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POLICY INCENTIVES FOR SELECTED AGRICULTURAL COMMODITIES IN BANGLADESH

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ABSTRACT

The paper evaluates the agricultural incentives in terms of levels of protection of selected agricultural commodities in Bangladesh for the period 1980-1998. Secondary data from various official and private sources were collected and compiled to derive the necessary parameters and co-efficients used in the analysis. NPC and NRP were measured by the proportional difference between the domestic producer price and the border price (adjusting for distribution, transportation, and other marketing costs). Likewise EPC and ERP were measured by considering the value-added components for fuller protection representation of incentive. The results showed that the main cereal crop rice was marginally protected for the policy goal of self-sufficiency. Wheat, jute, and potato were negatively protected during the period under review. But sugar production was highly protected due to inefficiency in publicly managed enterprise.

I. INTRODUCTION

The policy-bias against agriculture is an age-old phenomenon practiced by national governments across the world. Lewis (1955) argued that "squeeze" on agriculture provides the economic surplus, which is used to finance development of modern industrial sector. However, the discrimination policy also appears to insulate agricultural producers against price fluctuation in the world market and help adopt development strategy emphasizing saving of foreign exchange through import substitution.

The paradigm proposition that free trade is, from an economic point of view, more beneficial than protection. It is one of the most fundamental and widely accepted propositions in economic theory. The proposition is based on (a) the static argument that trade barriers distort the optimal allocation of national and world resources and so reduce output and (b) the dynamic argument that economic freedom stimulates competition, thus ensuring an environment beneficial to economic growth (Bale and Greenshields, 1975). In spite of strong arguments advanced by economists in favour of free trade, protections still exist, especially in the LDCs.

In Bangladesh, incentives to cultivators flow through various government policies. The policies relating to minimum support/procurement prices, subsidizing various inputs like fertilizers, irrigation are inward looking in character. As a result social or economic

profitability of agricultural production deviates from private profitability because of distortions in factor and product markets, externalities and government policy interventions that tend to distort relative prices. A fundamental concern of applied economists is to measure how government policies affect economic incentives.

The broad objective of the paper is to examine the incentive structure prevailing in the crop agriculture of Bangladesh through analysis of the levels of protections.

This paper comprises four sections. After this introduction, Section 2 deals with research methods, including data source and analytical techniques. Section 3 embodies the findings of the study. Finally Section 4 concludes the findings.

II. METHODOLOGY

Data Source

The study is based on published and unpublished data of various national and international agencies. The main sources of data were various publications of the Bangladesh Bureau of Statistics (BBS), Bangladesh Bank, World Bank, and Food and Agriculture Organization (FAO) of the United Nations. Some of the specific documents were Statistical Yearbook of Bangladesh (1985,1999), Yearbook of Agricultural Statistics of Bangladesh (1998), Report on Aus, Aman and Jute Crop Survey 1993-94 of the BBS (1999), International Financial Statistics of the World Bank; Commodity Outlook of the FAO and Economic Trends (2000) of the Bangladesh Bank. In addition, various unpublished documents and sources were also extensively used for obtaining data for the study.

Measuring the Impact of Policies on Agricultural Incentives

Incentive is the outcome of economic information from which farmers derive expectations. An optimum economic incentive provides the information that leads producers to allocate resources in ways that result in a maximum of production that clears the market at the ruling price (Schultz 1978). The policy regime regarding foreign trade and exchange rate management can affect the structure of incentives within agriculture as well as between agriculture and other sectors, through direct and indirect effects on domestic price formation. The direct effect on prices arises from commodity-specific policies such as taxes; subsidies or quantitative restrictions on export and import (Mahmud et al.1993). This effect is measured by the proportional difference between the domestic price and the border price (import or export parity price) at the prevailing official exchange rate.

To measure the indicators of protection and incentive, the study utilizes the following basic analytical tools and approaches:

