RESTRICTED

Report No. SA-32a

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

ECONOMIC SITUATION AND PROSPECTS OF INDIA

(in three volumes)

VOLUME III

RECENT DEVELOPMENTS IN IMPORTANT INDIAN MANUFACTURING AND MINING INDUSTRIES

May 10, 1972

South Asia Department

CURRENCY EQUIVALENT

1	U.S. dollar	=	Rs. 7.2793
1	Rupee	=	U.S. $ 0.1374
1	Million Rupees	=	U.S. $ 137,400
1	lakh of Rupees	=	100 thousand Rupees (U.S. $13,740.00 equivalent)
1	crore of Rupees	=	10 million (U.S. $ 1,374,000 equivalent)

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I. COTTON TEXTILE INDUSTRY

1. 1971 was one of the most difficult years in the long history of the largest Indian industry. Shortage of cotton was the primary cause resulting in a drastic rise in raw cotton prices which accounts for more than half the cost of producing cloth. Wages and other cost elements such as dyes, chemicals, fuel and interest charges also increased. Production of cloth and yarn fell by 7 percent and 9 percent respectively. There was consumer resistance to higher price of cloth and yarn and the mills were unable to pass on the full incidence of cost inflation. The net result was a shrinkage in the already low profit margin of the industry.

Capacity

2. There was a marginal increase in spindles in place, and in October 1971, the total number of spindles in the country was 18.07 million, as against 17.88 in December 1970. The addition to spindleage was the smallest since 1962. The number of looms installed by the end of 1971 was 209,000 or about the 1966 level.

3. The number of cotton mills was 668 at the end of 1971, a rise of four since 1970. Of this the number of composite mills was 291 and that of purely spinning mills 377. Of the addition of 190,000 spindles most were in the latter group of mills. In the ten years to 1971, the number of purely spinning mills has almost doubled from 192 to 377 and the share of these mills in the total spindleage rose from 22 percent to 32 percent. In absolute terms, the spindleage in the purely spinning sector has risen from 3.05 million to 5.66 million and that in the composite sector from 10.61 million to 12.22 million. The reason for spinning mills developing faster than integrated mills has been the large demand for yarn in the powerloom sector and the ceiling imposed by Government on the number of looms. The loomage in the mill sector has grown only fractionally from 199,000 to 209,000. This stagnation in the number of looms reflects the government's policy to encourage the development of the decentralized weaving sector for non-economic reasons. The result has been to say the least unfortunate for the industry as a whole.

Production

4. Yarn production in 1971 went down to its lowest level since 1962 and was not more than 881 million kgs. Cloth production in the mill sector was 6 percent lower than in 1970 at 3,947 million meters. This decline was after a fall in 1969 and 1970 and reached its lowest point since 1951. The continued set back in mill cloth production was accompanied for the first time in many years by a fall in the output of the decentralized sector. The latter suffered even more than the mill sector from the shortage of cotton yarn and its production declined by 8 percent. The total cloth production in both the mill and the decentralized sectors came to 7,364 million meters for 1971 against 7,849 million meters in 1970, a 7 percent fall.

5. Consumption of raw cotton in 1971 was the lowest since 1965/66. In 1970/71 cotton available for mill consumption from domestic sources declined by 8 percent and from foreign sources by 7 percent. Consumption of foreign cotton was very low in the first months of 1971 but much delayed imports provided some increase later on.

6. The output of raw cotton in 1970/71 has been estimated at 52 million bales (of 180 kgs) compared with the average for the four preceeding years of about 56 million bales. The wholesale price index for raw cotton (base 1961/62 = 100) rose to 232 (April - December) against 196 for the same period of 1970. The shortage of raw cotton and other factors (such as occasional shortage of power) also resulted in an increase in yarn prices (22 percent from April to December 1971 over the same period of 1970) and in cotton manufactures (+13 percent). The lower increase in cotton goods price was partly due to price controls and partly because of consumer resistance. The result has been a severe squeeze on profits at the weaving end.

