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ARTICLES

Fertiliser Subsidy: Is the Cultivator 'Net Subsidised'?

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The mounting burden of subsidies in the Government budgets is compelling the policy makers to search for means to tide over the resource crunch. Fertiliser subsidy that is touching Rs.3,650 crores mark, is often made out the principal target. The Government's reluctance to raise fertiliser prices is generally considered as pampering the 'kulak lobby'. Implicit in this understanding is the notion that Indian cultivators are receiving huge fertiliser subsidies.

This paper aims primarily at examining the issue whether Indian farmers are in fact being subsidised through fertiliser prices or not. The results of the study indicate that 'economic' subsidy on fertilisers to Indian cultivators constitutes not more than 50 per cent of what the Government delineates in its budget (average of 1981-82 to 1989-90). If, however, one examines the issue of fertiliser prices in relation to the prices of major crops, such as rice, wheat and cotton, Indian cultivators do not appear to have been 'net subsidised' on account of fertilisers. If there are any indications, they are more towards the fact that farmers have been 'net taxed' through pricing of fertilisers and crops.

Section I of this paper presents the budget estimates of fertiliser subsidy while Section II works out 'economic' subsidy on fertilisers. Finally, Section III examines the question of fertiliser subsidy in relation to crop prices and attempts to answer the question: Is the Indian cultivator 'net subsidised' through fertiliser prices?

I

FERTILISER SUBSIDY: BUDGET ESTIMATES

Fertilisers in India are subsidised apparently with a view to promoting their consumption in agriculture. Therefore, with the increase in the consumption of fertiliser over time, fertiliser subsidy has also increased. Table I presents the estimates of fertiliser subsidy as per the Central Government budgets over the period 1971-72 to 1989-90. It indicates that fertiliser subsidy increased from (-) Rs. 20 crores in 1971-72 to Rs. 3,250 crores in 1988-89 and is expected to touch Rs. 3,651 crores in 1989-90. It may be observed that the first time a steep increase in fertiliser subsidy occurred was 1974-75 when the cost of imported fertilisers shot up tremendously (almost three times), *i.e.*, from Rs. 713 per tonne in 1973-74 to Rs. 2,180 per tonne of urea in 1974-75 in the wake of the oil crisis of 1973-74 and India's entry into the international market in a big way in 1974-75. The subsidy on imported fertilisers registered an increase of more than eleven times in a single year (*i.e.*, from Rs. 33 crores in 1973-74 to Rs. 371 crores in 1974-75). Although the domestic retail price of urea was raised by about 90 per cent, it failed to arrest the growing subsidy simply because it was much less than the increase in imported cost. In view of the fact that the increase in the retail price of domestic fertiliser was higher than the increase in the domestic cost of fertiliser production, the Government imposed a Fertiliser Prices Equalisation Charge on domestic manufacturers in an effort to contain their windfall gains from changed international and

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domestic fertiliser price difference. For the first time, such dramatic changes in prices led to a drop in fertiliser consumption by about 10 per cent. Subsequently, to boost the consumption of fertilisers, the Government revised domestic prices downwards in 1975, 1976, 1977 and 1979. This reduced the difference between the retail price and domestic cost of production. Accordingly, the Fertiliser Prices Equalisation Charge was also lowered substantially and finally eliminated in June 1980. This strategy resulted in increasing fertiliser subsidies both on imported and domestic fertilisers from 1977-78 onwards. Within a decade fertiliser subsidy shot up from Rs. 112 crores in 1976-77 to Rs. 1,923 crores in 1985-86, and it is expected to touch Rs. 3,650 crores mark in 1989-90 (Table I).

TABLE I. FERTILISER SUBSIDIES ON IMPORTED AND DOMESTIC FERTILISERS

(Rs. crores)

Year (1)	Imported fertiliser (2)	Domestic fertiliser (3)	Total (4)
1971-72	-20	-	-20
1972-73	-18	-	-18
1973-74	33	-	33
1974-75	371	-	371
1975-76	242	-	242
1976-77	52	60	112
1977-78	159	107	266
1978-79	169	173	342
1979-80	282	321	603
1980-81	335	170	505
1981-82	100	275	375
1982-83	55	550	605
1983-84	142	900	1,042
1984-85	727	1,200	1,927
1985-86	323	1,600	1,923
1986-87	197	1,700	1,897
1987-88	114	2,050	2,164
1988-89 (RE)	250	3,000	3,250
1989-90 (BE)	530	3,121	3,651

Sources: 1. Desai (1986) for 1971-72 to 1979-80.
2. Government of India (1989*a*) for 1980-81 to 1987-88.
3. Government of India (1989*b*) for 1988-89 and 1989-90 figures.