(I) Nominal Protection

Following the traditional approach, the simplest indicator of price distortion, nominal protection co-efficient (NPC), was calculated for a selected number of commodities. Conceptually, NPC is expressed as:

$$NPC_i = \frac{P_i^d}{P_i^b} \dots\dots\dots(1)$$

Where, P_i^d is the domestic producer prices of the i th commodity i and P_i^b is the actual border price of that commodity. The estimates of world price at import parity level are based on the assumption that imports compete with domestic production at the producer level except sugar which competes at wholesale level. In the case of exportable commodities like jute and potatoes, domestic-to-border price comparison was made at producer level. The border prices of the selected commodities were adjusted for marketing cost (which included handling, transportation, storage cost) and price spread between the wholesale market to the farmer's level. Therefore, export parity price at producer level was derived from the following relationship:

$$P_i = P_i^b E_0 - C_i \dots\dots\dots(2)$$

Where P_i = price of i th exportable item, P_i^b = world price at port of entry (f.o.b) in foreign currency, E_0 = official exchange rate, C_i = all components of the marketing margin from border to producer level. On the other hand, for importable commodity, border price at farm level was derived as:

$$P_j = P_j^b E_0 + C_{jm} - C_{jd} \dots\dots\dots(3)$$

Where, P_j = price of j th importable commodity, P_j^b = world price at port of entry (c.i.f.), C_{jm} = the marketing margin from the port of entry to the wholesale market and C_{jd} = components of the marketing spread between the wholesale market to the producer's level.

In the study, country harvest time market prices of selected agricultural commodities such as rice, wheat, jute, cotton and potatoes for 1980 to 1998 were used as domestic price over the period. The study also alternatively measured the Nominal Rate of Protection (NRP) which is given as -

$$NRP_i = \frac{P_i^d}{P_i^b} - 1 \dots\dots\dots(4)$$

(ii) Effective Protection

This measure of policy incentive takes into account the effects of policies on input prices such as a subsidy on fertilizer, fuel and irrigation equipment which increase the incentives for domestic production. From the standpoint of incentive, it is important to capture the net effects of these distortions. This measure is termed as the "effective protection" and the study used

simple Corden (1957) method for calculating Effective Protection Co-efficient (EPC), which is expressed as -

$$EPC = \frac{P_i^d - \sum_j a_{ij} P_j^d}{P_i^b - \sum_j a_{ij} P_j^b} \dots\dots\dots(5)$$

Where, P_i^d is the domestic price of i th commodity, P_i^b is the border price of that commodity and a_{ij} are the technical co-efficients measuring the number of units of traded inputs j per unit of production of output i , P_j^d is the domestic price of traded inputs j , P_j^b is the border price of traded inputs j . The study also measured this indicator in the form of effective rate of protection (ERP) which can be expressed as -

$$ERP_i = EPC_i - 1$$

III. RESULTS AND DISCUSSIONS

Level of Protection in Agriculture: In the study the effects of trade and exchange rate policies on agricultural incentives have been assessed in respect of selected agricultural commodities using four related criteria, Nominal Protection Co-efficient (NPC), Nominal Rate of Protection (NRP), Effective Protection Co-efficient (EPC) and Effective Rate of Protection (ERP) which were estimated by using the official exchange rate. Rice, wheat, jute, sugar and potatoes, the major agricultural commodities of the country, were considered for the analysis.

(I) Nominal Protection

(a) Rice

Rice is a predominant crop in Bangladesh agriculture. So the impact of trade policy on agricultural incentives would be through the effects on the rice sector. The border price comparison for rice is in respect of coarse-quality rice, which accounts for most of the rice produced in the country.

The evidence of protection on rice from 1980 to 1998 is presented in Table 1 indicating that rice has been protected in Bangladesh. The average NRP worked out 19 per cent in the period under review. Mahmud et al (1993) found negative protection for rice in Bangladesh for the period between 1974-75 and 1989-90. According to Rahman (1993) rice has been implicitly taxed for the period of 1973-74 to 1990-91. In the present study out of the 19 years for which protection rates were estimated, the NRP was positive in 12 years. The NRP of 67 per cent in 1987 was the highest during the period under review. This was due to a sharp increase in domestic producer price during the year. The same situation prevailed in 1991 (NRP of 66%) which was the second highest. As a result of moderate increase in world price from 1993 to 1998, the NRP was reduced to -7 per cent, the highest in the sense of negative protection. From 1986 the world reference price started to decline. Such low reference price led NRP to be positive up to 1992 and average NRP from 1980 to 1998 was 19 percent. It suggests that domestic rice production was protected and trade liberalization resulted in a decline in the domestic price to bring it closer to the world price.

However this interpretation depends on the assumption of reference price. In most cases, the average import prices recorded in the country's trade statistics cannot be used to represent competitive market prices, because these imports were often financed by foreign grants (Mahmud et al. 1993). On the other hand, there is a strong consumer preference for the domestic coarse rice over the imported rice, which was studied by Rahman (1993). So it is difficult to rely on international reference price for comparison.

