

## **Impact of WTO's Trade Liberalisation on Selected Food Crops in Pakistan**

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### **I. INTRODUCTION**

There is a great potential in Pakistan for production of all types of food commodities due to vast natural resource base, covering various ecological and climatic zones. Most of the agricultural commodities produced in the country are consumed by the local population while the rest is exported in the form of primary products and some value added products. Previously, Pakistani products had a good market overseas with no restrictions of quality and quantity but under the changing environment affected by WTO, it is expected that Pakistan will face a strong competition in the agriculture sector from its competitors in the world market. According to the neoclassical trade theory, trade flows and pattern will develop along the lines of comparative advantage and competitiveness that can act as indicators of trade potential and direction.

There has been extensive government involvement in the determination of the overall structure of agriculture and its patterns of production, employment and trade. Pakistani government has been intervening in agriculture sector in the past in order to support agricultural production, income supports, ensure food security, improve the balance of trade, reduce consumer prices, address environmental and regional concerns and to pursue sanitary and phyto-sanitary objectives [Hassan (1995)].

Pakistan is a founding member of the General Agreement on Tariffs and Trade (GATT) since its creation. Following the Uruguay Round negotiations, all agricultural products were brought under multinational trade rules by WTO, under the Agreement on Agriculture. This established a framework to begin liberalising agricultural trade through the reduction of import duties (tariffs), trade-distorting production subsidies and export subsidies. Prior to the Uruguay Round, trade in agriculture was highly distorted. Market access for agricultural products was limited as most markets were restricted by physical import barriers. The presence of massive domestic subsidies led to overproduction of temperate crops in the developed countries that led to excess supply, and export subsidies were used to dump the surplus agricultural output in international markets. This resulted in depressed market prices and, in spite of being low-cost producers of agricultural products; developing countries could not compete with the subsidised exports from developed countries.

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Trade liberalisation is posing some serious challenges for agriculture sector and particularly for major food crops i.e. wheat and rice. Wheat is the most important food crop of Pakistan and has remained the central theme of self-sufficiency programmes in the country. It contributes 13.8 percent to the value added in agriculture and 3.4 percent to GDP. It is sown on about 37 percent of the total cropped area, and shares 80 percent in consumption of food grains, while its share in food grain production is around 70 percent (GOP, 2003-04). As a primary diet, wheat alone shares about 50 percent of the total calories and proteins intake in Pakistan, and contributes about 8 percent of the total fat consumed (FAO, various issues). Pakistan is one of the major producers of wheat in the world. Yet the domestic wheat production remains insufficient for the needs of population, which is at present growing at about 2.0 percent per annum. Hence to ensure food security, the country has to supplement the local production with imports. It is estimated that imports cover from 10-20 percent of national consumption needs [Ashiq and Ahmed (2001)].

During the UR of talks, the United States and Canada, promised to reduce government subsidies on wheat farmers. These two countries are major source of wheat imports of Pakistan. Since they are the major supplier of wheat in the world too, they are the price leaders. The elimination of subsidies on wheat by these countries would result in higher prices of Pakistan's wheat imports.

Rice is considered as one of the most important food cash crop playing a vital role in uplifting the country's economy. Firstly, it is a second staple food and contributes more than two million tones to our food requirement. Secondly, rice industry is an important source of employment and income for the rural people. Thirdly, it contributes in the foreign exchange earning for the country. It accounts for about 5.4 percent in value added in agriculture and 1.3 percent in GDP [Pakistan (2003-04)]. Basmati rice accounts for about 63 percent whereas, IRRI rice for the remaining 37 percent of total rice area in Pakistan. The contribution of other varieties, in the total area and production of rice is almost negligible.

Pakistan is one of the ten big exporting countries that dominate world rice trade. The stable growth of rice production has helped Pakistan meet increasing domestic demand and have surplus for export. Rice exports on the average increased over the last two decades but have experienced large annual variation due to various reasons.

Trade liberalisation is having a profound impact on the international rice market because rice market has been the highly protected in both industrialised and developing nations [Wailes (2002)]. Increased market access has been the most significant impact of the URAA for rice, following the implementation of minimum access (MA) commitments for Japan and South Korea.

Keeping in view the present global economic scenario and the speed with which Pakistan is opening its product market, there is a widespread concern about the effects of trade liberalisation on agriculture, whereas, improving the economy of the agricultural sector, achieving self-sufficiency in food, and improving farmer's income are the top priorities of the country.

Considering the present structure of agriculture sector, natural resource base, policy environment, trade related infrastructure, political economy, etc. the country is gradually moving towards liberalising trade in agriculture and is taking certain steps to support the domestic agricultural sector to compete in the international market. To fully implement all the requirements of the Uruguay Round agreement on agriculture, the

country has a long way to go, especially in terms of improving the trade infrastructure, quality of the products, environmental issues and issues related to sanitary and phyto-sanitary requirements of the agreement. To smoothly proceed towards a more liberalised economic environment, the expected effects of trade liberalisation related to various agricultural products, especially, those on the major food crops are needed to be identified and measured. The more specific objectives of the study are as follows:

- To analyse the welfare effects of trade liberalisation on the producers and consumers of major food commodities like wheat and rice in Pakistan.
- To determine the impact of trade liberalisation on farmers' returns from major food crops (wheat, rice) at farm level in Punjab.
- To implicate policy options for smooth adjustment process of trade liberalisation of agriculture in Pakistan.

