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Vol XXXVI
No. 4

CONFERENCE
NUMBER

OCTOBER-
DECEMBER
1981

ISSN 0019-5014

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS



INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

INTRA-SECTORAL PARITY BETWEEN COST, PRICE AND INCOME IN AGRICULTURE

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The relative levels of costs, prices and income of agricultural commodities influence the allocation of production resources and ultimately the level and pattern of agricultural production. The cost-price relationship of different commodities affects the relative profitability and economic incentives to produce. In planned development, when the nation has set certain objectives and targets of production of different commodities to be achieved, one of the functions of the price policy is to maintain parity in cost, price and income of different commodities so that the producers of various crops are not at undue advantageous/or disadvantageous position.

Of late, there has been a lot of controversy about the costs and prices of agricultural commodities. Doubts have been expressed that the prices of agricultural commodities fixed by the Government are not in harmony with the increases in the cost of production which has been rising at a very high rate due to increases in the prices of inputs. As between crops, paddy producing States have often accused that price policy has been tilted in favour of wheat. Wheat and sugarcane producers have also been alleging that the increases in the prices of their products were not proportional to increases in the prices of paddy and other commodities. A sound price policy is one that ensures remunerative price to the producers and also reasonable price to the consumers and reduces regional imbalances in agricultural income through maintaining a parity between costs and prices of different commodities. The objective of the present paper is to evaluate the present price policy from the angle of parity in the costs, prices and incomes in the agricultural sector.

Data and Methodology

Time-series data on the cost of production of wheat and paddy used were those generated under the comprehensive scheme for studying the cost of cultivation of principal crops in India and supplied to the Agricultural Prices Commission (APC) for policy formulation. The weighted average cost of production was estimated by assigning weight to each State in proportion to its contribution to all-India production of that crop for the year. However, this average cost of production was based on the data of major growing States for which cost studies were undertaken. Although the number of States and the crops covered under the comprehensive scheme varied from year to year, their coverage ranged between 50-85 per cent for different years. The index numbers of prices of agricultural inputs used were those issued by the office of the Economic Adviser (Ministry of Industry). The weighted average of index numbers of prices received by the farmers was constructed by com-

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bining the index numbers of prices of different crops through assigning weight to individual crops as developed for the construction of index numbers of agriculture in the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India.

Cost of Production

The average cost of production per quintal of paddy and wheat during 1970-71 to 1979-80 along with the index numbers with 1970-71 as base and also the price-cost ratio for different years are presented in Table I.

TABLE I—COST OF PRODUCTION AND PRICE-COST RATIO OF PADDY AND WHEAT DURING 1970-71 TO 1979-80

Year	Cost of production (Rs. per quintal)			Price-cost ratio	
	Paddy	Wheat		Paddy	Wheat
(1)	(2)	(3)	(4)	(5)	
1970-71	—	52.56 (100.0)	—	1.44
1971-72	50.67 (100.0)	54.77 (104.3)	0.92	1.39
1972-73	53.12 (104.8)	68.92 (131.1)	0.92	1.10
1973-74	56.03 (110.6)	78.31 (149.0)	1.25	0.97
1974-75	75.64 (147.6)	92.77 (176.5)	0.98	1.13
1975-76	70.05 (153.4)	91.63 (199.6)	1.05	1.15
1976-77	80.78 (153.4)	104.90 (199.6)	0.92	1.00
1977-78	75.29 (148.6)	101.30 (192.7)	1.02	1.09
1978-79	83.10 (164.0)	100.79 (191.8)*	1.14	1.11
1979-80	93.12† (183.8)	102.76 (195.9)	1.13	1.14

† Relates to Andhra Pradesh. * Relates to Punjab only. — Paddy was not studied in 1970-71.

