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Issues in Agricultural Price Determination and Price Policy

A FAIR PRICE FOR A PRINCIPAL CROP

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The question of a fair price for farm products from the point of view of the producers as well as the consumers which touches on the demand and supply, cost of production, terms of trade between farm and non-farm products, prices of inputs and of competing crops and a host of other factors remains as yet vexed and unsettled. The objectives of this exercise are: First, to trace the movement in revenue and costs of paddy during the seventies in West Bengal to indicate how far a balance could be maintained between the two. Secondly, to trace the variation in its cost of cultivation over the different agro-climatic zones of this State to indicate the justification or otherwise of fixing a uniform price for this principal crop. Thirdly, to throw some light on a suitable price policy for a developing economy.

II

Data collected under the Comprehensive Scheme: Cost of Cultivation of Principal Crops for the years 1971-72 to 1978-79¹ of are mainly relied upon to compute the rates of growth of revenue, cost, inputs and yield of paddy in West Bengal and for analysis of variance in cost of cultivation of paddy between different agro-climatic zones of the State over these years. For computing growth rates, the averages for the triennium ending with the third year of the time-series are used as the bases to smooth out cyclical fluctuations from the series and to estimate the trends. Both linear and compound growth rates along with their standard errors are computed and their statistical significance is tested. The familiar formulae are used for this purpose.² The tool of analysis of variance is applied to the basic data on per hectare (ha.) and per quintal costs of cultivation of paddy over the years 1971-72-1978-79 to estimate the extent of difference, if any, in these respects among the six different agro-climatic zones of the State. Per quintal cost is estimated by dividing the cost of cultivation per ha. (net of the value of by-product) by the yield per ha. The use of this technique is permissible as the population is large and hence, presumably, normally distributed, and costs are measurable.

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1. Government of India: Estimates of Cost of Cultivation of Paddy in West Bengal for the Years 1971-72-1978-79, Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi (Mimeo.).

2. K. Sain, "Impact of High Yielding Variety Programme on Agricultural Growth", *Commerce*, Annual Number, 1979.

III

The rates of growth of revenue, costs, inputs and yield of paddy in West Bengal during 1971-72-1978-79 are presented in Table I. Revenue from paddy consists of value of main product and by-product of paddy evaluated at the post-harvest prices. The estimated linear rate of growth of revenue from paddy per ha. during this period is 4.05 per cent per annum. The corresponding compound rate of growth is 3.50 per cent per annum. The linear and compound rates of growth of cost C (which excludes allowances for managerial responsibility) per ha. are 7.29 and 5.40 per cent per annum respectively. The rate of growth of cost C per quintal of paddy is 4.92 per cent (linear) and 4.00 per cent (compound) per annum. A comparison of growth of revenue and growth of cost over these years reflects that the latter has exceeded the former appreciably. This will be more evident from the movement of individual components of cost of cultivation. While per ha. fixed cost which includes such elements as rental value of owned land, rent paid for leased-in land, land revenue, cesses, taxes, depreciation on implements and farm buildings and interest on fixed capital moved at an annual rate of 4.80 per cent (linear) and 4.10 per cent (compound), per ha. operational cost which covers such elements as human labour, bullock labour, machine labour, seed, fertilizer and manure, insecticides, irrigation charges and interest on working capital grew at an annual linear rate of 8.76 per cent and at an annual compound rate of 6.20 per cent over these years. The linear and compound rates of growth of cost of fertilizer and manure per ha. are 15.66 per cent and 9.10 per cent per annum respectively. Cost C and its components are taken in terms of rupees for this purpose. The standard errors of linear growth rates are in some cases high, but the standard errors of compound growth rates are estimated to be very low and well below 5 per cent. The growth estimates are statistically highly significant in all these cases. These show that the growth estimates are fairly reliable. The fact that the operational cost per ha. increased much faster than the fixed cost per ha. bears on the more capital intensive nature of modern farm technologies including hybrid crop varieties introduced during the recent years. The rate of growth of traditional farm inputs used per ha. has been slow as a result. For example, the rate of growth of human labour hours—casual, attached and family labour combined—used per ha. is estimated to be 2.41 per cent (linear) and 2.18 per cent (compound) per annum over this period, notwithstanding the high rate of growth of labour force and population in the same period. The yield per ha. of paddy in quintals registered an annual growth rate of 2.14 per cent (linear) and 2.18 per cent (compound) during the same period. The standard error of compound growth rates being low and the growth rates being statistically significant, the growth estimates are fairly reliable.

