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Thus the hypothesis that the increase in input prices has affected the production and profitability of wheat and paddy crops is not substantiated. But one has to be very cautious in drawing out such inferences because the period under study is quite short and the data base is rather narrow. However, this conclusion has other implications. The farmers now have to make higher initial investment to get almost the same margin of profit. If the trend of price hike in input prices persists, it may lead to some distortions in the cropping pattern unless we have an integrated price policy. Although we have examined here the effect of increase in certain items of variable costs, yet it would be quite pertinent to examine the impact of increase in machinery prices on production. There has been a substantial increase in the prices of agricultural machinery and implements, particularly the tractors. The impact of this increase in machinery prices on capital formation and its resultant impact on productivity needs to be examined very carefully.

IMPACT OF INPUT PRICES ON LEVEL OF THEIR USE AND PRODUCTIVITY IN AGRICULTURE (A CASE STUDY)

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The introduction of High-Yielding Varieties (HYV) Programme in 1966-67 brought about the Green Revolution in the country. This called for the use of high doses of modern farm inputs like quality seeds, fertilizer, plant protection chemicals, assured irrigation, etc., as the high-yielding varieties are very much responsive to high doses of fertilizers and irrigation and are susceptible to insects, pests and diseases. All round efforts being made by the Government, farm financing institutions and extension agencies in recent years resulted in higher productivity of agricultural commodities particularly that of high-yielding varieties of paddy and wheat, which reached a peak in 1970-71. After 1970-71, the prices of purchased inputs particularly that of fertilizers, irrigation water rose to a very high level and resulted in their low level of use. This adversely affected the level of productivity of agricultural commodities which either remained stagnant or declined after 1970-71.

With a view to determining the level of productivity and use of inputs in relation to their prices, a study was conducted by the Department of Agricultural Economics, C. S. Azad University of Agriculture and Technology, Kanpur, in district Jaunpur, Uttar Pradesh at three points of time, *i.e.*, 1967-68 (one year after the adoption of the HYV Programme), 1970-71 and 1973-74 with a gap of three years each. The main objectives of the study were: (i) to study the levels of farm productivity on the farms as a whole and that of the important crop enterprises separately, (ii) to examine the level of pro-

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duction inputs used on the farms as a whole and that of individual crop enterprises separately and (iii) to analyse the trend in prices of farm production inputs at three points of time.

METHODOLOGY

The present study is based on an intensive enquiry of 100 farmers who were adopting the HYV Programme, selected randomly from the villages of Sikrara block, district Jaunpur, U. P. in the year 1967-68. The farmers were categorised into four size-groups, *viz.*, 0-1, 1-2, 2-3 and 3 and above hectares and their number was kept in proportion to their number falling under each size-group in the universe of ten villages. The study was conducted by survey method at three points of time, *viz.*, 1967-68, 1970-71 and 1973-74 with the same sample.

FINDINGS

Economic Structure of Sample Holdings

The average size of farms, cultivated area and its distribution on different size-groups are given in Table I.

TABLE I—AVERAGE SIZE OF FARMS AND DISTRIBUTION OF CULTIVATED AREA

Size-group (hectare)	Number of farm holdings	Average size of farm (hectare)	Total cultivated area (hectare)	Percentage of total cultivated area
0—1	36	0.48	17.28	9.72
1—2	30	1.50	45.00	25.32
2—3	20	2.40	48.00	27.00
3 and above	14	4.82	67.48	37.96
Total	100	1.78	177.76	100.00

Table I reveals that the average size of the sample holdings came to 1.78 hectare. An analysis of the distribution of the sample farms indicates that the smaller the size of the holding, the larger is the fraction which this group comprises in the total number of holdings on the sample. The holdings of the average size of 0.48 hectare comprised 36 per cent of the sample, those with an average size of 4.82 hectares constituted only 14 per cent of the sample holdings. As against this situation, the smaller the holding group, the smaller is the percentage of the total cultivated area in the entire sample operated by the group, thereby clearly indicating the inequitable distribution of the operational size of the farms in the area.

Level of Production on Farm

The level of productivity in terms of gross value of output and net income in relation to the level of input used per hectare in the farm business as a whole at three points of time are worked out in Table II.