Cost Inflation

7. The cost inflation in the textile industry which was quite disturbing in 1970, gathered momentum in 1971. Soaring raw cotton prices have been the main factor. But wages, too, kept on rising, linked with the cost of living index. The increases in dearness allowance in the major textile centers were greater in Bombay than in 1970 and also substantial in Ahmedabad and Kanpur. They swelled the wage bill of the industry without any corresponding rise in productivity. The other cost elements, too, were not free from the inflationary trend. While the prices of some chemicals went down from previous high levels, others moved up. Fuel and power, and also freight and bank credit, cost more. Profitability of the industry declined sharply and continued to be below the average of Indian industries.

Utilization of capacity

8. There was a deterioration in machine activity during 1971 as compared with the previous years and, underutilization of installed capacity remained large. As against an installed capacity of 17.87 million spindles at the beginning of 1971, the daily average number of spindles worked in the first seven months of 1971 was 13.32 million, 13.35 million and 11.37 million in the first, second and third shifts, the comparable figures for 1970 being 13.84 million, 13.87 million and 12.14 million respectively. On an average, nearly 4.5 million spindles remained idle or over 25 percent. Even if one excludes about 2 million spindles representing the capacity of closed mills, the underutilization of capacity was about 2.5 million spindles. Had cotton been available in adequate quantity and, at reasonable price, a substantial part of these would have been employed.

9. There was also an increase in the number of closed mills during 1971. These mills suffer from old and dilapidated machinery and are almost bankrupt. About 85,000 workers were affected. After declining from 79 in 1968 to 69 in 1970, the estimated number for 1971 is 84 of which 34 have been

taken over by the National Textile Corporation. The latter continued to be active in reviving closed mills but the success of its efforts made no visible improvement in the overall position, as other mills closed down. The number of closed mills includes 16 mills recommended for scrapping and seven mills the licenses of which had been revoked.

10. In 1970 the ratio of active spindles to those installed was well below 1968 and was certainly a far cry from what it used to be seven years earlier, as seen below:

Spindle Activity

(as percentage of spindleage capacity installed)

Year	1st shift	2nd shift	3rd shift
1964	89.80	89.99	68.59
1967	73.52	79.39	66.33
1968	79.25	79.60	64.43
1969	77.20	77.29	64.98
1970	78.35	78.48	68.70
1971 (est)	74.53	74.70	63.62

11. Also the underutilization of loomage capacity continued to be sizeable in 1971. At the beginning of 1971, the number of looms in place was 209,000. Of these the daily average of looms worked in the first seven months of 1971 was 168,000, 164,000 and 79,000 in the first, second and third shifts. The corresponding figures for 1970 being 172,000, 168,000 and 83,000 respectively. The percentage of looms employed to looms in place was 80.38, 78.46 and 37.79 in the first, second and third shifts.

Short term outlook

12. Since the major short term problem which confronted the cotton mill industry in 1971 was the inadequate supply and prohibitive cost of cotton, the situation should ease somewhat in 1971/72. The cotton crop might be around 5.7 million bales (estimates vary from 5.5 to 5.8 million bales) and the Government has allocated foreign exchange for the import of 8.5 million bales. Already prices have started to decline. The domestic raw cotton wholesale index price (1961/62 = 100) stood at 207 in December 1971 against 236 in December 1970 and 241 in August 1971. Cotton yarn prices were still at a high level (December 1970 = 180, August 1971 = 207 and December 1971 = 203). Only cotton piece goods have not shown a decreasing trend but they rose much less than cotton and yarn in 1971 and producers are trying to strike a balance between consumer resistance to high prices and fast increasing production costs. Given an expected higher cotton availability for mill consumption (in the order of 10 percent) and lower raw materials prices, profits should improve in 1972.