## II. RESEARCH METHODOLOGY

### Selection of the Sample and Data

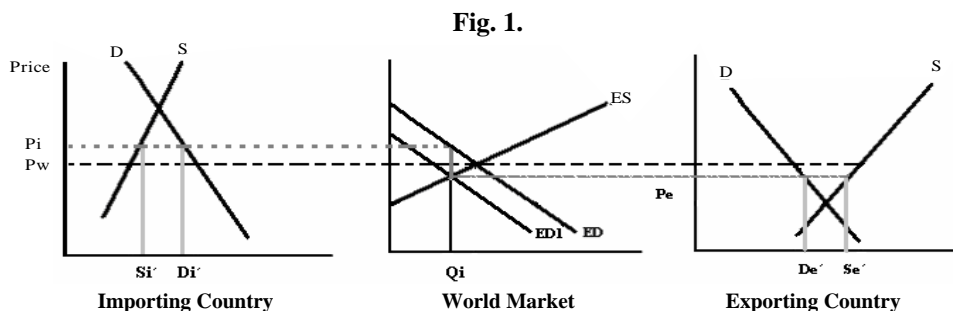
Wheat and rice are the main food grain crops of Pakistan so they were selected for studying the impacts of trade liberalisation both at national and farm levels. To determine the location specific impact, the rice-wheat cropping system of Punjab was selected, which is one of the major systems in Pakistan occupying more than 2.2 million hectares. The secondary data were collected from Federal Bureau of Statistics, Agricultural Statistics of Pakistan, Agricultural Prices Commission, Economic Survey of Pakistan, Ministry of Commerce, MINFAL and FAO.

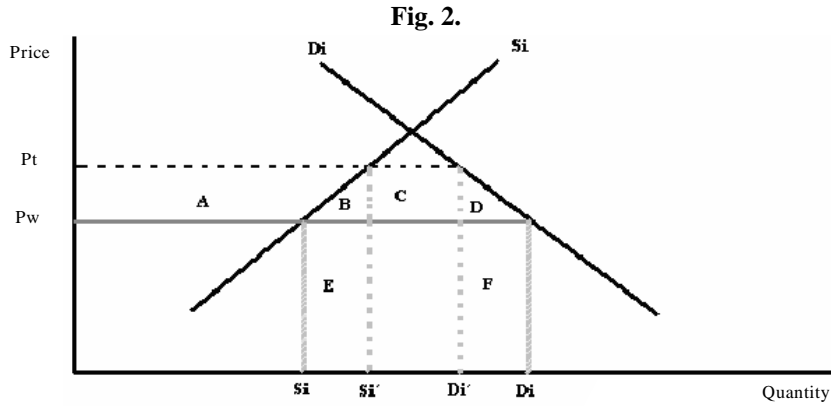
### Analytical Framework

Pakistani government intervenes in agriculture to influence product and input markets. Frequently used measures include tariffs, quotas and subsidies designed for trade protection or enhancement and price support intended to increase farm income.

The social welfare effects of an import tariff have impacts in both the importing and exporting countries due to the imposition of the tariff.

The introduction and effects of a tariff are shown in Figure 1 by the downward shift of the excess demand curve to  $ED_1$ , as the tariff acts as a tax on consumption, the new quantities demanded and supplied in the importing and exporting countries are represented by  $\hat{D}_i$  and  $S_i'$  and  $D_e'$  and  $S_e'$ , respectively.





As shown in Figure 2, the impact of the tariff on the importing country raises domestic prices to  $P_t$ , increases quantity supplied to  $S_i'$  and decreases quantity demanded to  $D_i'$ . This results in a decrease in imports from  $S_i - D_i$  to  $S_i' - D_i'$ . The geometric areas A-F can identify the welfare effects wherein A is an increase in producer surplus, as producers produce more with the higher price  $P_t$ . This area is a transfer from consumers as they pay more for the increase in quantity supplied. B is the extra cost to produce the extra supply above what it would cost to import the same quantity and represents a dead weight social welfare loss to society, since the resources representing area B could have been used to produce something else in the country. C is revenue that is collected by the importing government from domestic consumers while D is the loss in consumer surplus when consumers reduce their consumption because of the higher price  $P_t$ . This area represents a dead weight social welfare loss because it is not a transfer to another group in society. E and F represent savings in foreign exchange for the importing country and losses in foreign exchange to the exporting country [Akhtar (1999)].

**Fig. 3.**

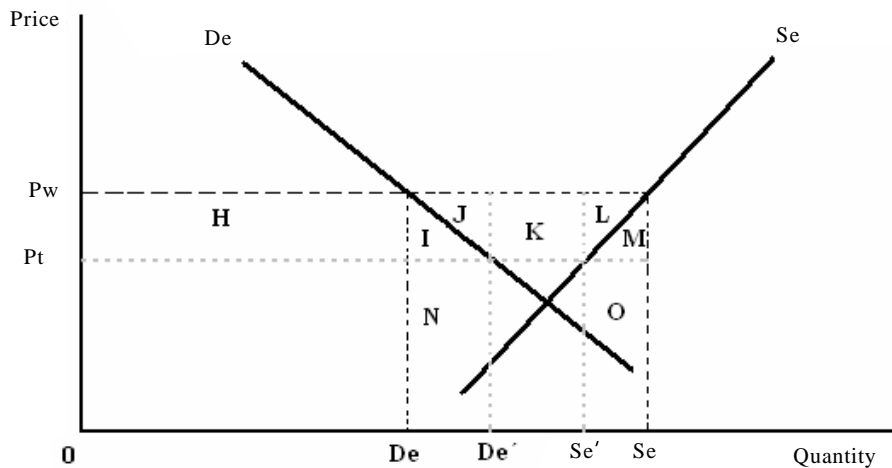


Figure 3 shows the impacts of the tariff in the exporting country where tariff reduces the domestic price to  $P_t$ , increase the domestic quantity demanded to  $D_e'$  and decreases quantity supplied from  $S_e$  to  $S_e'$ . This results in a decrease in exports from  $D_e - S_e$  to  $D_e' - S_e'$ . The welfare effects can be identified by the geometric area H-O wherein H and I together represent an increase in consumer surplus, as domestic consumers buy more of the item when its price falls to  $P_t$ .