TABLE II—LEVEL OF OUTPUT AND NET INCOME IN RELATION TO LEVEL OF INPUTS IN FARM BUSINESS

(Rs. per hectare)

Particulars	Year		
	1967-68	1970-71	1973-74
Input	991.06	1,350.55	2,310.29
Output	1,789.52	2,725.70	3,666.32
Net income	798.46	1,375.14	1,356.03
Input-output ratio	1:1.81	1:2.01	1:1.59

As Table II reveals, the value of output per hectare showed a steady rise during the three points of time. This rise was associated with a rise in the prices of farm products on the one hand and the higher level of inputs used on the other. A similar trend was observed in the case of level of input used but in a somewhat different manner. The rise in inputs per hectare in 1970-71 over 1967-68 was due to higher level of utilization in physical terms as the prices during this period remained more or less unchanged. But an exorbitant rise in prices during 1973-74 resulted in much higher input cost per hectare with even lower level of utilization of inputs in physical terms. This resulted in a lower level of net income in 1973-74 as compared to 1970-71.

Level of Productivity of Individual Crop Enterprises

The main crops of the study area were maize, paddy and wheat. The values of input, output and net income per hectare and the level of productivity in terms of average yield in quintals per hectare are shown in Table III.

TABLE III—PER HECTARE VALUES OF INPUT, OUTPUT AND NET INCOME AND AVERAGE YIELD

Year	Input (Rs.)	Output (Rs.)	Net income (Rs.)	Productivity in terms of average yield (quintals per hectare)	
				Grain	Straw
<i>Maize</i>					
1967-68	527.20	1,271.15	743.95	13.84	55.53
1970-71	748.44	1,503.75	755.31	16.90	64.59
1973-74	1,114.36	1,590.74	475.38	16.62	63.50
<i>Paddy</i>					
1967-68	617.92	1,019.05	401.13	13.13	33.98
1970-71	953.20	1,974.00	1,021.80	28.20	55.10
1973-74	1,309.53	2,290.25	980.72	27.26	54.58
<i>Wheat</i>					
1967-68	940.35	1,489.50	549.15	14.94	18.94
1970-71	1,244.13	2,520.10	1,275.87	28.10	41.70
1973-74	1,768.56	2,844.25	1,075.69	27.16	40.20

Table III shows that the productivity of the main crop enterprises, *viz.*, maize, paddy and wheat increased to a great extent in 1970-71 over 1967-68, but it declined in 1973-74. The reason for this trend is the high level of utilization of inputs in terms of physical units in 1970-71 which slightly went down in 1973-74 because of exorbitant rise in the prices of production inputs as discussed later.

Level of Production Inputs Used in Farm Business

The level of utilization of production inputs in terms of physical units per hectare in the farm business as a whole at three points of time is presented in Table IV.

TABLE IV—PER HECTARE UTILIZATION OF PRODUCTION INPUTS IN FARM BUSINESS

Input	Year		
	1967-68	1970-71	1973-74
1. Human labour in labour days	137.12	146.20	141.99
2. Manures and fertilizer in terms of N ₂ . .	47.66	86.53	69.24
3. Number of irrigations	0.97	2.32	1.93
4. Plant protection (BHC 10%/kg. which was used for dusting in paddy only)	—	—	7.28

Table IV reveals that with the adoption of modern farm technology, there was a substantial rise in the level of inputs used in terms of physical units in 1970-71 over 1967-68. This level of utilization of inputs lowered down in 1973-74 because of the exorbitant rise in prices of inputs during this year.

Level of Inputs Used in Individual Crop Enterprises

The level of inputs used in terms of physical units in the production of important crop enterprises is shown in Table V. Only those inputs which

TABLE V—LEVEL OF INPUTS USED IN CROP ENTERPRISES

Year	Cash inputs				
	Human labour (labour days)	Seed (kg.)	Manures and fertilizer in terms of N ₂ (kg.)	Irrigation (number)	Plant protection measures (Rs.)
<i>Maize</i>					
1967-68	107.71	18.58	44.22	0.45	—
1970-71	100.60	17.20	67.50	1.33	—
1973-74	99.97	18.96	57.82	1.14	—
<i>Paddy</i>					
1967-68	125.89	29.40	13.94	0.30	28.00
1970-71	127.57	30.24	42.12	4.18	22.50
1973-74	102.47	22.21	33.17	2.29	14.09
<i>Wheat</i>					
1967-68	106.11	102.00	46.79	1.84	—
1970-71	110.20	103.00	73.94	3.55	—
1973-74	102.76	103.02	61.50	2.56	—

directly influence the level of productivity, *viz.*, human labour, seed, manures and fertilizer, irrigation and plant protection measures have been dealt with.