13. The extent of which profitability will improve partly depends on government price controls. Cotton textiles have been subjected to partial price control for a number of years. Since 1964, mills have been required to produce 50 percent of popular varieties to be sold at controlled prices. The mills complain against such controls especially regarding the prices offered, which were kept low for social reasons, as the government wanted to provide lower quality cloth at a cheap price. In 1968, the percentage was lowered to 25 percent but with an additional clause that there would be a penalty of 6 paise per meter in case of default on deliveries. Resistance by the industry however continued and the percentage of controlled varieties produced fell to about 20 percent in 1969 and to about 2 percent towards the end of 1970. Reacting to this, early in 1971, the government declared its intention to revise upwards the percentage to 50 percent and raise the penalty from 6 to 25 paise. However, after negotiations, the statutory control was removed and in return the industry committed itself to produce 100 million square meters per quarter (i.e. roughly 10 percent of the total production) for sale at controlled prices. Industrialists producing cloth involved in the agreement are given a cash incentive of 35 paise per square meter. Even then the loss per square meter is about 13 paise according to the calculations of the industry. The cost to the government of this arrangement is Rs. 50 million. It is met by subjecting imported cotton to a special premium and by collecting special levies on cloth of the higher category. In other words, part of the cost is passed on to the consumer of finer cloth and the balance cuts into the profits or adds to the losses of the mills.

Structural problems

14. As is clear from the above, government policy with regard to the textile industry is affected substantially by welfare considerations. The policy is employment rather than efficiency-oriented. It has aimed at safeguarding the overall employment potential through the maintenance of the labor intensive powerloom and handloom sectors, and has (1) reserved for the handloom sector the production of dhoties and sarees for which they have assured domestic markets (2) frozen the weaving capacity of the organized mill sector (3) imposed a cess on mill-made cloth in order to enable the higher cost decentralized sector to compete with the mill sector and (4) arranged for an adequate supply of yarn for powerlooms.

15. These measures have arrested the trend towards vertical integration in the mill sector. The employment policy has produced a three-headed production apparatus - mill, handloom and powerloom - the outputs of which are not always synchronized with the pattern of consumer preference in the domestic market, not to mention markets abroad.

16. The attitude of organized labor is quite hostile to the rationalization of work loads so essential as a precondition for the installation of automatic looms. The percentage of automatic looms has remained for years at a very low level, now 18 percent as against 38 percent in Pakistan, 28 percent in Japan, 48 percent in the United Kingdom and 80 percent in

Common Market countries. The combination of outdated equipment with rising wages has had adverse effects on the net productivity of labor. Compared with average industrial wages, textile wages in India are higher than they are in major textile producing countries where textile wages are below the general average. The Indian textile industry is a privileged employment sector both in respect of the number of persons employed and the wages paid.

17. If India continues to perform not too badly in textile exports, it is because the textile wages in India, in spite of recurrent increases, are still so low as to counteract low productivity and leave India with a modicum of competitive power. However labor cost per unit of output is now higher in weaving than in Pakistan, Hong Kong or Japan and much higher in spinning (see tables 10 and 11). The productivity in spinning operations is ten times lower in India than in the US and half that of Hong Kong.1/ In weaving, Indian productivity is one eighth the US and half that of Hong Kong.2/

18. Merely changing machinery does not always mean reduced cost or more profits. Some mills with modern automatic looms show only 70 percent efficiency which is very low. Serious efforts at improving management of the mills would thus be highly desirable before investment decisions are made. A hard look should also be taken at the market and the product mix. A number of mills have shifted from coarse to finer varieties and invested heavily without changing their attitude towards quality control while at the same time they have had to satisfy a much more demanding clientele.

19. Inter-firm comparisons show that management is an important factor in explaining large cost and productivity differences despite similar equipment. In some cases, organization of work appears deficient particularly in regard to the competence of supervisors, discipline, delegation of authority and control. Cost accounting is often used for pricing, but not for improving internal processing.

20. Efforts are being made to help the exporting mills. Rs. 200 million of foreign exchange will now be allocated annually for importing modern, sophisticated textile machinery not made in the country. Already 75 mills with an average export ratio of 10 to 15 percent of their total production have applied. Also additional loomage and spindleage has been authorized for exporting mills.

21. Despite these efforts in favor of exporting mills, the much larger problem of modernizing and restructuring the textile industry remains. The current estimate of the cost of machinery required for rehabilitation is placed around Rs. 4 billion. The question is whether such a large quantity of equipment can be produced in India and more important whether the mills have the financial capability to go ahead with modernization.

1/ In pounds per operator hour.
2/ In million pick inches/year.

22. The indigenous textile machinery industry has a capacity to produce about Rs. 400 million worth of machines annually, but the actual production has been only Rs. 242 million in 1968 and Rs. 287 million in 1970. The principal reason for this in earlier years was lack of demand due to poor profitability of the textile mills. Of late though demand has increased machinery manufacturers are finding themselves unable to deliver complete machines, due to non-availability of, or delay in, the issue of import licenses for vital components and spare parts.