The above analysis shows that both cost C per ha. and its components moved significantly ahead of revenue per ha. in the case of paddy in West Bengal and the ratio has gone against the growers during the seventies. This

TABLE I—RATE OF GROWTH OF REVENUE, COST, INPUTS AND YIELD OF PADDY IN WEST BENGAL DURING 1971-72-1978-79

Items	Linear growth rate (%) per annum	Standard error of linear growth rate (Absolute)	Significance* of linear growth rate	Compound growth rate (%) per annum	Standard error of compound growth rate (Absolute)	Significance* of compound growth rate
Revenue: value of main product and by-product combined/ha. (Rs.)	4.05	0.4046	SS	3.50	0.0014	SS
Cost C: cost of cultivation/ha. (Rs.)	7.29	0.8585	SS	5.40	0.0013	SS
Operational cost/ha. (Rs.)	8.76	1.3201	SS	6.20	0.0034	SS
Cost C: cost of production/quintal (Rs.)	4.92	1.0888	SS	4.00	0.0036	SS
Fixed cost/ha. (Rs.)	4.80	0.3690	SS	4.10	0.0014	SS
Cost of fertilizer + manure/ha. (Rs.)	15.66	4.0196	SS	9.10	0.0103	SS
Human labour hours: casual + attached + family	2.41	1.0977	S	2.18	0.0896	SS
Yield/ha. (quintal)	2.14	0.5560	SS	1.93	0.0882	SS

* SS=Highly significant (at 1 per cent level of probability); S=Significant (at 5 per cent to 10 per cent level of probability). Table values of 't' at 1 per cent, 5 per cent and 10 per cent levels of probability with (8-1) d.f. are 3.499, 2.365 and 1.415 respectively.

Source of basic data: Estimates of Cost of Cultivation of Paddy in West Bengal for the Years 1971-72-1978-79, *op. cit.*

phenomenon of increasingly adverse ratio between revenue and cost for paddy has to be considered, *inter alia*, in determining a fair price policy for paddy.

IV

The distribution of weighted per ha. cost C of cultivation (C.C.) and weighted per quintal cost C of cultivation (C/QT) over the six agro-climatic zones of West Bengal during the years 1971-72-1978-79 reveals wide variations. For example, during the year 1971-72, the C.C. was minimum at Rs. 938.79 in zone II and maximum at Rs. 1,460.01 in zone VI. The C/QT was, however, minimum at Rs. 41.55 in zone IV and maximum at Rs. 86.28 in zone III. For 1974-75, the C.C. was observed to be minimum for zone V at Rs. 1,683.47 and maximum for zone IV at Rs. 2,024.67. The C/QT was minimum for zone VI at Rs. 63.10 and maximum for zone III at Rs. 95.24. For 1978-79, the minimum and maximum C.C. were noted for zone I and zone V respectively at Rs. 1,735.23 and Rs. 2,953.15. The corresponding figures for C/QT of Rs. 80.40 and Rs. 122.70 were observed for zone III and zone II respectively. The relevant data for weighted per ha. cost C (C.C.), weighted per quintal cost C (C/QT) and weighted yield (YLD) are presented in Table II.

The results of the analysis of variance of cost C per hectare are presented in Table III. The results indicate that the differences between the different zones in this respect are significant at 10 per cent level of significance. There are very significant differences also in per hectare cost of cultivation of paddy as between the years under investigation.