H-L together represents a loss in producer surplus; J is the dead weight social welfare loss. K represents the revenue obtained by the importing country from the exporting country producers. This is a social welfare loss in the exporting country and L is a dead weight social welfare loss.

M and O represent the opportunity cost of resources that are saved by the reduced production. These resources may be used for other activities in the exporting country and therefore, do not represent a net social welfare loss. N is the additional cost that consumers must pay for their increased demand and, therefore, is not a welfare loss. N and O together represent losses in foreign exchange to the exporting country and savings in foreign exchange for the importing country.

Using the welfare analysis [Akhtar (1999)], effects of trade liberalisation on major agricultural commodities were calculated. Following equations were estimated for quantitative analysis:

(1). consumer and producer surpluses were estimated using following equations:

$$\text{Consumer Surplus} = (P_t - P_w) [D_i' + (D_i - D_i') 0.5] \quad \dots \quad \dots \quad \dots \quad (1)$$

$$\text{Producer Surplus} = (P_t - P_w) [S_i + (S_i' - S_i) 0.5] \quad \dots \quad \dots \quad \dots \quad (2)$$

Where  $D_i'$  and  $S_i'$  are the demand and supply after trade.

(2). In evaluating the quantitative effects of liberalisation on wheat and basmati and non-basmati rice (IRRI), following functions were estimated for each commodity viz. the domestic demand and supply functions, and two price linkage equations. Nominal prices were used for the analysis and the equations were estimated through double log standard regression analysis by using SPSS.

### Domestic Demand Function

$$\text{Domestic Demand (QD}_i) = f(\text{PC}_i, \text{I})$$

$$\text{Elasticity of demand (E}_{pc}) = (\% \Delta \text{QD}_i) / (\% \Delta \text{PC}_i)$$

Where

(QD<sub>i</sub>) = Total quantity demanded of commodity i;

PC<sub>i</sub> = Domestic market price of commodity i;

I = Per capita Income; and

E<sub>pc</sub> = Demand elasticity of commodity i with respect to its market price.

### Domestic Supply Function

The supply response of wheat and rice (Basmati and IRRI) can be assumed to be a function of their own prices, prices of other relevant crops, prices of inputs and

technology [Ali (1990)]. For this study, to measure price elasticity coefficients, commodity's own price and technology were used keeping other factors constant.

$$\text{Domestic Supply (QS}_i) = f(\text{PF}_i, T)$$

$$\text{Elasticity of Supply (EP}_f) = (\% \Delta Q_{si}) / (\% \Delta \text{PF}_i)$$

Where

QS<sub>i</sub> = Total quantity supplied of commodity i;

PF<sub>i</sub> = Price of commodity i at farm level;

T = Trend (year as a proxy for technology) and 1982=1, 1983=2, ..., 2004=23;

EP<sub>f</sub> = Supply elasticity of commodity i with respect to its market price.

### Price Linkage Equations

Two price linkage equations were estimated. Equation 3 ascertained the relationship between world and domestic prices whereas the Equation 4 represented the relationship between wholesale and farm level prices [Akhtar (1999)].

$$\text{PC}_i = \text{PC}_{if} + \text{Tariff} + \text{Transfer cost} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

$$\text{PF}_i = a + \beta * \text{PC}_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

$$E_t = (\% \Delta \text{PF}_i) / (\% \Delta \text{PC}_i)$$

Where,

PC<sub>i</sub> = Domestic market price of commodity i

PC<sub>if</sub> = World Price of commodity i

PF<sub>i</sub> = Price of commodity i at farm level

β = Farm price transmission elasticity of commodity i with respect to its market price (% ΔPF<sub>i</sub>) / (% ΔPC<sub>i</sub>).

The location specific impact of trade liberalisation on rice and wheat was analysed using partial budgets of these crops without trade liberalisation (for 1993-94) and with trade liberalisation (for 2003-04) at farm level. Net Returns were calculated using the formula

$$\text{Net Returns} = \text{Gross Returns} - \text{Gross Costs}$$

## III. RESULTS AND DISCUSSION

### Impact of Trade Liberalisation on Wheat at National Level

To assess the impact of trade liberalisation on wheat at the national level in Pakistan, supply, demand and price linkage equations were estimated using standard regression analysis. All the equations were used to assess the impact of a 7 percent [FAO (1995)] increase in the international prices on domestic supply, demand, wholesale price; and producer and consumer surpluses. The estimated parameters were consistent across equations and with prior expectations concerning sign and significance except the price coefficient in the demand equation of wheat.

**Estimated Supply Equation for Wheat in Pakistan (QSW)**

$$\begin{aligned} \text{Log (QSW)} &= 7.796 + 0.231 \text{ Log (FPW)} + 0.012 \text{ TREND} \quad \dots \quad \dots \quad (5) \\ &\quad (6.066)^{***} \quad (1.774)^{**} \quad (0.791) \\ R^2 &= 0.90 \quad E_{sw} = 0.231 \quad DW = 2.48 \end{aligned}$$

Where QSW is total production of wheat in Pakistan (000 tons) while FPW is farm level price of wheat (Rs/ton) and  $E_{sw}$  is the elasticity of supply w.r.t. farm level price of wheat.