(b) Wheat

The foodgrain deficit of the country has been covered mainly through wheat imports. Wheat is clearly an importable and domestic production only supplements the imports. The trends in the domestic to border price ratio for wheat has been less than one or near one for most of the years investigated. The harvest time market price has been used as the domestic producer's price, while the US hard winter No.2 wheat price has been used as the world price. Table 1 indicates that out of 19 years NRP for wheat was negative in 12 years, while it was positive only for 5 years. But in 1987 and 1995 the structure of protection was neutral, as the estimated NRP was 0 for these years. The level of protection was negative in early 1980s with

Table-1 Nominal protection co-efficient (NPC) and nominal rate of protection (NRP) of selected agricultural commodities in Bangladesh

Year	Rice		Wheat		Jute		Sugar		Potato			
	NPC	NRP (per cent)	NPC	NRP (per cent)	NPC	NRP (per cent)	NPC	NRP (per cent)	NPC		NRP (per cent)	
									Import parity	Export parity	Import parity	Export parity
1980	1.23	23	0.91	-9	0.43	-57	1.92	92	0.35	0.74	-65	-26
1981	0.97	-3	0.90	-10	0.44	-56	2.22	122	0.31	0.54	-69	-46
1982	1.36	36	0.96	-4	0.39	-61	3.29	229	0.20	0.30	-80	-79
1983	0.94	-6	0.91	-9	0.65	-35	2.40	140	0.17	0.27	-83	-73
1984	1.13	13	0.86	-14	0.50	-50	2.88	188	0.38	0.49	-68	-51
	(1.13)	(13)	(0.91)	(-9)	(0.48)	(-52)	(2.54)	(154)	(0.28)	(-72)	(0.47)	(-53)
1985	0.95	-5	0.98	-2	0.87	-13	4.43	343	0.29	0.41	-71	-59
1986	1.37	37	1.08	8	0.55	-47	3.63	263	0.26	0.36	-74	-64
1987	1.67	67	1.00	0	0.25	-75	3.58	257	0.29	0.42	-71	-58
1988	1.43	43	0.98	-2	0.58	-42	2.53	153	0.18	0.25	-82	-75
1989	1.45	45	0.95	-5	0.44	-56	2.46	146	0.42	0.61	-58	-39
	(1.37)	(37)	(1.00)	(0)	(0.53)	(-47)	(3.33)	(233)	(0.29)	(-71)	(0.49)	(-59)
1990	1.47	47	1.04	4	0.88	-12	2.41	140	0.25	0.35	-75	-64
1991	1.66	66	0.82	-18	0.59	-41	2.22	122	0.21	0.29	-79	-71
1992	1.44	44	1.05	5	0.49	-51	2.49	149	0.30	0.62	-70	-38
1993	0.77	-23	0.74	-26	0.57	-43	2.29	129	0.32	0.51	-68	-49
1994	0.87	-13	0.70	-30	0.51	-49	1.25	25	0.34	0.54	-66	-46
	(1.24)	(24)	(0.87)	(-13)	(0.61)	(-39)	(2.13)	(113)	(0.28)	(-72)	(0.46)	(-54)
1995	1.19	19	1.00	0	0.59	-41	2.01	101	0.28	0.38	-72	-62
1996	1.01	1	0.97	-3	0.69	-31	2.19	119	0.37	0.50	-63	-50
1997	0.99	-1	1.16	16	1.09	9	2.33	133	0.44	0.59	-56	-40
1998	0.93	-7	1.38	33	0.71	-29	2.82	182	0.34	0.45	-66	-54
	(1.03)	(3)	(1.12)	(12)	(0.72)	(-28)	(2.34)	(134)	(0.36)	(-64)	(0.48)	(-52)
Ave rage	1.19	19	0.91	-9	0.59	-41	2.59	159	0.31	0.45	-69	-55

Note: Figures in parentheses indicate periodic average of NPC & NRP.

Source: Adapted from Huda, (2001)

average NRP being -9 per cent. From mid 1980s, average NRP turned to be zero. In early 1990s the NRP for wheat declined sharply from zero to -13 per cent. In late 1990s, however, the structure of protection turnout to be positive with NRP being 12 per cent (Table 1). Therefore, the border parity price of wheat at producer level measured at the official exchange rate has mostly remained below the domestic producer price, with average NRP of -9 per cent for the period of review (1980 to 1998).