Notes: Subsidy on domestic fertilisers includes (*a*) payments under the RPS to manufacturers of nitrogenous and phosphatic fertilisers; (*b*) payment of subsidies to indigenous manufacturers of single superphosphate; and (*c*) payments under the Fertiliser Freight Subsidy Scheme for delivery up to block headquarters.
RE = Revised estimates. BE = Budget estimates.

It may also be observed that from 1978-79 onwards, subsidy on domestic fertilisers has been greater than that on imported fertilisers (except in 1980-81 when domestic prices were substantially increased). This phenomenon of faster increase in domestic fertiliser subsidy since 1978-79 seems to be direct outcome of a switch in pricing policy of domestic fertilisers that the Government followed since November 1977 under the Retention Price Scheme (RPS).

Under the RPS, the Government fixed ex-factory retention prices for each plant and for each product. Manufacturers were reimbursed the difference between net realisation (consumer price minus distribution margin) and the ex-factory retention price (inclusive of equated freight). This is termed as fertiliser subsidy on domestic fertilisers.

The ex-factory pricing, which is carried out for different products of each plant, is based on a normative approach to production. Since each plant has a different cost structure depending upon vintage, size, location, feedstock, etc., it leads to quite varying retention prices for the same product across different plants, so much so that the difference between

the lowest and the highest retention price of urea, for example, exceeds 150 per cent (1985-86) (see Desai, 1986*b*). The ex-factory pricing exercise is done every three years based on detailed cost analysis and efficiency norms (for greater details of this scheme and efficiency norms, see Narayan, 1986 and Prakash, 1989). So far the exercise has been conducted four times, the last one in March 1987 (although it was due in April 1985) (see *Fertiliser News*, October 1987, p. 10).

The subsidy on imported fertilisers is calculated by deducting the farmer's price (excluding dealer's margin and sales tax, etc.) from the c.i.f. (cost, insurance and freight) price of imported fertiliser, plus pool handling charges paid for it. The latter is akin to the retention price in the case of domestic fertilisers.

The RPS is a fair device for the industry where it promotes efficiency through normative approach, takes care of the major risk element pertaining to the market by ensuring a 12 per cent post-tax return on net worth, and in the process induces greater investment in the industry. It appears that the operation of this scheme raised the installed capacity of fertiliser industry significantly from 3.4 million tonnes, entailing an investment of Rs. 800 crores in 1975-76 to 10.8 million tonnes with an investment of about Rs. 9,300 crores in 1988-89 for nitrogenous and phosphatic fertilisers (Gupta, 1989). The production of fertilisers increased even at a faster rate. But the problem arises in deciding whether this so-called 'fertiliser subsidy' given through the RPS is to the agricultural sector or to the fertiliser industry or perhaps to feedstock supplying agencies such as Oil and Natural Gas Commission (ONGC), Indian Oil Corporation (IOC), Coal India Limited (CIL), etc. In order to appreciate the significance of this problem, one needs to probe deeper into the cost structures of fertiliser plants, the variation in their retention prices, and especially in the prices being charged for feedstocks and power from different plants.

There were in all 25 plants producing urea in the country in 1984-85. Out of this, 11 were based on naphtha, five each on fuel oil and associated or natural gas, two on coal and one each on naphtha plus fuel oil and naphtha plus natural gas. The retention price of urea amongst these 25 plants varied from Rs. 1,705 to Rs. 4,506 in April-May 1985 (see Desai, 1986*b* for greater details). Looking at the cost structures of 17 out of 25 plants, for which data were accessible, it was observed that the main element of retention price was energy cost (52.2 per cent), followed by returns to capital and interest (21.8 per cent), conversion costs (12.1 per cent), depreciation (10.1 per cent) and bags (3 per cent). Exploring the details of energy cost, it was interesting to find that the weighted average cost of energy varied between Rs. 1,063 in gas-based plants to Rs. 2,255 in coal-based plants for producing a tonne of urea. The variation in energy cost across different plants was primarily due to a significant variation in the prices of feedstocks and power. For example, power charges to different plants ranged between Re. 0.42 per kWh and Re. 0.82 per kWh; price of gas varied from Rs. 301 to Rs. 2,068 per 1,000 SM^3 (standard cubic meter);[1] naphtha price between Rs. 2,048 to Rs. 2,332 per tonne and so on. It may be noted that the prices of these inputs are administered by the Government. It is basically the variation in these administered prices for the same feedstock across different plants that leads to variations in their retention prices and thereby plant-wise subsidies. A much higher price of feedstock, say gas, in one plant vis-a-vis another unnecessarily inflates the retention price of the former and thereby the subsidy. For example, the gas-based plant which was being charged Rs. 2,068 per 1,000 SM^3 of gas had its retention price as Rs. 3,717 per tonne of urea compared to Rs. 1,705 per tonne of urea in another plant where gas was priced at Rs. 301 per 1,000 SM^3. Of course there are many other factors such as higher investment costs of the new units that cause variations in retention prices but the differential pricing policy for feedstocks and their

