# PRICE INCENTIVES FOR THE PRODUCTION OF HIGH YIELDING MEXICAN VARIETIES OF WHEAT: A REJOINDER

*by*

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In his comments on my paper [1] Mr. Sarfraz Khan Qureshi tried to show that: (*a*) farmers faced with a choice between cultivating two types of wheat, i.e. local and Mexican varieties, would be guided by the net profitability (revenue) per unit of land; and (*b*) a varietal shift from local wheat at low prices to Mexican varieties at high prices is possible at some 'break-even' price, provided land is a fixed factor and Mexican varieties of wheat require less land but more nonland factors (costs) per unit of output than the local wheat [2].

Mr. Qureshi argued that the necessary assumption supporting my analysis of varietal shifts at 'break-even prices' was not satisfied as land was not believed to be the binding constraint during the wheat growing season. Moreover he felt that the cultivation of Mexican varieties of wheat has not been established to require more non-land factors (costs) per unit of output than local wheat. Mr. Qureshi goes on to say that empirical evidence available from other surveys does not show that non-land costs per unit of output are relatively higher for Mexican varieties of wheat. So the price of wheat (and the 'break-even' price analysis) is irrelevant to the choice of the process of production. Farmers would always produce Mexican varieties of wheat, thus invalidating my analysis and suggested policy on the pricing of wheat.

In this note, it will be argued that though Mr. Qureshi's basic analytical framework is sound, his conclusions about varietal shifts of output in response to price are not correct and that the empirical evidence quoted by him is irrelevant to the analysis.

Mr. Qureshi's basic analytical framework and notations are followed for convenience.

## I. THE BASIC PROBLEM

Given limited land, a farmer faced with the choice of cultivating either local or Mexican varieties of wheat would maximize his net profit (revenue) on

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the fixed factor, i.e. land. Assuming that variable costs remain *constant* with the scale of cultivation, he would produce:

Local varieties if: $$\frac{P-VC_1}{P-VC_2} > \frac{L_1}{L_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Mexican varieties if: $$\frac{P-VC_1}{P-VC_2} < \frac{L_1}{L_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

for maximum net revenue per unit of land (say an acre) $$\frac{P-VC_1}{P-VC_2} = \frac{L_1}{L_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where:

$P$ = price of wheat;

$VC_1$ = non-land (variable) costs of cultivating local wheat;

$VC_2$ = non-land (variable) costs of cultivating Mexican varieties of wheat;

$L_1$ = land per output unit of local wheat; and

$L_2$ = land per output unit of Mexican varieties of wheat.

## II. THE FIRST CASE

In the *first case* both the land factor and non-land costs are larger for local varieties compared to Mexican varieties, i.e., $\frac{L_1}{L_2} > 1$; $VC_1 > VC_2$, which make the $\frac{P-VC_1}{P-VC_2} > 1$ at all prices which cover at least the non-land (variable) costs per unit of output (e.g. $P \geq VC_2$). This led Mr. Qureshi to the conclusion:

> "Price of wheat is irrelevant to the choice of the process of production. The farmer would always produce Mexipak wheat" [2, p. 60].

Mr. Qureshi's conclusion that price of wheat is irrelevant to the choice of the process of production is correct in this case, but to say that there is no price at which the farmer would stop producing Mexican varieties is not valid as price of output must cover at least the non-land (variable) costs, i.e. $\hat{P} = P = VC_2$.

If we had data on $VC_2$, $\hat{p}$ the break-even price would have been identified easily.

Field data on $VC_2$ was not easy to compute because of problems of valuation of many inputs, e.g. canal water, family labour, etc. It was not correct to take water charges as the real price of canal water since the economic value of water exceeds water charges. Similarly for family labour market

wage rates are not proper value indicators because of under-employment and the fact that the switching of land from local to Mexican varieties can raise the intensity of labour use considerably.