Table I shows that the cost of production per quintal of paddy and wheat has considerably increased during the period 1970-71 to 1979-80. The average cost of production of paddy has risen by 83.8 per cent from Rs. 50.67 in 1971-72 to Rs. 93.12 in 1979-80. The cost of production per quintal of wheat has

shown an increase of 96 per cent during the period 1970-71 to 1979-80. One of the important aspects of increase in the cost of production is that it has shown near parity in both the crops under study. The price-cost ratio which was high in the case of wheat in 1970-71 being 1.40 was reduced to the level of 1.14 where it had parity with that of paddy in 1979-80.

Growth in Prices of Agricultural Inputs

Farmers' decisions about the allocation of resources are guided more by the prices of variable inputs—particularly purchased inputs like seed, fertilizers, electricity, pesticides, etc., and it would be of interest to examine the increase in the prices of these inputs. Table II shows that the prices of all the major purchased inputs in agriculture have risen sharply and have almost doubled showing an average increase of 128.20 per cent during the period 1970-71 to 1979-80. The prices of seed and fertilizers have shown an increase of 95.4 and 67.2 per cent respectively while the prices of electricity, pesticides and diesel oil have shown relatively higher increases, being 125.6, 172.2, and 220.8 per cent respectively during the same period. It may be noted that the increase in the cost of production of paddy and wheat as presented in Table I is, by and large, in tune with the average increase in the prices of agricultural inputs as reflected in the index numbers issued by the Economic Adviser's office of the Ministry of Industry. This shows that the cost of production fully reflects the increase in input costs and sets aside any doubt that are raised about the quality and reliability of these estimates.

TABLE II—INDEX NUMBERS OF PRICES OF AGRICULTURAL INPUTS

Year		Seed	Fertilizers	Electricity	Pesticides	Diesel oil	Average
Weight		14.86	12.96	2.60	1.19	9.37	
1970-71	..	100.0	100.0	100.0	100.0	100.0	100.00
1971-72	..	103.4	100.6	102.5	101.6	104.9	102.75
1972-73	..	119.5	105.6	105.7	111.6	105.9	110.92
1973-74	..	141.9	113.9	111.3	131.6	119.5	125.88
1974-75	..	195.8	203.0	137.2	200.3	194.3	194.17
1975-76	..	174.1	214.7	158.1	216.2	206.4	194.53
1976-77	..	152.7	186.5	171.6	232.4	213.9	180.89
1977-78	..	170.4	177.4	182.5	232.4	214.1	185.17
1978-79	..	172.6	177.2	209.1	236.9	269.1	204.94
1979-80	..	195.4	167.2	225.6	272.2	320.8	217.84

Growth in Prices of Agricultural Commodities

In order to protect the interest of producers as well as those of consumers, Government of India every year announces the procurement/minimum support prices for different agricultural commodities on the basis of the recommendations of Agricultural Prices Commission. The prices of major agricultural commodities as announced by the Government along with their index numbers with 1970-71 as base for the period 1970-71 to 1979-80 are given in Table III.

TABLE III—PROCUREMENT/MINIMUM SUPPORT PRICES OF SELECTED AGRICULTURAL COMMODITIES DURING 1970-71 TO 1979-80

Year	Rice	Bajra	Wheat	Ground-nut	Sugar-cane	Cotton	Average
Weight	33.98	2.83	12.16	4.82	7.01	3.01	
1970-71	.. 46.00 (100.0)	55.00 (100.0)	76.00 (100.0)	85.00* (100.0)	7.37 (100.0)	88.00† (100.0)	(100.0)
1971-72	.. 47.00 (102.7)	55.00 (100.0)	76.00 (100.0)	85.00* (100.0)	7.37 (100.0)	120.0† (136.3)	(102.9)
1972-73	.. 49.00 (106.5)	60.00 (109.1)	76.00 (100.0)	100.00* (117.6)	8.00 (108.5)	142.00 (161.4)	(109.2)
1973-74	.. 70.00 (152.0)	72.00 (130.9)	76.00 (100.0)	115.00‡ (135.3)	8.00 (108.5)	170.00 (193.2)	(137.2)
1974-75	.. 74.00 (160.8)	74.00 (134.5)	105.00 (138.2)	125.00‡ (147.1)	8.50 (115.3)	195.00 (221.6)	(152.2)
1975-76	.. 74.00 (160.8)	74.00 (134.5)	105.00 (138.2)	135.00‡ (158.8)	8.50 (115.3)	210.00 (238.6)	(153.8)
1976-77	.. 74.00 (160.8)	74.00 (134.5)	105.00 (138.2)	140.00 (164.3)	8.50 (115.3)	220.00 (250.0)	(154.9)
1977-78	.. 77.00 (167.4)	74.00 (134.5)	110.00 (144.7)	160.00 (188.2)	8.50 (115.3)	255.00 (289.8)	(163.3)
1978-79	.. 83.00 (180.4)	85.00 (154.5)	112.50 (148.0)	175.00 (205.9)	10.00 (135.7)	255.00 (289.8)	(175.2)
1979-80	.. 95.00 (206.5)	95.00 (172.7)	115.00 (151.3)	190.00 (223.5)	12.50 (169.6)	275.00 (312.5)	(196.7)