administered prices being fixed at high levels seem to be important ones. The fertiliser 'subsidies' that result as a consequence of this differential pricing policy of feedstocks across plants, especially when feedstock pricing is not based on its cost of production, cannot be truly termed as 'subsidies' even to the fertiliser industry not to talk of agriculture. These are basically in the form of intra-economy transfers within Government agencies such as ONGC, IOC, CIL, State Electricity Boards, etc.[2]

Thus, under such a regime of administered input prices of fertiliser industry, especially when administered pricing is based on considerations other than its own cost of production, and a normative approach followed in costing that provides an insurance cover to the fertiliser industry against market risk, the estimates of fertiliser subsidy as shown in the Central Government budgets, appear to be of questionable import.

II

ECONOMIC SUBSIDY ON FERTILISERS

An alternative approach to estimate fertiliser subsidy to the cultivators, therefore, would be to define it as the difference between the delivered cost of imported fertiliser at the farmgate and the actual price that is being charged from the farmer (excluding any taxes of customs duties therein involved in the process). Since fertiliser is a tradeable input it makes sense to take the delivered cost of imported fertiliser at the farmgate as a relevant opportunity cost for the simple reason that it is this cost which the farmer would have most likely paid under conditions of free trade and no Government intervention. But now in reality, due to the Government intervention, the farmer is made to pay a different price. The difference between the two can be termed as subsidy (tax), depending upon whether the farmer is paying less (more) than what he would have paid under conditions of free trade.

Going by this approach, first, one finds per unit c.i.f. price of urea, diammonium phosphate (DAP) and muriate of potash (MOP) separately, and then adds to that domestic handling charges including unloading, packing in bags, transporting to various places in the country and marketing expenses involved in the process together with the dealer's margin. In India, while fertilisers are imported by Minerals and Metals Trading Corporation of India (MMTC) on behalf of the Ministry of Agriculture, Government of India, final handling from the port to the farmgate is left to a few pool handling agencies. These agencies, till 1985-86 were paid charges as determined by the Government on the basis of port, type of consignment (bulk or bagged), and the destination where imported fertilisers were supposed to be made available. In 1986-87, the Government introduced the 'tender system' (with effect from April 1986) with the hope of cutting down handling costs.

Table II calculates economic subsidy on fertilisers per unit of urea (46 per cent N), diammonium phosphate (18-46-0) and muriate of potash (60 per cent K_2O). These estimates are adjusted to derive separately economic subsidy per ton of N, P and K, and then multiplied by the respective quantities of their consumption to obtain total economic subsidy on fertilisers (Table III). This constitutes roughly 48 per cent of what is presented in the Central Government budgets (average of 1981-82 to 1989-90). The rest of the budgeted fertiliser subsidy (52 per cent) can be deemed to be going either to the fertiliser industry or its feedstock supplying agencies. It may, however, be observed in Table III that the estimates of economic subsidy on fertilisers exhibit a much greater degree of variation than budget estimates. This wide variation results primarily from the violent fluctuations in fertiliser prices in the international market. This, in fact, cautions one not to use single year estimates in such a study but to look at three to five years' moving averages.