**Estimated Domestic Demand Equation for Wheat in Pakistan**

$$\begin{aligned} \text{Log (WCON)} &= 10.97 - 0.121 \text{ Log (WPW)} + 0.114 \text{ log (PCI)} + 0.027 \text{ TREND} \quad \dots (6) \\ &\quad (3.32)^{***} \quad (1.308) \quad (1.27) \quad (1.38) \\ R^2 &= 0.357 \quad E_{dw} = -0.121 \quad DW = 2.00 \end{aligned}$$

Where WCON is per capita consumption of wheat  $\times$  population; WPW is whole sale price of wheat at Lahore (Rs/ton), PCI per capita income (Rs) and  $E_{dw}$  is elasticity of demand with respect to wholesale price of wheat.

**Price Linkage Equations for Wheat:** There were two sets of price linkage equations, which represented the relationship between price of wheat at farm level and price of wheat at various market channels. The estimated results of the relationship between the wholesale price of wheat at Lahore versus world price of wheat are as follows:

$$\begin{aligned} \text{Log (WPW)} &= -1.29 + 1.13 \text{ Log (IPW)} \quad \dots \quad \dots \quad \dots \quad (7) \\ &\quad (-1.64) \quad (11.86)^{**} \\ R^2 &= 0.887 \quad E_{ww} = 1.13 \quad DW = 1.64 \end{aligned}$$

Where IPW is world price of wheat (Rs/ton) and  $E_{ww}$  is elasticity of wholesale price of wheat at Lahore with respect to its export price.

The results of the estimated price linkage equation for the farm gate price of wheat versus wholesale price of wheat at Lahore are as under:

$$\begin{aligned} \text{Log (FPW)} &= 0.244 + 0.95 \text{ Log (WPW)} \quad \dots \quad \dots \quad \dots \quad (8) \\ &\quad (0.291) \quad (28.31)^{***} \\ R^2 &= 0.974 \quad E_{fw} = 0.95 \quad DW = 2.18 \end{aligned}$$

Where  $E_{fw}$  is elasticity of farm gate price of wheat with respect to its wholesale price.

**Impact on Domestic Prices of Wheat in Pakistan**

From Equation 7, the elasticity of wholesale price of wheat at Lahore with respect to international price (c.i.f. Karachi) was 1.13. Therefore, the increase in the world prices of wheat by 7 percent would have caused an increase in the wholesale price of wheat in Pakistan by 7.91 percent under globalisation. Therefore, the wholesale price of wheat during 2004-05 would have increased from Rs 8,827/ton to Rs 9,525/ton.

The impact of the increase in wholesale price of wheat on the price received by wheat growers was estimated by Equation 8. It was estimated by using elasticity of transmission of the wheat price received by farmers with respect to the wholesale price of wheat at Lahore, which was found to be 0.95. The impact is such that the price of wheat

received by farmers (farm-gate price) would have increased by 6.65 percent in 2004-05 (from Rs 8,175/ton to Rs 8,719/ton).

### Impact on the Domestic Supply and Demand of Wheat

From Equation 5, the elasticity of supply of wheat with respect to farm level price was 0.23. The impact of the 7 percent increase in the world price of wheat on the price of wheat received by the farmers was estimated at  $(7 \times 0.95)$  in 2004-05. Therefore, this would have increase the domestic production of wheat by  $(7 \times 0.95)$  (0.23), i.e. from 19.50 million tons to 19.80 million tons during 2004-05. This increase in production of wheat would have generated a gain in producers' surplus of Rs 10,682 million (using Equation 6 of the analytical framework in methodology).

The impact on domestic demand for wheat was estimated by Equation 6. The demand elasticity with respect to Lahore wholesale price of wheat was  $-0.121$ . Therefore, the impact of the 7 percent increase in world price of wheat on the wholesale price was estimated to be 7.91 percent, as elasticity of wholesale price of wheat at Lahore with respect to international price (c.i.f. Karachi) was estimated to be 1.13, given by the Equation 7. Therefore, this would have caused the per capita demand for wheat to decline by 0.957 percent. The domestic demand of wheat was estimated to decline from 18.07 million tons to 17.90 million tons during 2004-05.

The increase in wholesale price of wheat in Pakistan and resultantly decrease in quantity demanded would have caused a loss of consumer's surplus of Rs 12,557 million (using Equation 5 of the analytical framework in methodology). It can be concluded from the preceding analysis that the 7 percent increase in the international price of wheat due to trade liberalisation had a positive impact on the production of wheat in Pakistan. On the other hand it caused a negative impact on the consumers while the overall impact or net loss to Pakistan was of Rs 1,875 million.

### Impact of Trade Liberalisation on Rice (Basmati) at National Level

Following results, representing coefficients of price transmission, supply and demand elasticities of basmati rice, are unit-free and relate only to percentage changes. The  $R^2$ , DW and F-statistics, all showed reasonable values.

#### Estimated Supply Equation for Basmati Rice in Pakistan

$$\begin{aligned} \text{Log (BP)} &= 4.308 + 0.322 \text{ Log (FPB)} + 0.011 \text{ TREND} \dots \dots \dots (9) \\ &\quad (2.624)^{***} \quad (1.650)^{**} \quad (0.627) \\ R^2 &= 0.861 \quad E_{sbr} = 0.322 \quad DW = 1.758 \end{aligned}$$

Where BP is total production of basmati rice in Pakistan ( $\hat{c}$  000 tons), FPB is farm-gate price of paddy in Pakistan (Rs/ton) and  $E_{sbr}$  is elasticity of supply with respect to farm-gate price of paddy.

