Keywords: Input, input pricing, input subsidy, mode of payment.

1. Introduction

In Bangladesh, rice is grown in three seasons namely Boro, Aus and Aman. Modern rice varieties (MVs) were introduced for the Boro and Aus seasons during the mid sixties and for the T. Aman season in 1970 (Hossain *et al.*, 1994). Out of 10.74 million hectares of rice area in Bangladesh, production of modern Boro alone covers about 4.30 million hectares of which nearly 96% area is under irrigation. The available statistics indicate that roughly 70% of the MV Boro area falls under costly diesel operated irrigation schemes (run by DTW, STWs and LLP etc.) and about 30% area falls under the less expensive power operated irrigation tools (BBS, 2004).

Nevertheless, adequate irrigation/water supply and timely application of fertilizers are the key inputs for modern Boro rice production. Irrigation alone determines the substantial variation on the adoption of MVs in the Boro season. As such, availability of irrigation is considered as the leading input for desired adoption of high yielding modern rice varieties (Rahman, 2002). In fact, the development of irrigation facility renders multiple advantages in enhancing yield increasing factors (e.g. MV seeds, time of planting and fertilizer application etc.), cropping intensity and over all productivity (Ray, 1992; Vaidynathan, 1994). In a recent study it was observed that under loamy soil condition, application of irrigation water after 5, 7 and 10 days on disappearing of standing water

reduced yield by 15, 23 and 31%, respectively (Kashem, 2006). With the advent of modernization in the rice sector, the demand for inputs like quality HYV seed, fertilizers and irrigation facilities has been increasing profusely. On the other hand, among different production inputs cost of irrigation holds the highest share (nearly 20%) as a single cost item followed by fertilizer (about 18%) because of the price increase of these items both at national and international markets (Jabber *et al.*, 2006).

However, in order to keep pace with the growing demand for food, rice production is to be increased at the desired rate. Government is also trying to take initiatives like offering input subsidy in almost every year with a view to ensure proper utilization of these inputs. During 2005-06 government allocated Tk. 600 crore as subsidy on different inputs (fertilizer, electricity etc.) It is therefore, imperative that farmers all over the country would derive benefits out of the given opportunity. As input subsidy is given to all areas of the country, price of fertilizer and irrigation is expected to be more or less similar for all areas and farmer should be able to harness the benefit from this program. But it is widely known from different reports that irrigation price vary from location to location using same device and the mode of payment of irrigation is also different. Some times farmers had to face the supply shortage of fertilizers specially urea during Boro season. Therefore, it is necessary to look into the existing discrimination in input pricing. Taking all these issues into consideration, the present study was under taken in order to delineate the fact on input pricing at the farm level. The specific objectives of the study were : (i) to know the mode of input (irrigation and fertilizer) pricing mechanism in the selected areas; (ii) to identify the problems faced by the farmers in timely getting input and its impact on yield; and (iii) to evaluate farmers' perception about government subsidy on different inputs and asses the ways how farmers can derive benefit from the given subsidy program.

2. Methodology

The study was conducted in three districts namely Satkhira, Bogra and Lalmonirhat in the year 2006. Sample survey was carried out. Two Upazilas under each district were selected purposively considering the intensity of MV Boro cultivation. Six villages (taking one from each Upazila) were selected randomly. From a comprehensive list of the rice farmers under the selected villages, twenty farmers were then selected in each village. In selecting the households, random sampling technique was followed. A total of 120 sample households were finally selected and interviewed using pre-structured questionnaires. Mainly the conventional tabular analysis was done for descriptive presentation of the findings.

3. Results and Discussion

3.1. Mode of irrigation and differences in payment and expenditure scenario

The over all picture on mode of payment for irrigation is presented in Table 1. There were three major modes of payment of irrigation prevailing in the study areas e.g. (1) Cash payment, 2) Crop sharing arrangement (under which plot owners pay one-fourth of the output as irrigation cost), and (3) Machine rental arrangement (under which plot owners pay the fuel cost and the machine owners charge a fixed amount for irrigation). This system was found in operation in the Boro growing areas mainly at Lalmonirhat. While both crop sharing and cash payment systems were found in practice mainly in the villages under Satkhira. Lesser proportion of the area (about 5%) was covered under hourly payment system in Satkhira (Table1).

The cost structure for irrigation in different areas is given in Table 2. It was evident that the cost of irrigation varied significantly from location to location, even with the same device.