TABLE II. ESTIMATION OF AVERAGE ECONOMIC SUBSIDY ON FERTILISERS

(Rs./tonne)

Particulars	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90 (upto December 1989)
Urea (N) (46% Nitrogen):									
1. c.i.f. price of urea (on ship)	1,743.59	1,379.74	1,396.04	2,000.00	2,157.00	1,350.00	1,589.66	1,940.80	2,362.80(3)
2. Pool handling expenses (1)	791.36	1,063.89	878.10	882.55	956.88	782.59	927.38	927.38(6)	927.38(6)
3. Dealer's margin (7)	120.00	120.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00
4. Domestic price	2,350.00	2,350.00	2,150.00	2,150.00	2,150.00(2)	2,350.00	2,350.00	2,350.00	2,350.00
5. Subsidy to the farmer (1+2+3-4)	304.95	213.63	254.14	862.55	1,093.88	-87.41	297.04	648.18	1,070.18
Diammonium phosphate: P(DAP, 18-46-0)									
1. c.i.f. price of DAP (on ship)	2,240.15	2,010.48	2,045.48	2,550.00	2,487.00	2,500.00	2,650.95(4)	3,532.64	3,787.10
2. Pool handling expenses (1)	791.36	1,063.89	878.10	1,041.54	1,163.36	840.97	996.55(5)	1,061.20	994.67
3. Dealer's margin (7)	145.00	145.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00
4. Domestic price	3,600.00	3,600.00	3,350.00	3,350.00	3,350.00(2)	3,600.00	3,600.00	3,600.00	3,600.00
5. Subsidy to the farmer (1+2+3-4)	-423.49	-380.63	-236.42	431.54	490.36	-69.03	237.50	1,183.84	1,371.77
Muriate of potash: K(60%) K_2O)									
1. c.i.f. price of MOP (on ship)	1,716.00	933.24	998.94	1,200.00	1,347.00	1,185.00	1,200.57	1,832.20	2, 149.13
2. Pool handling expenses	387.53	400.96	401.97	401.92	416.02	450.99	515.04	514.99	515.00
3. Dealer's margin (7)	90.00	90.00	95.00	95.00	95.00	95.00	95.00	95.00	95.00
4. Domestic price	1,300.00	1,300.00	1,200.00	1,200.00	1,200.00(2)	1,300.00	1,300.00	1,300.00	1,300.00
5. Subsidy to the farmer (1+2+3-4)	893.53	124.20	295.91	496.92	658.02	430.99	510.61	1,142.19	1,459.13

Sources: 1. Ministry of Agriculture, Government of India.
2. Fertiliser Association of India, New Delhi.
3. Fertiliser Statistics (various issues).

Notes:-

1. Pool handling charges basically consist of port handling and port dues, transit and storage losses, depot handling charges, finance charges, storage charges, freight, inventory holding cost, cost of bags and bagging, administrative overheads and contingencies, etc. These charges differ from agency to agency depending upon whether it is handling bulk or bagged fertilisers and where it is supposed to take the imported fertilisers. We have used in this exercise the weighted average of expenses paid to pool handling agencies for handling and transporting the imported fertilisers. The quantity handled by each agency acted as the relevant weight. These are worked out separately for urea DAP and MOP. Up to the year 1983-84, however, it may be noted that there was one common rate of handling charges for all non-potassic fertilisers. There were only five agencies (Indian Potash, SPIC, MCF, HFC, and RCF) handling fertilisers in 1983-84. Their number increased from 1984-85 onwards and went upto twelve in 1986-87, when the Government introduced the tender system' (with effect from April 1, 1986).

2. These domestic prices of urea, DAP and MOP indicated under 1985-86, actually prevailed up to January 31, 1986.

3. India did not improt urea in 1989-90 (up to December 1989). Its c.i.f. price, therefore, has been worked out by adding freight expenses of $25 per tonne to the f.o.b. (free on board) price of urea prevailing in the Middle East during June 1989 ($118.20 per tonne). June is a month when India normally makes its purchases in the international market.

4. India did not import DAP during 1987-88. Thus, its c.i.f. price is worked out by adding freight expenses of $35 per tonne to the f.o.b. price prevailing in US Gulf during June 1987 ($170.5 per tonne).

5. The handling expenses of DAP in 1987-88 have been worked out by applying the same percentage increase (18.5) over its 1986-87 value, as it existed in the case of urea.

6. The pool handling expenses of urea for the years 1988-89 and 1989-90 are not available. We have used the actual expenses of 1987-88 for these later years too.

7. The dealer's margin taken here is that of private dealers. For co-operatives it is generally a bit higher.

8. The c.i.f. prices of urea, DAP and MOP are worked out at official exchange rate. If one uses shadow price of foreign exchange, the subsidy estimates would obviously be different.