* Recommended by the APC but not announced by the Government.

‡ Interpolated as the APC did not make any recommendation and Government did not announce any purchase price.

† Estimated from the cotton lint prices announced by the Government.

It would be seen from Table III that the prices of all major agricultural commodities as announced by the Government have shown increases ranging from 51.3 per cent in wheat to 212.5 per cent in cotton during the period 1970-71 to 1979-80. The procurement price of paddy has shown an increase of 106.5 per cent whereas that of bajra has shown an increase of 72.7 per cent. Amongst the non-foodgrains, the minimum price of sugarcane has shown an increase of only 69.6 as against an increase of 123.5 per cent in the prices of groundnut and 212.5 per cent in cotton during the same period.

An examination of the increase in prices announced by the Government in the light of the increase in prices of major purchased agricultural inputs, as given in Table II, shows that the increase in prices of agricultural inputs of the order of 117.84 per cent is much higher than the increase in prices of wheat, sugarcane and bajra. The increase in prices of cotton and groundnut was much higher than the average increase in prices of agricultural inputs during the period selected for study. In the case of paddy the increase in the price of output was less than that of the inputs, but the difference in increase was small.

At this stage it may not be correct to conclude that the increases in the prices of paddy, cotton and groundnut have been more favourable to the producers as compared to the increases in wheat and sugarcane prices without examining the increase in the value productivity of these crops. It is agreed that the benefits of modern technology, which result in an increase in productivity and lower cost per unit, should be shared by both the producers and consumers. There have been more technological advances in wheat in foodgrains and sugarcane in non-foodgrain crops as reflected by the increase in their productivity. Relatively less increase in their prices may be aimed at for passing the benefits of technology to the consumers through relatively cheap supplies. But this pricing system would not adversely affect the interest of the producers only where relatively less increase in prices is compensated by relatively higher increase in productivity and ultimately resulting in a similar increase in value productivity as in other commodities so that a parity in increase in gross income of different agricultural commodities is maintained.

Trends in Gross Income of Major Crops

Gross income per hectare at prices announced by the Government of major selected crops from 1970-71 to 1979-80 along with their index numbers with 1970-71 as base is given in Table IV. Gross income per hectare at prices announced by the Government during the period 1970-71 to 1979-80 has shown the maximum increase in the case of cotton, being 380.5 per cent followed by paddy and groundnut, being 150.5 per cent and 113.6 per cent respectively. The increase in gross income per hectare in the case of bajra was the lowest, being 5.5. per cent in spite of an increase in its price by about 91 per cent. This may be attributed to a decline in its average yield from 622 kg. per hectare in 1970-71 to 380 kg. per hectare in 1979-80. The increase in gross income per hectare of wheat and sugarcane was 66.4 and 78.8 per cent respectively.