#### Estimated Domestic Demand Equation for Rice in Pakistan

$$\begin{aligned} \text{Log (BCON)} &= 7.243 - 0.225 \text{ Log (WPB)} + 0.126 \text{ Log (PCI)} + 0.0456 \text{ TREND} \dots (10) \\ &\quad (2.380)^{**} \quad (1.993)^* \quad (1.371) \quad (1.780)^* \\ R^2 &= 0.683 \quad E_{dbr} = -0.225 \quad DW = 1.451 \end{aligned}$$



Where BCON is total consumption of Rice ('000' tons), WPB is wholesale price of Rice in Lahore (Rs/Ton) and  $E_{dbr}$  is demand elasticity of Basmati rice w.r.t wholesale price.

### Price Linkage Equations for Rice

Two sets of price linkage equations, representing the relationship between price of paddy at farm level and price of milled rice at various market channels, were estimated. The results of the relationship between wholesale price of milled rice at Lahore versus its export price are given below:

$$\begin{aligned} \text{Log (WPB)} &= -0.746 + 1.036 \text{ Log (IPB)} \quad \dots \quad \dots \quad \dots \quad \dots \quad (11) \\ &\quad (-0.888) \quad (11.764)^{***} \\ R^2 &= 0.868 \quad E_{wbr} = 1.036 \quad DW = 1.615 \end{aligned}$$

Where IPB is export price of Rice (Rs/ton) and  $E_{wbr}$  is elasticity of wholesale price of rice at Lahore w.r.t. its export price.

The estimated results of the relationship between the farm-gate price of paddy versus wholesale price of rice at Lahore are as under:

$$\begin{aligned} \text{Log (FPB)} &= -1.427 + 1.076 \text{ Log (WPB)} \quad \dots \quad \dots \quad \dots \quad \dots \quad (12) \\ &\quad (-4.251)^{***} \quad (29.272)^{***} \\ R^2 &= 0.976 \quad E_{fbr} = 1.076 \quad DW = 1.68 \end{aligned}$$

Where  $E_{fbr}$  is elasticity of farm-gate price of rice with respect to its wholesale price.

### Impact on Domestic Prices of Rice in Pakistan

From Equation 11, the elasticity of price transmission of wholesale price of Rice at Lahore with respect to its export price was 1.036. It means that 1 percent increase in the export price of rice would increase wholesale price of rice by 1.036 percent at Lahore. Therefore the increase in the export price of rice by 7 percent would have caused an increase in the wholesale price of rice in Pakistan by 7.252 percent under full trade liberalisation. Thus the wholesale price of rice during 2004-0 would have increased from Rs 23328/ton to Rs 25020/ton.

The impact of the increase in wholesale price of rice on the farm gate price of paddy was estimated using Equation 12. The elasticity of price transmission of the paddy at farm gate with respect to wholesale price of rice at Lahore was 1.076. The impact was such that the farm gate price of paddy would have increased by 7.532 percent in 2004-05 (from Rs 12525/ton to Rs 13468/ton) as a result of 7 percent increase in the wholesale price of rice at Lahore.

### Impact on the Domestic Supply and Demand of Rice

From Equation 9, the elasticity of supply of rice with respect to its farm level price was 0.322. The impact of the 7 percent increase in the world price of rice on the farm gate price of paddy was estimated at  $(7 \times 1.076)$  in 2004-05. Therefore, this would have caused an increase in the domestic production of rice by  $(7 \times 1.076)$  (0.322), i.e. from 3884 thousand tons of Basmati paddy (2522 thousand tons of rice  $\times$  1.54) to 3978 thousand tons (2583 thousand tons of rice  $\times$  1.54). This increase in production of paddy would generate a gain of producers' surplus of Rs 3708 million (using Equation 6 of the analytical framework in methodology).

The impact on the domestic demand for rice was estimated by Equation 10. The demand elasticity with respect to wholesale price of Basmati at Lahore was  $-0.225$ . Therefore, the impact of the 7 percent increase in world price of rice on wholesale price was estimated to be 7.252 percent. This would have caused the domestic demand for Basmati rice to decline by 1.63 percent.

The domestic demand of rice was estimated to decline from 16.03 million tons to 15.77 million tons during 2004-05. The increase in wholesale price of rice in Pakistan and resultant decrease in quantity demanded would have caused a loss of consumer's surplus of Rs 2690 million. It can be concluded from the above analysis that the 7 percent increase in the international prices of rice due to trade liberalisation would have a positive impact on the production of rice in Pakistan while causing a negative impact on the consumers although the net gain to Pakistan was to be Rs 1018 million.

### **Effects of Trade Liberalisation at Farm Level**

Impact of trade liberalisation on wheat and Basmati rice was analysed using the partial budgets of these crops without liberalisation (during 1993-94) and with trade liberalisation (during 2004-05) at farm level in the rice areas of Punjab (Appendices A1 and A2). The impact of trade liberalisation was analysed through the changes in input and output prices which considerably increased from 1993-94 to 2004-05 as the support prices of these crops significantly increased and were quite close to the international prices (which were used to be below international prices). Government allowed trade of these commodities to the private sector which used to be completely under its control.