TABLE III. ECONOMIC SUBSIDY ON FERTILISERS: SHARE OF AGRICULTURE AND FERTILISER INDUSTRY OR ITS FEEDSTOCK SUPPLYING AGENCIES

Particulars	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	Average 1981-82 to 1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Economic subsidy on fertiliser as per the alternative approach adopted in this study										
(1*a*). On nitrogenous fertilisers (N)	269.20	196.47	289.57	1,030.85	1,348.35	-110.45	375.06	1,003.75	1,790.38	688.13
(1*b*). On phosphatic fertilisers(P)	-156.50	-145.01	-127.43	37.37	25.90	-16.57	59.17	557.30	641.32	97.28
(1*c*). On potassic fertilisers(K)	100.47	14.79	38.24	69.44	88.62	61.50	77.99	216.64	291.43	106.57
(1*d*). Total (N+P+K)	213.17	66.25	200.38	1,137.66	1,462.87	-65.52	512.22	1,777.69	2,723.13	891.98
2. Fertiliser subsidy as given in Central Government budgets	375.00	605.00	1,042.00	1,927.00	1,923.00	1,897.00	2,164.00	3,250.00	3,651.00	1,870.44
3. Share of fertiliser subsidy going to the cultivator (Row 1*d*/Row 2) 100 (per cent) (The rest of fertiliser subsidy may be ascribed going to fertiliser industry or its feedstock supplying agencies)	56.84	10.95	19.23	59.04	76.07	-3.45	23.67	54.70	74.59	47.69

Notes:-

1. The negative figures in row 3 indicate some sort of 'taxation' on fertiliser industry.

2. Economic subsidy on nitrogenous fertiliser is calculated by multiplying the difference between farmgate cost of imported N and its domestic price, with the consumption of N. Similarly, economic subsidy on phosphatic fertilisers is obtained by multiplying the difference between farmgate cost of imported P and its domestic price, with the consumption of P. And finally, economic subsidy on potassic fertilisers is derived by multiplying the difference between farmgate cost of imported K and its domestic price, with the consumption of K.

3. Farmgate cost of imported N is (1/0.46) of farmgate cost of imported urea (46% N.). Farmgate cost of imported P is (1/0.46) (Farmgate cost of imported DAP -0.18 of farmgate cost of imported N.). Finally, farmgate cost of imported K is derived as (1/0.6) of farmgate cost of imported MOP(60% K_2O).

III

Is the Cultivator 'Net Subsidised'?

Two points need to be explored before one could really judge whether Indian cultivators are in fact being 'net subsidised' through fertiliser subsidies. The first point relates to the marketing costs paid to the pool handling agencies, which appear to be abnormally high. The second issue is a major one and involves answering the question: What would have been the crop-fertiliser price ratio under free trade scenario, compared to what exists under controlled trade? If the former ratio exceeds the latter, it would obviously imply some sort of 'net taxation' on cultivators despite subsidy on fertilisers and vice versa.

Regarding the first point, it may be recalled that as per the marketing system in vogue during 1981 to 1986 (at least up to April 1, 1986), fertilisers were imported by MMTC on behalf of the Ministry of Agriculture, Government of India and sold on the high seas on ownership basis to a few nominated pool handling agencies. These pool handling agencies were given an 'appropriate' amount to cover their expenses from unloading and bagging to transporting these fertilisers to block headquarters. These expenses paid to the pool handling agencies came to as high a figure as Rs. 957 per tonne of urea (46 per cent N) and Rs. 1,163 per tonne of DAP (18-46-0) during 1985-86. On top of that was the dealer's margin to the tune of Rs. 130 in the case of urea and Rs. 190 in the case of DAP. For other years too, the situation was not very different. For example, during 1981-82 to 1985-86, on an average, these pool handling charges plus the dealers' margin turned out to be 60 per cent of c.i.f. urea (46 per cent N) price and 51 per cent of c.i.f. DAP (18-46-0) price (Table II). It may be emphasised here that these charges are significantly higher than the marketing costs paid to manufacturers for distributing domestic fertilisers. Although these marketing costs vary across manufacturers, Ramaswamy (1985,p. 241) observed in a survey of certain fertiliser firms that the marketing cost of imported fertiliser was about 54 per cent higher than that of domestic fertilisers in 1980-81 and about 21 per cent higher in 1982-83. There were two main reasons for this: (*a*) that imported fertilisers also played the role of buffer stocks and therefore their inventory cost was significantly higher than that of domestic fertilisers.[3] For example, as per Ramaswamy's survey (1985), inventory cost was 424 per cent higher in 1980-81 and 47 per cent higher in 1982-83; (*b*) that the average lead covered by imported fertilisers is much higher than that covered by domestic fertilisers, which raises the transportation cost of the former. For example, as per Ramaswamy's survey this cost was higher by 33 per cent in 1980-81 and 1982-83.