One of the important points that emerges from the examination of growth of gross income per hectare of major crops during the period 1970-71 to 1979-80 is that the price policy of the Government during the seventies has been, by and large, aimed at reducing the disparity in the value productivity of major crops. Wheat, which had a very high rate of growth of production and productivity during the late sixties, became a very high income crop amongst foodgrains in the early seventies. Paddy had a relatively low value productivity at that stage. The price policy being more in favour of rice than

TABLE IV—GROSS INCOME PER HECTARE OF SELECTED CROPS IN INDIA
FROM 1970-71 to 1979-80

(Rs. per hectare)

Year	Rice	Bajra	Wheat	Ground-nut	Sugarcane	Cotton	Average* index number
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1970-71	.. 774.87 (100.0)	342.1 (100.0)	993.3 (100.0)	708.9 (100.0)	3,561.3 (100.0)	279.8 (100.0)	(100.0)
1971-72	.. 804.4 (103.0)	248.6 (72.6)	1,048.8 (105.4)	699.5 (98.7)	3,501.6 (98.3)	543.6 (194.0)	(105.6)
1972-73	.. 786.4 (101.0)	199.8 (58.4)	966.0 (97.2)	585.0 (82.5)	4,076.6 (114.7)	541.0 (193.3)	(102.8)
1973-74	.. 1,208.5 (155.9)	388.8 (113.6)	890.7 (89.7)	971.7 (137.1)	4,093.0 (114.9)	724.2 (259.2)	(140.3)
1974-75	.. 1,159.9 (149.6)	214.6 (62.7)	1,404.9 (141.7)	905.0 (127.7)	4,237.6 (119.0)	941.8 (336.8)	(148.0)
1975-76	.. 1,370.8 (176.0)	367.0 (107.3)	1,480.5 (149.0)	1,262.2 (178.0)	4,326.7 (121.5)	869.4 (310.7)	(163.3)
1976-77	.. 1,207.6 (155.0)	402.6 (117.7)	1,456.4 (146.1)	1,045.8 (147.5)	4,537.5 (127.4)	950.4 (339.6)	(156.7)
1977-78	.. 1,510.7 (194.0)	315.2 (92.1)	1,628.0 (163.9)	1,385.6 (195.4)	4,773.1 (134.0)	1,201.5 (429.4)	(188.4)
1978-79	.. 1,667.0 (215.0)	413.1 (120.7)	1,770.8 (178.3)	1,480.5 (208.8)	4,999.9 (140.4)	1,377.7 (492.3)	(208.2)
1979-80	.. 1,940.8 (250.5)	361.0 (105.5)	1,652.5 (166.4)	1,514.3 (213.6)	6,369.4 (178.8)	1,344.7 (480.5)	(228.0)

* Weights for combining index numbers of different crops are the same as used in Table III.
Figures in brackets are index numbers with 1970-71 as base.

wheat during the seventies, the disparity in the value productivity of paddy and wheat at the close of seventies, *i.e.*, 1978-79 was marginal. In fact during 1979-80 the value productivity of paddy was more than that of wheat. This tilt in the price policy in favour of paddy induced the growers to invest more in its production which resulted in a significant increase in its production from 42.2 million tonnes in 1970-71 to 53.8 million tonnes in 1978-79 as against the stagnant production at about 39 million tonnes during the period 1964-65 to 1969-70.

Groundnut, cotton and sugarcane are important non-foodgrain crops, the demand for which increases at a relatively higher rate. Sugarcane had

already the highest value productivity per unit of area and there was enough incentive for the producers to invest in this crop. On the other hand, cotton had the lowest value productivity per hectare amongst the major crops, being Rs. 280 in 1970-71 as against Rs. 3,561.3 in sugarcane. The value productivity per unit of area for groundnut was also relatively low in 1970-71. To induce the producers to invest for increasing the production of oilseeds and cotton, the price policy was also tilted in favour of groundnut and cotton by allowing relatively higher increases in their prices and value productivity. In 1970-71 while the value productivity per hectare of wheat was more than three times that of cotton and about 40 per cent higher than that of groundnut, during 1979-80 the differences in the value productivity of these crops are reduced to 18-20 per cent.