#### ***Impact of Trade Liberalisation on Wheat at Farm Level***

The impact of trade liberalisation on wheat producers was analysed using the partial budgets of wheat crop without (1993-94 crop) and with (2004-05 crop) trade liberalisation at farm level in the rice areas of Punjab (Appendix A1). During this period, the minimum support price of wheat had considerably increased and was close to the International price during 2004-05. Expenditure on fertiliser, irrigation and land preparation significantly increased from 1993-94 to 2004-05. For Example, expenditure on fertiliser increased from Rs 1,187/ha to Rs 4,804/ha during this period. Total cost of production of wheat increased from Rs 8,130/ha to Rs 26,576/ha during before and after liberalisation period. Gross cost per ton of wheat increased from Rs 3,764 to Rs 10,673 for with and without trade liberalisation, respectively. These results show positive impact of trade liberalisation on wheat production in Punjab.

#### ***Impact of Trade Liberalisation on Basmati Rice at Farm Level***

The impact of trade liberalisation on Basmati was analysed using the partial budgets of Basmati crop without (1993-94 crop) and with (2004-05 crop) trade liberalisation at farm level in the rice areas of Punjab (Appendix A2). Expenditure on fertiliser, irrigation and land preparation had significantly increased from 1993-94 to 2004-05. For Example, expenditure on fertiliser increased from Rs 1,109/ha to Rs 3,378/ha while total cost of production increased from Rs 9,439/ha to Rs 27,831/ha before and after liberalisation period. Gross cost per ton of Basmati rice increased from

Rs 4,271 to Rs 13,253 for with and without trade liberalisation, respectively. These results show positive impact of trade liberalisation on Basmati production in Punjab.

The trade liberalisation in agriculture is affecting the production and consumption of major food commodities in many ways. It is argued that trade liberalisation will increase domestic prices of basic food stuffs and thus will serve as incentives for farmers to increase production. Moreover, keeping in view relatively inelastic supply response, the finding of means to increase agricultural productivity and the issue of food security would be a challenge to Pakistan in the near future. In the case of rice, domestic price is expected to be significantly higher than it would have been in the absence of Uruguay Round. Such increase in price, on the domestic level, would increase the production while internationally it would mean higher prices for rice exporters. The effect on the consumption of rice would be relatively slight mainly due to increasing trend in the rice consumption, which is likely to continue.

#### IV. SUMMARY AND CONCLUSION

The study intended to evaluate the impact of WTO on domestic prices, production and consumption of major food commodities like wheat and rice and ultimately their impact on the producers' and consumers' surpluses. The farm level impact was also calculated to chalk out the eventual position at farm level with the purpose to identify necessary policies and actions to cope with the new world situation. The study tries to provide a useful guide to the likely impacts of agricultural liberalisation. The findings of this study may be summarised as follows.

The impact of trade liberalisation on wheat was estimated by standard regression analysis, utilising data on the relevant variables for the period 1982-83 to 2004-05. Using an FAO study, it was assumed that the international price of wheat would increase by 7 percent. Due to this 7 percent increase, it was estimated that wholesale and farm level prices of wheat in Pakistan would increase by 7.91 and 6.65 percent, respectively under full liberalisation. The increase in farm level prices would have increased the total production of wheat from 19.50 million tons to 19.80 million tons during 2004-05. This increase in production of wheat would have generated a gain of producer's surplus of Rs 10682 million. On the other hand due to increase in wholesale price of wheat, the domestic demand of wheat would have declined and caused a loss of consumer surplus of Rs 12,557 million. Overall the impact of the increase in the international price of wheat would have resulted in a net loss to Pakistan of Rs 1,875 million during 2004-05.

In case of basmati rice, the results showed that the wholesale and farm gate prices of basmati rice would have increased by 7.25 percent. The increase in the farm level price would have increased the total production of rice from 3,884 thousand tons to 3,978 thousand tons during 2004-05. This increase in the production of rice would have generated a gain of producer's surplus of Rs 3708 million. However, due to increase in the wholesale price of rice (by 7.252 percent), its domestic demand would have declined thus causing a loss to consumers' surplus. Overall the impact of the increase in the international prices of rice would have resulted in a gain to Pakistan of Rs 1,215 million in 2003-04.

To study the impact of trade liberalisation at farm level, the rice-wheat area of Punjab province was selected to analyse the effects on wheat and rice. Partial budgets of

these two commodities were estimated for this purpose. The cost of production and net returns for wheat and rice were estimated for the scenarios 'without trade liberalisation' (using base year 1993-94) and 'with trade liberalisation' (for 2004-05). The difference in cost of production and net returns between these two scenarios was assumed to be the effect of trade liberalisation at the farm level while keeping the yield constant.

Costs of production of wheat and rice increased by Rs 18,595/ha and Rs 18,553/ha respectively, during 2004-05 as a result of trade liberalisation. On the other hand, net returns in case of wheat and rice increased by Rs 2255/ha and Rs 1345/ha, respectively during 2004.

Finally, on the basis of above findings, the study concluded that along with the challenges, liberalisation also offers immense scope for sustained agricultural performance. This, however, cannot come about automatically as most of the gains from trade liberalisation would largely depend on the extent of internal liberalisation and adjustability of national agricultural policies to changing global economic environment.