It may be noted here that in 1986-87 when the Government introduced the 'tender system', the pool handling charges of urea declined from Rs. 957 in 1985-86 to Rs. 783 per tonne in 1986-87. Similarly, in the case of DAP these charges declined from Rs. 1,163 to Rs. 841 per tonne over the same period. In later years, although the pool handling charges increased, these still remained below their 1985-86 levels. This implies that the subsidy estimates for the period up to 1985-86 contain some element of upward bias.

Now let us take up the second point, *i.e.*, the question of crop-fertiliser price ratios under free and controlled trade scenarios. We have taken here three crops of Indian agriculture, which consume a larger share of fertilisers in India. These are rice, wheat and cotton. Free trade prices are estimated for the producers of these crops on region-specific basis. For example, in the case of rice, free trade producer reference prices are estimated for six States - Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Punjab and Uttar Pradesh; for wheat these are estimated for Haryana, Madhya Pradesh, Punjab and Uttar Pradesh and for cotton

also four States - Maharashtra, Gujarat, Punjab and Andhra Pradesh - are covered. It is worth noting that in estimating free trade producer reference prices under importable hypothesis, marketing costs are deducted from the c.i.f. landed price, while in the case of fertilisers these are added.[4]

TABLE IV. CROP - FERTILISER PRICE RATIOS UNDER FREE AND CONTROLLED TRADE SCENARIOS

Trade scenario	Crop and fertiliser	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	Average (1981-82 to 1986-87)	Weights of N, P and K
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Free trade	Ratio of rice price to:								
	price of N	0.64	0.47	0.58	0.47	0.42	0.60	0.53	0.71
	price of P	0.79	0.55	0.64	0.55	0.53	0.52	0.60	0.23
	price of K	1.01	1.11	1.22	1.10	0.95	1.03	1.07	0.06
	Weighted price of NPK	0.70	0.53	0.63	0.53	0.48	0.61	0.58	
Controlled trade	Ratio of rice price to:								
	price of N	0.37	0.39	0.46	0.48	0.50	0.47	0.44	0.71
	price of P	0.32	0.34	0.39	0.41	0.42	0.41	0.38	0.23
	price of K	0.87	0.92	1.07	1.12	1.16	1.10	1.04	0.06
	Weighted price of NPK	0.39	0.41	0.48	0.50	0.52	0.49	0.46	
Free trade	Ratio of wheat price to:								
	price of N	0.31	0.30	0.34	0.30	0.29	0.36	0.32	0.73
	price of P	0.38	0.35	0.38	0.35	0.37	0.31	0.36	0.22
	price of K	0.48	0.71	0.72	0.70	0.67	0.61	0.65	0.05
	Weighted price of NPK	0.33	0.33	0.37	0.33	0.33	0.36	0.34	
Controlled trade	Ratio of wheat price to:								
	price of N	0.25	0.28	0.32	0.32	0.34	0.32	0.30	0.73
	price of P	0.22	0.24	0.28	0.28	0.29	0.28	0.26	0.22
	price of K	0.60	0.65	0.75	0.76	0.78	0.75	0.71	0.05
	Weighted price of NPK	0.26	0.29	0.33	0.33	0.35	0.33	0.31	
Free trade	Ratio of seed-cotton price to:								
	price of N	0.94	1.10	1.70	1.16	0.84	1.41	1.19	0.69
	price of P	1.17	1.27	1.89	1.35	1.06	1.20	1.32	0.23
	price of K	1.49	2.58	3.57	2.69	1.91	2.40	2.44	0.08
	Weighted price of NPK	1.04	1.26	1.89	1.33	0.98	1.44	1.32	
Controlled trade	Ratio of seed-cotton price to:								
	price of N	1.00	0.98	1.31	1.20	1.09	1.13	1.12	0.69
	price of P	0.87	0.86	1.12	1.03	0.93	0.99	0.97	0.23
	price of K	2.35	2.32	3.05	2.81	2.55	2.66	2.62	0.08
	Weighted price of NPK	1.08	1.06	1.40	1.29	1.17	1.22	1.20	

Note:-

1. For rice this ratio is the weighted average of six rice producing States, namely, Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Punjab and Uttar Pradesh. Relative shares of each State in the consumption of N, P, K and (N+P+K) by six States combined for the triennium average ending 1985-86 acted as the relevant weights.