A considerable increase in the level of inputs used in physical terms has been noticed particularly in the case of manures and fertilizers and irrigation in 1970-71 over 1967-68. The level of input use went down in 1973-74 as compared to that of 1970-71. In the case of human labour and seed, not much variation was noticed at the three points of time but marked variation was observed in the case of manures and fertilizer and irrigation.

The level of utilization of manures and fertilizer and irrigation was the highest in 1970-71, but it went down in 1973-74 mainly because of the exorbitant rise in the prices of fertilizers on the one hand and that of electricity and diesel used in pumping sets on the other in 1973-74.

Trend in Prices of Farm Production Inputs

The behaviour of the prices of farm production inputs over the three points of time has been analysed in Table VI.

TABLE VI—TRENDS IN PRICES OF PRODUCTION INPUTS

Particulars	Prices in rupees in		
	1967-68	1970-71	1973-74
Human labour (per labour day)	1.60	2.00	4.00
Fertilizers in terms of N ₂ /kg.	1.61	2.06	4.57
Irrigation (per irrigation)	15.00	22.50	60.00
Plant protection (BHC 10%/kg. which was used only in paddy for dusting)	0.48	0.48	1.20

As Table VI clearly reveals, though there has been a slight rise in the prices of farm production inputs in 1970-71 over 1967-68, their prices rose exorbitantly to a highest level in 1973-74. The per day cost of human labour rose from Rs. 1.60 in 1967-68 to Rs. 2 in 1970-71 and to Rs. 4 in 1973-74. In the case of manures and fertilizers, their prices rose to about three times in 1973-74 over 1967-68. As regards irrigation, the per irrigation cost increased about four times in 1973-74 as compared to 1967-68. A similar trend was noticed in the case of plant protection measures.

CONCLUSIONS

The foregoing discussion leads us to infer that the rise in the prices of farm production inputs adversely affected the level of its utilization on the one

hand and the level of farm productivity on the other. The exorbitant rise in the prices of modern farm inputs like fertilizer, irrigation and plant protection measures restricted their use by the farmers and thereby reduced the level of productivity in recent years. Therefore, to maintain the tempo of increased productivity, the prices of modern farm inputs should not be allowed to rise beyond the reach of the majority of the farmers.

IMPACT OF INCREASE IN THE PRICES OF FERTILIZERS ON THE PRODUCTION AND PROFITABILITY OF HIGH-YIELDING VARIETIES OF RICE AND WHEAT CULTIVATION

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Introduction

Fertilizer is one of the most important inputs in agricultural production. This is particularly so in the context of modern agricultural technology which devolves round high-yielding varieties programme. The high-yielding varieties of various crops are very responsive to the application of fertilizers upto fairly high doses. Fertilizer is also the one input which utilizes maximum share of cash resources of the farmers. Therefore, the demand for fertilizers is bound to be highly sensitive to any change in its price. On the other hand, the consumption of fertilizers influences the production to a great extent. Although high-yielding varieties have been developed for a number of crops, their cultivation on a large-scale is mainly confined to rice and wheat crops. In this paper an attempt has been made to study the impact of increase in the price of fertilizer on the production and profitability of rice and wheat cultivation under cultivators' conditions.

Impact of Increase in the Price of Fertilizer on Production and Profitability

If a farmer is not working under resource constraint he would continue to utilize any one input to a level that the marginal physical return from that input is equal to the ratio of its price to the price of the output or in other words as long as its use is remunerative. That, however, is not the real situation. Most of the farmers in India have little resources and any increase in the price of one or more inputs forces him to utilize it at a lower level and this definitely affects production. The type and quality of change will, however, depend upon the type of relationship between the input and the output. If there is a linear relationship between the two the production is bound to decrease due to an increase in the price of the input at whatever level the input might be used. If, on the other hand, there is a non-linear relationship between

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