Table 1. Mode of payment for irrigation in growing MV Boro in different locations: Boro 2006

Prevailing payment system	Study areas	% area covered
Cash payment (acre basis)	Bogra,	100
	Satkhira	10
	Lalmonirhat	60
Crop sharing Machine rental (with diesel cost)	Sathkhira	85
	Lalmonirhat	40
Cash payment (hourly basis)	Satkhira	5

Table 2. Cost of irrigation under different methods in the study locations

Irrigation device	Mode of payment	Cost (Tk/ha)		
		Satkhira	Bogra	Lalmonirhat
DTW(Electricity)	Cash	7625 (75%)	4360	4570 (5%)
DTW(Electricity)	Crop share	10125	*	*
DTW(Diesel)	Cash	9050 (49%)	6085	7550 (24%)
DTW(Diesel)	Crop share	10125	*	*
STW(Electricity)	Cash	7625 (75%)	4360	4570 (5%)
STW(Electricity	Crop share	10125	*	*
STW(Diesel)	cash	9050 (49%)	6085	7550 (24%)

* The method is not practiced in these areas

Figures in the parenthesis indicate percent increase compared to Bogra

Irrigation cost for per hectare land under all modes of payments in Satkhira was higher than those at the other two study areas. This was due to high installation cost of irrigation machines and lack of competition as the number of irrigation machines was also low. Bogra was taken as the central point since it is well communicated area and more close to the capital city of Dhaka than two other study areas. More over agriculture in Bogra falls under favourable environment compared to the other areas. Per hectare expenses on irrigation was much costly in Satkhira compared to that in Bogra and it varied from Tk.7625 to 10125. Irrigation cost with diesel operated STWs was 49% higher in Satkhira compared to that in Bogra. In most

cases farmers had no bargaining scope in fixing irrigation charge. Virtually, the machine owners or the share holders of the irrigation schemes fixed up the rate of payment. In Lalmonirhat, irrigation charge in case of power operated machine was lower (Tk. 4570/ha) which was closer to that of Bogra but under diesel operating system it was 24% higher than that of Bogra implying that the price of diesel in Lalmonirhat was much higher. Irrigation machine owners received Tk. 3200/ha as machine charge meaning that rice farmers had to bear the fuel costs as additional expenses for irrigating their fields. Though power operated irrigation was less costly compared to diesel operation in all locations, the non-availability of power causing severe

disruption in irrigation resulted in poor plant growth and low yield.

3.2. Fertilizer use level and regional price variation

Farmers' pattern of fertilizer use and price of different fertilizers in the study locations are furnished in Table 3. It was evident that farmers' application level of Urea, TSP and MP both at Bogra and Lalmonirhat was almost close to the recommended level, but in Satkhira the

application level of Urea was quite low. Substantial variation in fertilizer prices (especially urea price) was observed among the study regions. Price of both TSP and MP fertilizers were high in Satkhira. The level of application of the potash fertilizer (MP) at Satkhira was much lower compared to that at Bogra probably because: (i) Satkhira farmers had the tendency of applying lesser Potash to the rice fields due to soil salinity, and (ii) high price of MP caused its low application.

Table 3. Fertilizers application level and price of different essential fertilizers under different Regions of Bangladesh

Fertilizer type	Satkhira		Bogra		Lalmonirhat	
	Amount (Kg/ha)	Price (Tk./kg)	Amount (Kg/ha)	Price (Tk./kg)	Amount (Kg/ha)	Price (Tk./kg)
Urea	170	8.76 (44%)	220	6.06	270	6.30 (3.96%)
TSP	100	19 (2.15%)	95	18.60	92	18.60
MP	78	14.20 (1.43%)	82	14	72	14.10

Figures in parenthesis indicate % increase price compared to Bogra

Table 4. Farmers expected price of different fertilizers and irrigation cost under different locations

Fertilizer/Irrigation	Price Tk/kg / Tk/ha		
	Satkhira	Bogra	Lalmonirhat
Urea)	6 (46 %)	6 (1%)	6 (5%)
TSP	14.50 (31%)	15 (24%)	14 (32.83%)
MP	11.40 (24.56%)	10.80 (29.63%)	11.50 (22.61%)
DTW/STW(cash payment)	5125 (38%)	4000 (8%)	4100 (10%)
DTW/STW(crop share)	6750 (33%)	**	**

**The method was not practiced in these areas

*Figures in parenthesis indicate percent rise/increase in the existing market price.

3.3. *Producer's speculation on input prices*

Taking into consideration the issue of farmers' affordability, they were asked about their expectation on different input prices. The farmers' average expected price for each input was then compared with the prevailing market price of that input and the findings are presented in Table 4. In Satkhira, the existing market price of all categories of fertilizers was much higher than the expected price specially Urea price was 46 % higher than the farmers' expectation. In fact, in all the study areas, the market price of Urea, TSP and MP were higher than the expected price. This has the rigorous implication on the application of those inputs. Since the market price of TSP and MP fertilizers were much higher, the resource poor farmers' budgetary constraint might have restrained them in applying the required amount resulting the use of fertilizers at sub-optimal level. Similarly, irrigation cost under cash payment system in Satkhira and Lalmonirhat was respectively, 38 and 10% higher than the farmers' expected price.