2. For wheat this ratio is the weighted average of four wheat producing States, namely, Haryana, Madhya Pradesh, Punjab and Uttar Pradesh. Relative shares of each State in the consumption of N, P, K and (N+P+K) by four States combined for the triennium average ending 1985-86 acted as the relevant weights.

3. For cotton this ratio is the weighted average of four cotton producing States, namely, Maharashtra, Gujarat, Punjab and Andhra Pradesh. Relative shares of each State in the consumption of N, P, K and (N+P+K) by four States combined for the triennium average ending 1985-86 acted as the relevant weights.

4. Under the free trade scenario this price ratio refers to the price that the farmer would have received for his crops (rice, wheat or cotton) under hypothetical situation of free trade divided by the price of fertilisers (N, P or K) that he would have paid under that situation (see text for details).

5. Under the controlled trade scenario, this ratio refers to the price that a farmer gets for his produce divided by what he pays for fertilisers.

These free trade producer reference prices for the three crops are estimated keeping in mind the quality aspect so that 'like is compared with the like'.[5] Once these reference prices are estimated, the next step is to work out crop-fertiliser price ratio. This is done for each region, separately for N, P and K and then weighted by their respective consumption to obtain weighted average ratios indicative of the picture at the all-India level. This free trade scenario, so derived, is then compared with the crop-fertiliser ratios that the farmers are actually paying under the controlled trade scenario.

It is clear from Table IV that under free trade scenario Indian cultivators of rice, wheat and cotton would have been better-off compared to what they are under the controlled trade scenario. For example, the rice-fertiliser ratio averaged over the six-year period, 1981-82 to 1986-87, shows that it would have been much higher (0.58) than what actually existed (0.46). The difference is greater in the case of rice-phosphate price ratio than in the case of rice-nitrogen or rice-potash price ratios. It is indicative of the fact that the rice cultivator has been 'net taxed' despite fertiliser subsidies. The degree of this was greater in the early eighties than in 1986-87. Similar results follow in the case of cotton, though with lesser intensity. Cotton-fertiliser price ratio (weighted) under the free trade scenario turns out to be 1.32 compared to 1.20 under the controlled trade scenario (average of 1981-82 to 1986-87). It is only in the case of wheat that the two ratios are quite close to each other. It is 0.34 under free trade compared to 0.31 under the controlled trade scenario. Thus, on the whole, it appears that Indian farmers would have been better-off in terms of crop-fertiliser price ratio under the free trade scenario than under the controlled trade. It implies that in fact the farmers have been 'net taxed' rather than 'net subsidised' on account of crop fertiliser pricing.

It might be interesting at this stage to note that Indian cultivators face an unfavourable crop-fertiliser price ratio not only compared to the one under the free trade scenario but also this ratio remains unfavourable when it is seen in comparison with similar (controlled trade) crop-fertiliser price ratios prevailing in most of the Asian and Pacific countries. For example, in 1984-85 the quantum of paddy (kg) required to buy one kilogram of nitrogen in different countries was as follows: Burma - 0.69, the Republic of Korea - 0.99, Indonesia - 1.24, Malaysia - 1.26, Sri Lanka - 1.63, Bangladesh - 2.01, Pakistan - 2.47, Nepal - 2.87, India - 3.41, Philippines - 3.78 and Thailand - 3.91 (FADINAP, 1986).[6] In 1986-87 this figure for India stood at 3.50 kg of paddy required to buy one kilogram of nitrogen.

All these empirical findings suggest one thing: that the Indian cultivator has not been 'net subsidised' on account of fertilisers despite the large quantum of budgetary or economic 'subsidies' on fertilisers.

NOTES

1. Almost a similar situation existed in the earlier period, around March 1982. For example, HFC, Namrup was paying for gas Rs. 267 per 1,000 SM^3, IFFCO, Kalol paid Rs. 342. The RCF, Trombay, on the other hand, paid Rs. 1,791 for unit V and Rs. 1,637 per 1,000 SM^3 for Unit II. The RCF, Trombay price was much higher than for other plants as it was based on the replacement value of naphtha for feedstock and of fuel oil for fuel energy. The underlying philosophy behind this switch in pricing policy of gas, which in no way was related to its cost of production, was to promote efficient allocation of natural gas amongst different uses under the overall objectives of national energy policy (see Narayan, 1986).