In exhibiting regional or zonal variations in the cost of production, cost C per quintal is more important than cost C per hectare due to wide variations in per hectare yield noticeable among the different zones. Table IV shows the results of the analysis of variance in respect of cost of cultivation per quintal on the basis of data contained in Table II. It is revealed that there are significant differences in per quintal cost of cultivation of paddy among the six agro-climatic zones of West Bengal. The differences in per quintal cost of cultivation of paddy between the years are also highly significant.

The costs of cultivation of paddy thus reveal significant variations among the six zones of West Bengal and this goes against the policy of fixing uniform price for paddy for different zones followed so far by the Government.

V

A proper farm price policy for a developing country must be based on a careful consideration of wide intra-State and inter-State or interregional differences in costs of production. The cost of production of paddy per quintal thus varied from Rs. 67.53 in Punjab to Rs. 88.36 in Andhra Pradesh during 1978-79.³ A uniform price policy for a crop throughout the country

3. Government of India: Report on Price Policy for Kharif Cereals for the 1980-81 Season, Agricultural Prices Commission, New Delhi, May 1980 (mimeo.), p. 4.

TABLE II—DISTRIBUTION OF WEIGHTED* PER HA. COST C IN RS. (C.C.), WEIGHTED PER QUINTAL COST C IN RS. (C/QT) AND WEIGHTED PER HA. YIELD IN QUINTAL (YLD) IN SIX AGRO-CLIMATIC ZONES OF WEST BENGAL DURING 1971-72-1978-79 FOR PADDY

Zone	I		II		III		IV		V		VI	
	C.C.	C/QT (YLD)	C.C.	C/QT (YLD)	C.C.	C/QT (YLD)	C.C.	C/QT (YLD)	C.C.	C/QT (YLD)	C.C.	C/QT (YLD)
1971-72	..	—	938.79	75.97 (10.79)	1,360.69	86.28 (14.40)	1,351.20	41.55 (24.79)	1,069.92	51.83 (16.11)	1,460.01	53.67 (20.71)
1972-73	..	—	1,083.72	65.26 (13.75)	1,070.59	72.14 (12.50)	1,267.21	42.32 (22.18)	1,151.06	54.58 (15.69)	1,471.24	54.72 (20.44)
1973-74	..	—	1,495.70	71.05 (16.85)	1,658.89	89.58 (15.78)	1,449.93	43.09 (24.00)	1,480.30	52.05 (20.81)	1,628.33	57.57 (22.34)
1974-75	..	—	1,890.86	87.69 (17.98)	1,693.85	95.24 (15.35)	2,024.67	72.72 (22.51)	1,683.47	64.51 (19.68)	1,971.24	63.10 (24.34)
1975-76	..	—	819.90	76.79 (9.37)	2,108.72	66.43 (22.64)	2,089.15	62.38 (26.66)	1,640.42	65.35 (19.61)	1,895.55	70.31 (21.52)
1976-77	..	1,651.78 (15.71)	1,842.69	68.22 (22.10)	2,043.76	91.29 (18.00)	2,408.05	81.40 (25.55)	1,906.82	88.22 (18.54)	2,231.04	91.86 (20.87)
1977-78	..	2,110.90 (22.39)	2,050.15	69.99 (24.43)	3,207.36	76.95 (27.42)	2,250.26	66.99 (27.66)	2,287.38	78.26 (23.91)	2,461.49	85.45 (23.31)
1978-79	..	1,735.23 (17.32)	2,098.87	122.70 (14.53)	2,370.33	80.40 (22.88)	2,823.06	95.51 (24.74)	2,953.15	95.09 (25.87)	2,689.38	103.13 (22.26)

* Weight indicates proportions of the area under the crop of all the holdings (selected as well as others) in the respective size classes to the total area under the crop in the cluster as a whole.