### **Suggestions**

Following suggestions may prove useful for the smooth process of liberalisation:

- Agricultural policy needs to aim at improved infrastructure and institutions. Without infrastructure and other institutional approach, Pakistan may not be able to take advantage of price increase in the world market.
- It is expected that domestic prices of wheat will increase considerably and the country will have to spend a huge amount of foreign exchange on its imports and the best strategy would be to achieve self sufficiency through increased productivity of the local wheat crop which is far below the potential yield levels.
- Export of rice is expected to gain from increased prices. Government should play its role in terms of funding new research and development activities, aimed at improving rice quality so that Pakistan remains competitive in the world rice market.
- Internal liberalisation is the key to fully benefiting from external trade liberalisation in agriculture. There is a need to remove distortions in the agricultural sector, such as excessive and unnecessary government control, restrictions on produce movement and private sector participation in agriculture, fixing minimum support prices, etc.
- Due to lower (or negative) net returns from planting food grains, including wheat, the cropping pattern is getting diversified with a shift from food grains towards high value and export oriented crops. This is a very serious issue, since with the current population growth of around 2 percent; demand for food commodities is increasing at a faster rate. In such a situation there is need to carefully design policies on such transformation, although earnings from high value crops may be used to import food grains.
- Trade-related physical infrastructure in the country needs considerable improvements to fulfil the growing needs of international trade in Pakistan. Facilities such as the transport network, equipment for quality control, bulk storage and handling, railway sheds, etc., should be improved through increased public and private investment.

## APPENDIX

Appendix Table A1

*Average Farmer's Cost of Production and Returns of Wheat Crop in Punjab, Pakistan*

Operations/Input/Output	Without Trade Lib*	With Trade Lib**	Difference
	(Rs/hac)	(Rs/hect)	(Rs/hect)
1. Land Preparation	785.78	2022.93	1237.15
2. Seeds and Planting	784.69	2687.36	1902.67
3. Interculture/Weeding/Weedicides	45.42	508.27	462.85
4. Farm Yard Manure	52.34	111.15	58.81
5. Fertiliser	1187.06	4804.07	3617.01
6. Irrigation	674.75	4870.84	4196.09
7. Interest on Investment @ 14 percent Per Year for 6 Months on Items 1-7	264.47	817.17	552.7
8. Harvesting and Threshing	1833.98	5132.66	3298.68
9. Management Charges for 6 Months	252.68	681.72	429.04
10. Land Rent for 6 Months	2000.7	4940	2939.3
11. Gross Cost (Add Items 1-10)	8129.99	26576.17	18446.18
12. Yield Per Hec (ton)	2.16	2.49	0.33
13. Farm Gate Price Per Ton (Avg. Market Price)	4000	10575	6575
14. Returns (Multiply Items 12 and 13)	8640	26331	17691
15. Value of Wheat Bhoosa	950.26	2470	1519.74
16. Gross Returns (Add Items 14 and 15)	9590.26	28801	19210.74
17. Net Returns Per Hec (Subtract Item 11 from 16)	1460.27	2225.58	765.31
19. Gross Cost Per Ton (Divide Item 11 by 12)	3763.88	10673.16	6909.28
20. Net Return Per Ton (Divide Item 17 by 12)	676.05	893.8	217.75

Source: Agricultural Prices Commission, Islamabad, Pakistan.

\*Cost of production and net returns of 1993-94 wheat crop per acre, without the impact of trade liberalisation at the farm level.

\*\*Cost of production and net returns of 2004-05 wheat crop per acre, with the impact of trade liberalisation at the farm level.

## Appendix Table A2

Average Farmer's Cost of Production and Returns of Basmati Paddy  
Rice Crop in Punjab, Pakistan

Operations/Input/Output	Without Trade Lib*	With Trade Lib**	Difference
	(Rs/ha)	(Rs/ha)	(Rs/ha)
1. Land Preparation	1330.29	3161.60	1831.31
2. Nursery	944.31	2731.5	1787.19
3. Weedicides/Plant protection	364.7	1249.82	885.12
4. Fertiliser including FYM	1109.3	3378.96	2269.66
5. Irrigation	2397.48	9005.62	6608.14
6. Interest on Investment @ 14 percent per Year for 6 months on Items 1-5	430.23	1062.03	631.80
7. Harvesting, Threshing and Winnowing	880.78	2679.95	1799.17
8. Management Charges for 6 Months	252.68	610.09	357.41
9. Land Rent for 6 Months	1729	3952.0	2223
10. Gross Cost (add items 1-9)	9438.77	27831.62	8392.85
11. Yield per ha (tons)	2.21	2.21	-
12. Farm Gate Price per Ton	4850	13580	9000
13. Returns (multiply items 11 and 12)	10718.5	28518	17799.5
14. Value of Straw	406.66	2346.5	1939.84
15. Gross Returns (add items 13 and 14)	11125.16	30864.50	19739.34
16. Net Returns/ha (subtract item 10 from 15)	1686.39	3031.88	1345.49
17. Gross Cost per Ton (divide item 10 by 11)	4270.93	13253.15	8982.22
18. Net Return per Ton (divide item 16 by 11)	763.07	1443.75	680.68

Source: Agricultural Prices Commission, Islamabad, Pakistan.

\*Cost of production and net returns of 1993-94 wheat crop per acre, without the impact of trade liberalisation at the farm level.

\*\*Cost of production and net returns of 2004-05 wheat crop per acre, with the impact of trade liberalisation at the farm level.

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## Comments

The paper is concerned with the impact of rise in prices, resulting from trade liberalisation, on wheat and rice—the major food crops in Pakistan. It is an interesting paper and dwells on a topic: trade liberalisation, which has become a buzz word in the economic jargon. The authors have selected two of the most important food grains, wheat and rice, which are also important from trade perspective. Wheat is a major import while rice an important export crop of Pakistan.

Authors have provided some useful insights regarding the welfare of consumer and producers of these crops, stemming from the economic liberalisation in the wake of the establishment of WTO in 1995 and its Agreement on Agriculture (AOA). I have reviewed the paper carefully and raised some points for deepening my understanding of the issue, which I want to share with you. These are arranged below by sections of the paper under reference.