(c) Jute

Jute is an important export commodity and the most important among agricultural exports in Bangladesh. Once upon a time it occupied central position in export item, but with the emergence of readymade garments and introduction of synthetic fibers, it started losing its position from the early 1980s. However, Bangladesh are still the predominant jute suppliers in the world market. Jute fiber or raw jute is internationally traded.

The effects of jute pricing and trade policies have resulted in negative nominal protection. Thus domestic producer prices have always been below the world price (border price at farm level at the official exchange rate), except in the year 1997. A ban on raw jute exports in mid 1980s depressed domestic prices to 75 percent of the world price measured at farm level in 1987. On an average, domestic raw jute price depressed by the 51.8 per cent of the export parity price from 1980 to 1985. After 1987 the domestic price declined to an average of 30 per cent of the world price up to 1998 due to devaluation of domestic currency. In 1997, NRP was positive, that is domestic price was 9 per cent higher than the world price. However, the overall data series reveal that jute has grossly been negatively protected over the period under review.

(d) Sugar

In Bangladesh, about half of the country's need for white sugar is met from imports (Mahmud et al. 1993), thus sugar clearly is an importable commodity and import parity price is the relevant world reference price in this study. The estimates of import parity price are based on the assumption that sugar imports compete with domestic production at the wholesale level and in case of sugarcane; comparison was made at producer level.

The NPC for sugar (Table I) ranged between 1.24 to 4.43 during the investigation period. The Nominal Rate of Protection (NRP) was estimated at 343 per cent in 1985, which was the highest and since then declined to 25 per cent in 1994. These estimates imply that sugar has been highly protected in Bangladesh. These results were also supported by findings of earlier studies by Mahmud et al. (1993) and Rahman (1993). Mahmud et al. (1993) argued that the highly inefficient public refineries, which generally procure sugarcane at administered prices, absorbed much of the protection to sugar. Average Nominal Protection Co-efficient (NPC) for sugar was 2.60. Table 1 shows that on an average domestic wholesale sugar price was 159 per cent above their free-trade equilibrium border parity prices.

(e) Potatoes

Bangladesh are virtually self-sufficient in potatoes production. However, seed potatoes are imported by the BADC from Holland every year. On the other hand, a very small quantity is reported to have been exported under the government's initiative. Due to large production instability induced by weather shifts, periods of scarcity and surplus arises, altering the potential trade status of the country in this commodity (Rahman 1993). In calculating protection rates, both import and export parity prices at producer's level were used as the reference price under free trade. The results indicated that potato production was negatively protected for the investigation period 1980 to 1998 both at export and import parity prices. The Nominal Rate of Protection (NRP) implied that in Bangladesh domestic producer price is 70 per cent and 55 per cent lower than its free trade equilibrium prices at export and import parity levels respectively.

(ii) Effective protection

Government policy in Bangladesh often tries to compensate producers for low farm prices by subsidies on inputs. So the present study has estimated the level of effective protection, as it is a relevant measure of incentive. EPC and ERP have been calculated for each crop based on technical co-efficient (e.g. units of fertilizer for producing per tonne rice).

As noted in Table 2, the EPCs for rice were more than one in most of the years investigated. The average EPC worked out for rice was 1.23 at official exchange rate. So the estimates of ERP implied that the domestic rice market was marginally protected. The policy of self-sufficiency in foodgrain production has been at the expense of protection for rice. The incentive for factors of production of rice increased the protection level on an average to 3.9 percent. EPC of wheat was found similar to its NPC, as product specific fertilizer subsidies further reinforced only 3 per cent protection on the product side. In the case of jute, the effective protection co-efficient was in general similar to nominal protection coefficient presented earlier. This is due to low traded input component used in jute production. The estimates of ERP (Table 2) for jute implied that the factors of production of jute could be paid up to 18 percent under free trade and still could remain competitive with import. There is an incentive for factors to be pulled into production of jute. The average EPC worked out for sugar was 2.61 at official exchange rate, which was similar to nominal protection co-efficient, presented earlier. Therefore, the estimates of ERP implied that the domestic sugar market was highly protected with both product and non-product subsidies. So sugar production has not been efficient import substitutes.

Like other crops, traded inputs cost are very low in potato production. As a result the effective rates of protection were similar to the nominal rates of protection presented earlier. The average effective protection co-efficient was worked out at 0.25 and 0.41 at import parity and export parity price respectively for the period 1980 to 1998. The estimates of ERP (Table 2) for potato implied that the factors of production of potato could be paid upto 75 per cent considering import parity price and 59 per cent considering export parity respectively.