23. The low profitability of the textile industry raises doubts as regards its capability and/or willingness to undertake a modernization program. Average profits after tax as a percentage of net worth were 1.6 percent in 1967/68 and 1.5 percent in 1968/69, for 271 companies surveyed by the Reserve Bank of India.1/ Another survey covering 30 large companies (presumably in better financial position than average) showed profits on net worth of 3.7 percent in 1968/69 and 7.4 percent in 1969/70. But in 1971 the profit margin of the industry has shrunk again. It would then seem that special assistance should come from government for rehabilitation and modernization, and this not only for exporting mills. This is justified by the fact that government has used the industry for social purposes for a number of years and as a result the industry is not in a position to solve its problems alone. Special arrangements must be made for providing the industry with for instance, a rebate of excise duty linked to the actual outlay on modernization, or other direct financial assistance measures. In addition, industry should push for the merger of weak mills with strong mills in order to prevent the increase in the number of closed mills.

24. A long term reorganization of industry should also be studied. Spinning mills have developed in past years at the expense of composite mills, because the latter have to bear labor and fixed costs increasing mostly on the weaving side and had to compete with the non-mill sector. Under present conditions weaving of grey cloth in the mill sector is usually not a profitable operation.2/ On the other hand, finishing operations are profitable and large efficient units specialized in finishing may be developed. The weaving decentralized sector has been expanding, not only because of the protection given by government, but also because of lower labor and other costs, and some industry experts are of the opinion that it is more economical for India to avoid integrated mills, because the latter are losing on the weaving side. In fact the legal limit of 4 looms is being more and more ignored and the trend is to set up medium size weaving units in the decentralized sector. A number of large mills have also asked for the removal of the now more and more artificial distinction between the mill sector and the non-mill weaving sector. They are advocating the setting up of low cost producing cooperative or small private weaving companies (from 16 to 100 looms)

1/ Reserve Bank of India Bulletin October 1971.

2/ If the government's policy had not systematically protected the decentralized sector through measures outlined in paragraph 14 integrated mills might have had a chance to remain profitable on the weaving side, but there is no absolute evidence of this.

processing yarn supplied by large spinning mills. An expansion of these weaving units might absorb part of the weavers now employed in composite mills. The production from weaving units would be processed in large, modern finishing plants. Such a reorganization would be similar to the solution adopted in Japan to meet increasing weaving costs. In view of the present state of the Indian textile industry, such reorganization of the weaving operations would seem to deserve immediate study as it might lead to much needed cost reduction.

Table 1: AVAILABILITY OF COTTON VIS-A-VIS MILL CONSUMPTION

Cotton year ended 31st August	Cotton production (Trade estimate inclusive of loose cotton*)	Export and extra factory consumption	Available for mill consumption from domestic sources	Imports	Total availability for mill consumption	Total cotton consumption in mills
1950-51	32.80	4.43	28.37	8.00	36.37	35.78
1955-56	46.36	8.74	37.62	6.02	43.64	49.09
1960-61	56.28	6.40	49.88	11.00	60.88	53.73
1961-62	49.70	6.76	42.94	8.08	51.02	56.88
1962-63	59.60	6.84	52.76	8.61	61.37	56.70
1963-64	64.00	6.23	57.77	6.48	64.25	60.81
1964-65	60.00	5.93	54.07	9.28	63.35	63.71
1965-66	56.08	5.32	50.76	5.26	56.02	58.21
1966-67	52.80	5.95	46.85	7.82	54.67	57.63
1967-68	62.20	5.81	56.39	7.78	64.17	61.66
1968-69	61.20	5.40	55.80	4.29	60.09	61.99
1969-70	59.20	5.77	53.43	9.10	62.53	63.71
1970-71	54.70	5.50	49.20	8.50	57.70	59.40
1971-72 (est)	59.70	5.50	54.20	8.50	62.70	-

*Loose cotton traditionally estimated at 2.70 lakh bales.