### Introduction

Introductory section, which is supposed to set the ball rolling and introduce the subject of the study, has not done justice to the topic. The authors keep on jumping from domestic to world and again to domestic issues. I am also a bit surprised over the authors' relying on old data in their introductory section when more up-to-date statistics were available. I am a bit confused by some of the statements, reproduced below, in the introductory section.

“Keeping in view the present global economic scenario and the speed with which Pakistan is opening its product market, there is widespread concern about the effects of trade liberalisation on agriculture... Considering the present structure of agriculture sector, natural resource base, policy environment, trade related infrastructure, political economy, etc., the country is gradually moving towards liberalising trade in agriculture and taking certain steps to support the domestic agriculture sector to compete in international market”.

These two statements do not support each other and are rather in conflict. Then authors go on to suggest that to fully implement the requirements of the AOA the country has to go a long way in terms of improving trade infrastructure, quality of the produce, environmental issues and issues related to the sanitary and phyto sanitary requirements of the agreement. Let me say that as far as the three pillars of the AOA (i.e. Domestic support, Market Access and Export Competition) are concerned Pakistan has already complied with the same during the time frame meant for the purpose. Obviously if Pakistan has to compete in world commodity markets she will have to improve and maintain quality as per demand of the trading partners. The environmental and sanitary concerns are not the obligations under AOA but may be the requirements for some other agreements like SPS.

### Objectives of the paper as spelled out by the authors are:

- Analyse welfare effects of trade liberalisation on producers and consumers of wheat and rice in Pakistan.
- Determine the impact of trade liberalisation on farmer's returns from wheat and rice at farm level in Punjab.
- To implicate policy options for smooth adjustment process of trade liberalisation of agriculture in Pakistan.

### Sample Selection and Data

Wheat and rice the main food grains—hence selected. For examining the location specific effects of trade liberalisation on rice-wheat situation, this cropping system from the Punjab was selected. However, rice-wheat cropping system in Sindh, an important component of rice-wheat cropping system has not been examined. I wonder why? As the authors have relied on secondary data, this should have been easily included in the analysis.

### Analytical Framework

A few questions because of my ignorance and also on account of lack of explanations provided in the paper: What is the time frame of analysis i.e., time period covered is not clear.

### Domestic Demand Function

In case of domestic demand function it is not clear: what is the measure of total quantity demanded, and how it was estimated for rice and wheat? Domestic market price of commodity: is it the national average or belongs to some specific market?

### Domestic Supply Function

In the supply function it is not clear: whether the quantity of commodity supplied is the same as total output, and price of commodity being referred to in the analysis, is at farm level or at some other level? It is also not known whether the prices referred to are the harvest period prices or the annual averages?

### Price Linkage Equations

$$PC_i = PC_{if} + \text{Tariff} + \text{Transfer cost}$$

Here  $PC_i$  is the domestic market price of commodity  $i$ , while  $PC_{if}$  is the world price of commodity  $i$ . I wish the real life situation was that simple and allowed direct translation of world commodity prices into domestic prices. There are large qualitative differences in the commodities like wheat and rice produced and traded by Pakistan and for which world prices are quoted. Then it is the question of converting world prices into local prices and the use of exchange rate having its own set of practical problems; which exchange rate official or equilibrium one to use? I am sure the authors are aware of all these issues but they have to inform their reader accordingly which has not been done.



I am a little uncomfortable with the specification of supply equation, which includes farm level prices of wheat in the current year. By estimating the price linkage equations the authors have gone on to estimate the impact of seven percent increase in world wheat price. From where does this seven percent increase come about is not however clear. But the interesting equations in this whole exercise for me is how did the farm gate price received by the farmers in 2004-05 compare with the price being used here in this exercise. During 2003-04, support price of wheat was Rs 350/40 kg or Rs 8750/ton and increased to Rs 400/40 kg in 2004-05 (or Rs 10,000/ton).

Now let us see the actual wheat production in 2003-04 and 2004-05. As per the information reported in Pakistan Economic Survey, wheat production in 2003-04 was 19.5 million tones and increased to 21.61 million tons in 2004-05. Why I am mentioning all these numbers is not to bore the audience with these but to highlight a point: the authors should have taken note of the situation on ground and educated their readers about the limitations of their approach and assumptions of growth rate in prices being used viz. a via the actual numbers. I have similar reservations about the results of rice equations, with the added confusion of rice and paddy being used interchangeably.

The data relating to domestic demand for rice reported on page 15 under sub-heading: Impact on the domestic supply and demand of rice, estimated to have declined from 16.03 million tons to 15.77 million tons during 2004-05 is too high to be true. Authors may like to check whether it is clerical mistake or something has gone wrong with their equations and calculations.

#### **Effect of Trade Liberalisation at Farm Level**

Two points need to be explained here; one factual the other conceptual. Government allowed trade of these commodities i.e., wheat and rice to the private sector, which used to be completely under its control. As the two points of comparison in the paper are 1993-94 and 2004-05, in both these years rice trade had been open to private sector while wheat trade has remained semi official. The other point, more important, is conceptual and relates to the use of support prices in estimating revenues. As the support prices have been designed to provide floor to the market prices the use of market prices should have been preferred in the calculations. Another important issue in this contest is that the periods of comparison are 10 years apart and the period was characterised by substantial inflation. Thus, use of nominal input and output prices provides a distorted picture of costs and returns. This could have been avoided by using constant prices for inputs and outputs.

#### **Suggestions**

My simple question here is how many of these suggestions flow from the analysis in the paper. Retain the one following from the analysis and ignore the rest.

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