Table 2. Effective rates of protection for selected agricultural commodities In Bangladesh.

Year	Rice		Wheat		Jute		Sugar		Potato			
	EPC	ERP	EPC	ERP	EPC	ERP	EPC	ERP	EPC		ERP (per cent)	
		(per cent)		(per cent)		(per cent)		(per cent)	(per cent)	Import parity	Export parity	Import parity
1980	1.26	26	0.92	-8	0.48	-52	1.93	93	0.28	0.73	-72	-27
1981	0.99	-1.3	0.90	-10	0.44	-56	2.24	124	0.25	0.47	-75	-53
1982	1.47	47	0.99	-1	0.38	-62	3.32	232	0.11	0.18	-89	-82
1983	0.94	-6	0.92	-8	0.65	-35	2.42	142	0.10	0.16	-90	-81
1984	1.19	19	0.87	-13	0.49	-51	2.91	191	0.27	0.44	-73	-56
1985	0.99	-0.2	0.95	-5	0.87	-13	4.50	350	0.23	0.36	-77	-64
1986	1.51	51	1.20	20	0.52	-48	3.67	267	0.22	0.31	-78	-69
1987	1.83	83	1.07	7	0.24	-76	3.61	261	0.25	0.37	-75	-63
1988	1.17	17	1.07	7	0.57	-43	2.55	155	0.14	0.20	-84	-80
1989	1.59	59	1.00	0	0.43	-57	2.47	147	0.40	0.60	-60	-40
1990	1.61	61	1.16	16	0.90	-10	2.42	142	0.23	0.36	-77	-64
1991	1.99	99	0.88	-12	0.59	-41	2.24	124	0.18	0.25	-82	-75
1992	1.67	67	1.19	19	0.49	-51	2.51	151	0.27	0.47	-73	-53
1993	0.70	-30	0.76	-24	0.56	-44	2.31	131	0.29	0.48	-71	-52
1994	0.92	-7.5	0.74	-26	0.51	-49	1.25	25	0.30	0.51	-70	-49
1995	1.43	44	1.13	13	0.60	-40	2.02	102	0.25	0.35	-25	-65
1996	1.06	6	1.07	7	0.70	-30	2.20	120	0.33	0.47	-67	-53
1997	1.06	6	1.33	33	1.1	-10	2.34	134	0.40	0.57	-60	-43
1998	0.99	-1	1.56	56	0.7	-30	2.83	183	0.31	0.42	-69	-58
Average	1.24	24	1.03	3	0.81	-19	2.62	161	2.5	0.41	-75	-51

Source: Adapted from Huda, (2001)

IV. CONCLUSIONS

The results of the study revealed that agricultural price and trade policy in Bangladesh was uneven with respect to production of individual commodities. The main food crop rice was marginally protected at import parity prices as the estimates of NPC were found greater than unity for most of the years. In achieving the goal of self-sufficiency in foodgrain production, rice production was moderately protected in Bangladesh with 19 percent of NRP. As Bangladesh needs to maintain self-sufficiency in production of rice such moderate protection may be rationalized. The NPC of wheat ranged between 0.70 and 1.33. The average nominal rate of protection for wheat was found -9 per cent, which indicated that wheat production was negatively protected in Bangladesh. Domestic production of wheat may require mild protection for expanding production as an import substitution position. The measurement of NPC and NRP for the major export crop jute revealed that it was heavily taxed with NPC ranging between 0.25 to 1.0 and an average NRP being -41.0 per cent. In order to attract resources for jute production, adequate incentive is required. Sugar production in Bangladesh has been excessively protected. On an average, the domestic sugar price was 160 per cent above the world price evaluated at import parity level. The government policy should be concerned with finding out appropriate ways and means for more effective use of

public refineries by diversifying the sugar industry. Potato emerged to be a potential tradable commodity, which was implicitly, taxed both at importable or exportable situations, with NRP being -70.0 per cent and -55.0 per cent respectively. It implied that with a considerable amount of subsidy, potato would be still be enjoying competitiveness with world price. Therefore incentives for potato production could be increased as a means of export earning. The ERP was in general similar to NRP for all crops except rice. This was due to lower traded input cost components in the production of the commodities.

Finally the indicators of price distortion analyzed in the paper gave a measure of magnitude of the incentive effects of price policies on producers and consumers. But it did not trace out the efficiency, welfare, government budget and balance of trade implication of distortion signals. Therefore the study suggests for undertaking further research in these directions.

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