
SUMMARY

The object of the study is to examine the impact of the recent price rise in oil based inputs for agriculture on the production of wheat and rice in the agricultural year 1974-75, and on the basis of it, to foresee the future trend in their production.

The two major oil based inputs in Indian agriculture are fertilizers and high speed diesel oil. Of the two the latter in terms of its share in the total cost of production is much less important.

The price of both fertilizers and diesel oil is controlled by the Government. In June 1974, the price of fertilizers was raised, the range of increases for the different varieties being 56 per cent to 90 per cent. The price of high speed diesel oil was raised earlier in March by 15 per cent. Considering the relatively small share of the cost of high speed diesel oil in the total cost of production this increase in price seems to have had little impact on the consumption of high speed diesel oil.

Since data on input consumption and output for rice and wheat crops for 1974-75 were not available, we decided to do a small survey as a case study, with a sample of 50 farmers in two districts. The object of this survey was, (a) to gather facts and (b) to analyse farmers' response to the increase, particularly in fertilizer prices, and to derive, if possible, some general conclusions.

The results of this survey presented in the following table show that the rise in the price of fertilizers led to:

- (i) a fall in the quantity of fertilizer input per unit of land,
- (ii) a rise in the cost of fertilizers per unit of output as well as land, and
- (iii) a fall in the farmer's net return.

The survey also gave evidence of the farmer's effort to improve his input mix with a view to protecting his net return. Of particular interest in this context was the decision of large rice farmers in Karnal to increase the input of P_2O_5 despite a 90 per cent increase in its price, in order to bring the fertilizer mix closer to the recommended N:P ratio.

To attempt quantitative projections of wheat and rice production for the future, incorporating the impact of the rise in fertilizer prices would be hazardous. There have been basic structural changes in the input mix of these crops over the last decade and the only two crop seasons since the rise in fertilizer prices have been strongly influenced by weather. This attempt is, therefore, not made. Instead, it is pointed out that, given the imperative need to augment the production of foodgrains to feed its growing population, India does not have many options. The scope for minimising the cost of fertilizer inputs per

unit of output exists and, spurred on by the high cost of fertilizers, the farmer is likely to exploit it in a manner he has not done before. The Government, on its part, will be induced to encourage farmers' efforts through policy and institutional support. We identify four major responses to the price rise in petroleum based agricultural inputs:

- (i) a new drive among farmers to advance their know-how with a view to securing higher levels of efficiency in input use, particularly with respect to fertilizers for which evidence is already available;
- (ii) a major expansion in institutional credit facilities to provide a more effective source of credit for smaller farmers, for which the Government has already taken steps through its programme for setting up Regional Rural Banks;
- (iii) a strengthening of the distribution network along with a rationalisation of the control system; and
- (iv) the Government's use of pricing policy as a means of redressing the balance between input and output prices.

Salient Findings of our Survey of Selected Rice & Wheat Farms in Karnal and Muzaffarnagar Districts - 1973-74 and 1974-75

Variables	Wheat		Rice-IR-8	Rice-Bansmati	
	Karnal	Muzaffarnagar	Karnal	Karnal	
1. Cost of fertilizer inputs per hectare in rupees					
a) Before June 1974	301.9	421.8	376.6	127.8	
b) After June 1974	426.4	486.2	578.7	212.6	
2. Quantity in nutrients, kilograms per hectare					
a) Before June 1974					
	N	101.3	115.1	130.1	49.0
	P ₂ O ₅	34.2	54.6	16.1	4.2
	K ₂ O	2.8	9.7	6.9	-
b) After June 1974					
	N	78.2	73.5	110.9	43.8
	P ₂ O ₅	25.9	33.3	18.5	4.7
	K ₂ O	1.7	3.8	5.3	-
3. Yield per hectare in kilograms					
a) Before June 1974	2473	1891	4177	2749	
b) After June 1974	2646	3054	3507	2386	
4. Net returns to cost A ₂ per hectare in rupees ²					
a) Before June 1974	1729	721	1490	1315	
b) After June 1974	1657	1897	1054	958	

From an analysis of our survey data some observations relevant to the response to the increased cost of fertilizers can be made.

First, it seems clear that an important fact determining the farmer's behaviour in the context of the much higher fertilizer prices is the way he perceives the risk involved in incurring the additional cost for the same input of fertilizers. While we find that the small farmer in our sample gets as high a yield from a hectare of land as any other farmer and a higher net return per hectare because of greater personal (or family) involvement, he seems to be more sensitive to cost increases when perceiving the risk of weather uncertainty at the beginning of a crop season. Because he has limited resources of his own the possibility of a fall in income is magnified as it threatens essential consumption. Also he has comparatively less capacity to hold stock for selling later when the prices tend to be higher and, therefore, usually secures a lower price for his output. On both counts it appears that an assured supply of institutional credit at a reasonable rate of interest would be of considerable help in modifying the framework within which he perceives his risk.

Secondly, a considerable variation was observed in the fertilizer input between farmers. In particular, the NPK ratio employed seems to be very different from the recommended one. While this showed that the farmers were much more interested in nitrogenous fertilizers and did not fully appreciate the utility of phosphatic and potassic fertilizers, there was a difference in the way they reacted after the increase in fertilizer prices in respect of wheat and rice crops. In Karnal they increased the input of phosphatic fertilizers for rice while decreasing it for wheat. This contrary behaviour deserves attention, particularly in the context of the same NPK ratio recommended for both wheat and rice. It seems in general that there is not enough feed back from the farms to the laboratories where the recommended doses are determined.

Thirdly, the increase in the cost of diesel oil, which to start with was moderate, did not induce any farmer to reduce its consumption either for tractors or for pumping water for irrigation. Most farmers in our sample used tractors on hire and found it cheaper even at the increased hiring charges than the alternative of going back to tilling with bullocks. They also did not find it worthwhile to reduce the efficiency of tilling by using the tractor less. No farmer regarded the increased cost of pumping water with diesel tubewells or pumpsets as a matter of any significance.

Fourthly, since our survey was completed, fertilizer prices have been lowered mainly on account of the decline in world prices and a fall in the proportion of imported fertilizer in the domestic supply. Meanwhile, there has been a substantial increase in domestic production as new capacity has come on stream. In the past, because of supply shortages and deficiencies in the distribution network, farmers were often unable to get their full requirements of fertilizers at the controlled price and were forced to pay a much higher price in the black market. Supply bottlenecks are not likely to arise, at least, in the near future. Several of the controls imposed to deal with a shortage situation, which were a hindrance to fertilizer consumption, have now been removed. Attention is also being directed to the strengthening of the distribution network, which at present is weak.

Fifthly, there is evidence that there was an increase in fertilizer consumption in 1975-76, but the extent of the increase is not firmly established.

Lastly, the increase in the world price of crude oil made coal a cheaper base for fertilizer manufacture in India and it appeared as a logical course to consider a shift. It was, therefore, decided to set up three plants based on non-coking coal for producing urea. While the technology for coking coal is well established, it was not so for non-coking coal. But since India's reserves are mainly of non-coking coal, the plants now being set up are, in part, experimental. Over the last three years India has found off-shore oil, its balance of payments position has radically improved and the price of coal is likely to be raised relative to oil. With these developments and the prospects of gas from the new oil finds, the situation seems to have changed. The dominant raw material base for fertilizers in India in the future will depend on the extent to which gas becomes available and how technology can be developed for non-coking coal based fertilizers.