3.4. *Constraints in getting inputs*

Farm level problems of getting inputs (e.g. irrigation and fertilizer) are presented in Table 5. In Satkhira, 100% farmers opined that irrigation cost was very high under both power and diesel operating machines as they had no bargaining scope. But in Lalmonirhat, those who supplied diesel for running the irrigation machine stated that irrigation cost was high because of the higher price of diesel. Nearly 80% percent farmers stated that during the peak season they purchased diesel at 13% higher price than the officially rated price. Diesel supplier did not provide the required amount of diesel to the farmers at official rate on different excuses. Frequent load shading and low voltage were great problems in power operated irrigation schemes in all locations causing yield loss and this was stated by 100% farmers. With respect to the price of fertilizers, 100% farmers opined that the price of TSP, especially deshi TSP and MP was very high. In Satkhira, the sample farmers stated that price of urea was too high and the increase in price was due to shortage of supply and creation of artificial crisis (Table 5). As

fertilizer and irrigation are the two major inputs for MV Boro rice production, inadequate supply of these two inputs caused sub-optimal application leading to severe yield loss at Satkhira.

Regarding input subsidy, 100% farmers of the study areas reported that they had no idea about subsidy. In case of irrigation subsidy, the owners of the irrigation machines seemed to be powerful and they enjoyed the benefit of subsidy depriving the end users. District fertilizer distribution and monitoring committee determined the fertilizer price and fertilizer dealers are supposed to sale at that price but in reality the dealers did not follow it. Since there are less number of dealers available in each market, so due to imperfect competition among the dealers, they can control the price. More over the monitoring committee did not monitor continuously. The price of subsidized fertilizer was also higher. The present findings with respect to high price and low affordability of the farmers render support to similar studies undertaken in India (Tuteja, 2004). About 90% of the sample farmers did not have idea about the unit price of electricity, while 100% farmers did not know the selected price of fertilizers.

4. **Conclusions and Recommendations**

Cost of irrigation for diesel operated machines all over the study areas was quite high under all the prevailing payment systems. Subsequent increase in diesel price appeared to be the main cause of high cost of irrigation. The unusual power disruption along with low voltage caused severe disturbance in running power operated irrigation machines, which eventually led to crop failure in many cases. High variation in fertilizer prices was observed in the study locations particularly, in Satkhira and Lalmonirhat. This was possibly because both Satkhira and Lalmonirhat are the extreme distant areas and situated at the boarder areas. Therefore, the high transport cost along with artificial crisis caused rise in input price. The prevailing market price of different inputs was at much higher level than the farmers' expectation and affordability. As

Table 5. Problems faced by the farmers in getting irrigation and fertilizers

Stated problems	% of respondent		
	Satkhira	Bogra	Lalmonirhat
High cost charged by the machine owners	100	25	50
High price of diesel	100	100	100
Shortage of diesel supply at peak season	80	50	50
Creation of artificial diesel crisis	80	50	90
Frequent load shading and low voltage	100	100	100
High price of fertilizer	100	100	100
Shortage of urea	98	-	20
Creation of artificial crisis of urea	50	-	25
Smuggling	10		

Table 6. Farmer's perceptions about the govt. subsidy on different inputs

Items	% farms opined					
	Satkhira		Bogra		Lalmonirhat	
	Yes	No	Yes	No	Yes	No
Having idea about subsidy		100		100		100
Whether avail any subsidy		100		100		100
Knowledge about unit price of electricity for irrigation	10	90	10	90		100
Idea about diesel price for your area	20	80	50	50	20	80
Idea about govt. selected price for fertilizers		100		100		100

Price of subsidized fertilizer was also higher because of inadequate monitoring of the relevant authority. Farmers had no idea about the subsidy due to inadequate publicity.

Based on the findings of the following recommendations are made.

- At the out set of the crop season, the unit price of subsidized inputs should be circulated through the mass media so that farmers are informed about the subsidy.
- Local government representatives, members of the fertilizer distribution and monitoring committee, fertilizer dealers and representative of concerned office should be involved in different awareness creating program like farmers' rally, farmers' training, field day etc. in order to enable the concerned personnel to play their role in implementing the program.
- Adequate and timely supply of fertilizers and diesel should be ensured so that no one can increase the price on irrelevant excuse.
- Proper monitoring must be ensured. In case of any irregular practice on pricing and distribution, immediate action should be taken against that dealer.

- Smooth supply of electricity during Boro season must be ensured and more areas should be brought under power operated irrigation scheme to minimize irrigation cost.

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