Table 2: PRODUCTION OF YARN AND CLOTH
(In million kgs)

Year	Yarn	CLOTH				
	Spindle point production	Mill Cloth (Million metres)	Percentage to Total Cloth Production	Handloom and Powerloom Cloth (Million metres)	Percentage to Total Cloth Production	Total Cloth Production
1959	781	4,504	68.5	2,075	31.5	6,579
1960	788	4,616	69.6	2,013	30.4	6,629
1961	862	4,701	66.4	2,372	33.6	7,073
1962	860	4,560	65.4	2,412	34.6	6,972
1963	893	4,423	60.6	2,876	39.4	7,299
1964	965	4,654	60.3	3,066	39.7	7,720
1965	939	4,587	60.0	3,056	40.0	7,643
1966	901	4,239	57.8	3,097	42.2	7,336
1967	896	4,097	56.3	3,179	43.7	7,276
1968	961	4,366	55.3	3,530	44.7	7,896
1969	951	4,168	54.1	3,538	45.9	7,706
1970	968	4,157	53.0	3,692	47.0	7,849
1971	881	3,947	53.6	3,417	46.4	7,364

Table 3: EXPORTS OF COTTON YARN AND CLOTH

Year	Yarn		Mill-made Cloth		Handloom & Powerloom	
	Quantity (mil. kgs.)	Average unit value realized (US cents/kg.)	Quantity (mil.metres)	Average unit value realized (US cents/metres)	Quantity (mil.metres)	Average unit realized (US cents/metre)
1961	7.14	109.7	525.14	18.5	25.92	38.8
1962	10.42	106.5	464.85	18.1	25.96	46.8
1963	13.55	95.9	485.69	17.7	33.87	48.5
1964	12.37	99.9	502.87	20.4	35.06	48.3
1965	12.75	99.2	506.85*	19.6	40.72	49.9
1966	16.20	86.5	424.33	19.0	37.47	30.4
1967	11.02	90.6	409.56	19.3	33.43	28.3
1968	16.54	86.2	475.10	18.7	20.77	31.4
1969	33.07	95.7	418.50	20.1	25.05	34.7
1970	30.50	117.6	413.40	21.2	27.00	37.5
1971	11.90	144.5	381.00	22.6	na	na

* Since April 1965, figures are in square metres.

Table 4: EMPLOYMENT OF WORKERS IN COTTON MILLS

(in thousands)

Year	Total No. of workers on list	Average number of workers employed in			
		First shift	Second shift	Third shift	Total
1957	9,43	4,39	2,78	96	8,13
1958	9,00	4,22	2,62	83	7,67
1959	8,85	4,17	2,61	85	7,63
1960	8,95	4,16	2,63	93	7,72
1961	9,18	4,17	2,66	1,10	7,93
1962	9,29	4,17	2,65	1,16	7,98
1963	9,38	4,18	2,63	1,23	8,04
1964	9,70	4,22	2,71	1,38	8,31
1965	9,67	4,18	2,67	1,37	8,22
1966	9,31	4,04	2,54	1,30	7,88
1967	9,28	4,00	2,54	1,35	7,89
1968	9,08	3,83	2,43	1,34	7,60
1969	8,99	3,70	2,34	1,36	7,40
1970	9,27	3,73	2,35	1,41	7,49
1971 (End July)	9,44	3,61	2,26	1,35	7,22

Table 5: MINIMUM WAGES AND DEARNESS ALLOWANCE IN COTTON MILLS
(in Rs.)

Period	Bombay	Ahmedabad	Kanpur
Current Minimum Basic Wages	40.00	38.00	38.00
Monthly average D.A.[1/]			
1958	81.58	75.31	58.18
1959	86.42	88.69	59.59
1960	89.25	87.81	59.49
1961	91.79	86.95	59.94
1962	95.76	88.52	65.43
1963	96.08	85.15	66.69
1964	114.79	106.97	85.58
1965	127.08	125.90	101.92
1966	148.62	138.80	106.76
1967	167.56	172.77	135.39
1968	179.48	172.96	127.85
1969	187.01	175.55	130.79
1970	195.78	183.16	141.51
1971 (10 months)	204.17	186.48	149.82

1/ DA = Dearness Allowance

Table 6: INDEX NUMBERS OF WHOLESALE PRICES
(Base 1961-62 = 100)