Keeping these problems in mind, the output of local wheat per acre was taken as the opportunity cost of producing Mexican wheat and the additional non-land (variable) costs per acre were attributed to the additional output gained from the cultivation of Mexican wheat. By this method, the 'break-even' price $\hat{P}$ approximated to $\overset{*}{P} = \frac{Y_2(VC_2) - Y_1(VC_1)}{(Y_2 - Y_1)}$ where $Y_2$ and $Y_1$ are the yields per acre of Mexican and local varieties. If $VC_2 = VC_1$, $\overset{*}{P} = VC_2 = \hat{P}$. Since $VC_2 < VC_1$, $\overset{*}{P}$ is less than $\hat{P}$ by $(VC_1 - VC_2)$. Thus the element of inefficiency (non-land cost differential) was ignored in calculating 'break-even' price for simplicity. In our judgement accurate information on $VC_1$ and $VC_2$ was difficult to obtain which compelled us to rely on data on yield and input differentials. To minimize the possibility of misleading results caused by the use of $\overset{*}{P}$ instead of $\hat{P}$, sensitivity analysis was carried out by assuming different floor prices.

Mr. Qureshi's contention that the price of wheat is irrelevant in the choice of process of production is valid for Mexican wheat produced at prices equal or above $\hat{P} = VC_2$. At prices below $\hat{P}$, farmers would face negative net revenue and produce neither local nor Mexican varieties. In the context of Pakistan, it may be mentioned that even at prices below $\hat{P}$, farmers may continue to grow wheat as they would obtain positive returns on non-wage family labour. The income (return) on family labour would be larger for local wheat at prices below $\overset{*}{P} < \hat{P}$; unless the scale of cultivation is reduced and slack in terms of land develops. If the assumption of constant land and non-land costs in relation to the scale of cultivation is dropped, farmers may switch back to local varieties. In any case, switching from Mexican varieties to local varieties at low prices was not essential to our policy conclusions.

## III. THE SECOND CASE

In the second case, land cost is higher and non-land (variable) costs are lower for local varieties compared to Mexican varieties, i.e. $\frac{L_1}{L_2} > 1$; $\frac{VC_1}{VC_2} < 1$, which make it profitable to switch from local wheat at low prices to Mexican wheat at higher prices. The switch-over price is the 'break-even' price:

$$\hat{P} = \frac{L_2 VC_1 - L_1 VC_2}{L_2 - L_1}$$

In this case our analysis of price incentives for the Mexican wheat holds in theory. But Mr. Qureshi rejects this case on the basis of empirical evidence indicating $\frac{VC_1}{VC_2} > 1$. The empirical evidence is based on a survey conducted by a study group of the Planning Division in 1968-69. Without going into unnecessary details, it may be mentioned that data on land and non-land costs for local and Mexican varieties of wheat does not refer to the same land. The survey covers local and Mexican wheat plots/fields separately and then ascertains costs of production. For our purposes we need data on costs ($L_1$, $L_2$, $VC_1$, $VC_2$) for the same acre which the survey fails to provide. The differences in costs, thus, may be attributed to other factors such as differences in land, farmers' resources, etc., whereas Mr. Qureshi wrongly insists on attributing the cost differences to the process of production only.

## CONCLUSION

Mr. Qureshi's conclusion that the price of wheat is irrelevant to the choice between local and Mexican varieties is not justified. In both the theoretical cases, prices of wheat are important in determining whether Mexican varieties of wheat would be cultivated. In the first case, we adopted an indirect method of estimating $\hat{P}=VC_2$ by $\overset{*}{P}$, which is an underestimation of $\hat{P}$ by $(VC_1 - VC_2)$. However price sensitivity analysis was carried out before arriving at policy conclusions.

In the second case, both theoretical and empirical measures give similar results. Mr. Qureshi's attempt to rule out the second case from reality on the basis of empirical evidence which, strictly speaking, is not relevant to the analysis, is rather unfair.

## REFERENCES

1. Hussain, S.M., "Price Incentives for the Production of High-Yielding Mexican Varieties of Wheat," *Pakistan Development Review*, Vol. X, No. 4, Winter 1970.

2. Qureshi, S.K., "Price Incentives for the Production of High-Yielding Mexican Varieties of Wheat: A Comment" *Pakistan Development Review*, Vol. XI, No. 1, Spring 1971.