2. In this context, the following statement made by G.V.K. Rao Committee may be noted. It says: "prices of inputs like naphtha or gas are controlled by the Government. The cost of one unit of naphtha/gas in the UAE/Saudi Arabia, is about 30 cents per unit. It is $ 1.00 in the U.S.A. and about $ 4.00 per unit in India. If inputs are priced in the same manner as in other countries, it is not unlikely that the prices of fertilisers would also be priced differently. The higher price of raw materials enables the ONGC to show a profit of about Rs. 1,600 crores while about Rs. 1,800 crores is shown as subsidies given to farmers for the supply of fertilisers. This is only a book-keeping

exercise" (see Government of India, 1987, p. iv).

3. Theoretically, imported fertilisers act as a residue in the fertiliser distribution plan. Therefore, they are kept as pipeline stocks for a relatively longer period, which hike their inventory cost.

4. This is because the farmer is a producer of these crops who competes with the imported crops at the port or at deficit place, where the competitive price is set. As a result of this, the producer's own price at the farmgate gets squeezed by the margin of marketing costs involved from the port (or deficit place) to the producer's farm. On the contrary, in the case of fertilisers he is a consumer and therefore the relevant reference price is the delivered cost of imported fertilisers at the farmgate. The transport cost and marketing margins from the relevant producing State to the port in the case of these crops are worked out as follows:

In the case of wheat and rice transport cost from different States to the relevant port is worked out by multiplying the freight rates (Rs.MT km) with the distance. Actual railway freight rates for grains, though telescopic in nature, are worked out on average basis from Annual Report and Accounts of Indian Railways (Ministry of Railways). These freight rates are adjusted for road transportation assuming that 40 per cent of the grains move through road and that road transport is 40 per cent more expensive than rail (based on discussions with FCI officials). Marketing costs and distribution margins, consisting of interest cost, handling expenses, storage charges, establishment charges, distribution margin of wholesaler and miscellaneous expenses arising out of transit and storage losses, etc., are estimated on the basis of a review of Annual Reports of Food Corporation of India and various empirical studies on the subject, particularly those contained in *Indian Journal of Agricultural Economics*, July-September 1985. Accordingly, interest is calculated for two months at 18 per cent on the procurement price of grain. Handling expenses, storage charges, establishment charges, wholesaler's distribution margin and miscellaneous expenses, all are estimated separately at the rate of one rupee per quintal each. Marketing costs and dealer's margin (excluding transport costs) come to about 6 per cent of procurement price of wheat and 5 per cent of procurement price of rice (average 1980-81 to 1984-85). This is added to the transport cost arrived earlier. It is this total of transport and marketing expenses, which is deducted from the c.i.f. prices of grains to work out the reference prices for cultivators under the free trade scenario.

In the case of cotton transport costs, processing costs pertaining to ginning and pressing of seed-cotton (*kapas*), marketing costs and trader's margin are worked out as the difference between ex-Bombay price of variety-specific cotton lint (exclusive of sales tax and octroi) and the corresponding variety's wholesale price of *kapas* in the regional centres of cotton production. Cotton lint price is adjusted to take into account the lint-*kapas* ratio (34 per cent), cotton seed prices and ginning loss of 1.3 per cent. The relevant information on these aspects is culled out from *Indian Cotton Annual* of the East India Cotton Association and various reports of the Commission for Agricultural Costs and Prices (CACP) on Price Policy for Kharif Crops. (For greater details and exact numbers worked out in this connection for wheat, rice and cotton, see Gulati with Hanson and Pursell, 1990, pp. 20-22, 41-43, 48-50, 71-74 and 84-89.)

5. In the case of rice, *e.g.*, it is Thai white 5 per cent broken, compared with Indian 'common' rice; in the case of wheat it is US Hard Red winter No.2 with ordinary protein compared with Indian 'FAO' wheat; in the case of cotton four different varieties are compared with their likes in India, such as Mexican cotton is compared with Maharashtra's H-4, California's cotton is compared with Gujarat's S-4, Orleans/Texas cotton is compared with Punjab's J-34 and Giza 67/69/81 is compared with Andhra's MCU-5 variety. For greater details on this aspect, see Gulati (1987 *a,b*), and Gulati with Hanson and Pursell (1990).

6. These figures are reproduced in G.V.K. Rao Committee (Government of India, 1987, p. 73).

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