Parity Indices of Prices of Agricultural Products and Inputs

In order to examine the parity between the prices received by the farmers for their produce and the prices paid for agricultural inputs, parity indices were computed from the indices of prices of agricultural products and agricultural inputs. Parity indices of prices of major agricultural commodities and purchased agricultural inputs are given in Table V. It shows that there

TABLE V—PARITY INDICES OF PRICES OF MAJOR AGRICULTURAL COMMODITIES AND INPUTS
DURING 1970-71 TO 1979-80

Year	Paddy	Bajra	Wheat	Ground-nut	Sugar-cane	Cotton	Average	Gross income-input prices parity indices
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1970-71	..	100·0	100·0	100·0	100·0	100·0	100·0	100·0
1971-72	..	99·4	97·3	97·3	97·3	97·3	132·7	100·1
1972-73	..	96·0	98·3	90·1	106·1	97·8	147·7	98·3
1973-74	..	121·1	104·2	79·6	107·6	86·4	174·3	109·5
1974-75	..	82·8	69·3	71·2	75·7	59·4	114·1	78·4
1975-76	..	82·7	62·2	71·0	81·6	59·3	122·7	79·1
1976-77	..	88·9	74·4	76·4	91·0	63·7	138·2	85·6
1977-78	..	92·5	73·1	78·2	101·6	62·3	156·5	88·2
1978-79	..	97·4	75·4	72·2	100·4	66·2	141·4	85·4
1979-80	..	100·8	79·1	69·9	102·6	71·8	143·4	90·3

was near parity in prices announced by the Government and increase in prices of agricultural inputs in the case of paddy and groundnut. In the case of cotton, price-cost parity indices were much higher in later years which shows higher increase in output price than that in input prices. However, in the case of wheat and sugarcane parity indices of price to cost showed continuous decline from 1970-71 to 1979-80, indicating a relatively higher increase in the prices of inputs than in the prices of output. This may be due to the high price-cost ratio and value productivity of these crops in the early seventies and tilt in the price policy of the Government in favour of other important crops so that the disparity in the value productivity of these crops is decreased over time.

So far as the overall parity between prices of agricultural commodities and inputs is concerned, there was near parity in the increase in the prices of products and inputs till 1973-74. However, parity indices of prices of products and inputs became as low as 78.4 and 79.1 in 1974-75 and 1975-76 respectively due to a sharp increase in the prices of all inputs particularly fertilizers, diesel oil, pesticides and seed in these years. At this stage the terms of trade turned against the farmers as the increase in the prices of inputs was almost double, being 94.5 per cent as compared to the increase in the prices of products, being 53.8 per cent in 1975-76 over 1970-71. However, after 1975-76 the terms of trade improved in favour of farmers through a gradual decline in the prices of major inputs, *i.e.*, fertilizers and through an increase in the prices of products with the result that the overall parity index was raised to 90.3 in 1979-80.

As regards gross income-input prices parity, the parity indices in column (9) in Table V show almost complete parity by the close of the decade, *i.e.*, 1979-80. The parity indices were near 100.0 throughout from 1970-71 to 1979-80 except during the years 1974-75 to 1976-77 when these indices were low due to a sharp increase in the prices of agricultural inputs without any proportionate increase in the prices of products in these years. However, due to sound price policy of the Government which involved a gradual decline in the prices of major inputs like fertilizers and an increase in the prices of products as also productivity through developmental programmes, a complete parity in increased gross income of the farmers and prices paid by them for major agricultural inputs was maintained till the year 1979-80.

The foregoing analysis sets aside all doubts and controversies about the price policy of the Government. It shows that there has been parity in the increase in income and prices of inputs in the agricultural sector in general but also, by and large, in the increases in the prices of different crops and agricultural inputs except in the case of wheat and sugarcane. In the case of these two crops, the increase in the prices of output and income was less than the increase in the prices of inputs. As these two crops had a high price-cost ratio in the early seventies due to technological break-through, the price policy was tilted in favour of paddy and other important non-foodgrain crops such as groundnut and cotton mainly with a view to bringing parity in income of different crops and to reduce the regional imbalances in the growth of agricultural income.