TABLE III—ANALYSIS OF VARIANCE OF COST OF PRODUCTION PER HECTARE OF PADDY IN DIFFERENT AGRO-CLIMATIC ZONES OF WEST BENGAL DURING 1971-72-1978-79

Source of variation	Sum of squares	Degrees of freedom	Mean sums of squares	Calculated value of F	Level of significance*
Between zones	1155249.98	5	231049.99	$\frac{231049.99}{92688.27} = 2.4927$ ↪ F _{5, 30} d.f.	S
Between years	8564061.43	7	1223437.34	$\frac{1223437.34}{92688.27} = 13.1994$ ↪ F _{7, 30} d.f.	SS
Error	2780648.24	30	92688.27		
Total	12499959.65	42			

TABLE IV—ANALYSIS OF VARIANCE OF COST PER QUINTAL OF PADDY IN DIFFERENT ZONES OF WEST BENGAL DURING 1971-72-1978-79

Source of variation	Sum of squares	Degrees of freedom	Mean sums of squares	Calculated value of F	Level of significance*
Between zones	2168.64	5	433.728	$\frac{433.728}{122.89733} = 3.5291897$ ↪ F _{5, 30} d.f.	S
Between years	6766.55	7	966.65	$\frac{966.65}{122.89733} = 7.8655085$ ↪ F _{7, 30} d.f.	SS
Error	3686.92	30	122.89733		
Total	12622.11	42			

S = Significant at 5 per cent to 10 per cent level.

SS = Significant at 1 per cent level.

is, therefore, likely to penalise the potentially viable but relatively less fertile or less efficient areas of production. Costs of production both at the intensive and extensive margins have also to be considered. The parity price ratios of farm products vis-a-vis non-farm products and all commodities have to be considered. It is observed that foodgrains prices and general price level advanced at an even speed during the last two decades. The parity price

(wholesale) ratio: $\frac{\text{All commodity index}}{\text{Primary article index}} \times 100$ was 98.55 in 1962-63, 110.98

in 1970-71, 102.29 in 1975-76 and 108.03 in April 1980.⁴ Foodgrains prices and general price level are marching forward rapidly in other countries too. Higher import prices of farm products have also to be taken into consideration in formulating a suitable farm price policy. Prices of farm inputs have risen, sometimes by as high as 300 per cent or more over the past decade. The Government has failed to check the rise in prices of such basic materials and to ensure their regular supply to the farmers at reasonable rates. In the background of global oil crisis and persistent scarcity of strategic farm inputs like fertilizer and power, the farmers have often failed in their new ventures involving improved farm technologies. This bears adversely on the nature of elasticity of supply of farm products. Unnecessary resistance to due upward revision of prices of farm products may help further rise in general price level by killing incentives and checking the growth of output. The effects of such a rise in input and output prices are reflected on the index numbers of cost of living of people for different countries. The price policy for farm products could not realise its objectives of price stabilisation and economic growth to any significant extent.

In order that the interests of both the farmers and the consumers are protected alike, the farm price in a developing country has to be more carefully formulated covering the multifarious related matters and administered as an integral part of the overall development policy of the economy.⁵

To sum up, costs of production of paddy have moved faster than its revenue over the recent years in West Bengal. Significant inter-zonal variations in costs of production of paddy are observed over these years in the State suggesting the need for a change in the present policy of fixing uniform prices of paddy for all zones. Finally, a proper price policy for paddy and other farm products has to be conceived on the basis of costs of cultivation, parity principles, import prices, cost of living indices and other related matters. The price policy for paddy and other farm products pursued in India so far has been faulty and needs a change for the better.

4. *Reserve Bank of India Bulletin*, Vol. XXVIII, No. 2, February 1974 and Vol. XXXIV, No. 5, May 1980.

5. K. Sain, "Foodgrains Price Policy in a Developing Economy", in K. R. Gupta (Ed.): *Issues in Indian Agriculture*, Atlantic Publishers and Distributors, New Delhi, 1980.