Period April-March	Raw cotton	Cotton yarn	Cotton manufactures
1962-63	104	107	103
1963-64	111	108	108
1964-65	117	109	110
1965-66	119	113	114
1966-67	127	123	122
1967-68	142	132	126
1968-69	155	130	129
1969-70	171	145	134
1970-71	209	174	146
1970 December	236	180	150
1971 January	253	206	157
February	252	202	159
March	238	198	160
April	230	197	160
May	220	192	159
June	228	196	160
July	236	205	160
August	241	207	161
September	249	210	161
October	244	212	162
November	217	210	163
December	207	206	163
Average April-Dec. (1971)	232	203	161
Average April-Dec. (1970)	196	167	142

Source: Reserve Bank of India.

Table 7: PROGRESS DURING PLAN PERIODS

	1951 (1st year of 1st Plan)	1956 (1st year of 2nd Plan)	1961 (1st year of 3rd Plan)	1965 (Last year of 3rd Plan)	1969 (First year of 4th Plan)	1971 (Third year of 4th plan (Provisional)
1. Number of spinning mills (as at the beginning of the year)	103	121	192	253	358	377
2. Number of composite mills (as at the beginning of the year)	275	291	287	290	289	291
3. Installed capacity (as at the beginning of the year						
(a) Spindles (in millions)	11.00	12.05	13.66	15.43	17.41	18.07
(b) Looms (in thousands)	195	203	199	206	208	209
4. Production:						
(a) Yarn - (in mil. kgs.)	591	758	862	939	951	881
(b) Mill-made cloth (in mil.metres)	3,727	4,852	4,701	4,587	4,168	3,920
(c) Estimated production of cloth by Decentralized Sector (in mil. metres)	1,013	1,663	2,372	3,056	3,538	3,400
5. Per capita availability of cotton cloth (in metres)	10.99	14.71	14.74	14.57	13.50	13.52
6. Exports: Cotton piecegoods (in mil. metres)	669	625	525	507	418	381
7. Cotton consumption by mills (in lakh bales of 180 kg each)						
(a) Indian cotton	24.86	43.12	42.46	56.12	56.04	51.10
(b) Foreign cotton	10.92	5.97	11.27	7.59	5.95	8.30
(c) Total (a+b)	35.78	49.09	53.73	63.71	61.99	59.40
8. Cotton production (in lakh bales of 180 kg each)	32.80	46.36	56.28	60.00	61.20	54.70
9. Cotton imports (in lakh bales of 180 kg each)	8.00	6.02	11.00	9.28	4.29	8.30

Table 8: SUMMARY OF COST PER METER
(paise per meter)

Element of cost	Range	
	Minimum	Maximum
Cotton	63.20	94.87
Spinning labor	6.24	14.85
Loomshed labor	11.99	15.51
Total labor	22.39	34.86
Total 1/	92.17	120.95

1/ Total does not add up to elements to cost as minimum and maximum cost are different for various mills. For example a mill can have a high cotton price but a low spinning labor cost. Above figures only give a range of various elements of costs and a range of total costs.

Source: Above data are from a sample of 25 large scale textile mills surveyed by the Ahmedabad Textile Industry's Research Association in September 1970.

Table 9: PERCENTAGE OF AUTOMATIC LOOMS

United Kingdom	48
United States	100
Austria	87
France	77
Holland	80
West Germany	87
Portugal	38
India	18
Pakistan	69
Hong Kong	100
Japan	28

Source: IFCATI - 1969

Table 10: PRODUCTIVITY OF COTTON TEXTILE INDUSTRIES - SPINNING

	lb/Spindle/Year 1/	Hr/Spindle/Year 1/	Average Pay/Hour (US cents)	Productivity 2/ (lb/Operator hour)	Labour 3/ Cost	Spinning Costs 4/ Wages	Other	Total
India	312	7488	19.0	3.33	4.19	4.19	7.29	11.48
Hong Kong	537	8644	32.3	7.00	3.23	3.23	7.24	10.47
Japan	329	4896	42.9	10.23	3.26	3.26	4.97	8.23
Pakistan	316	7401	13.4	3.68	2.56	2.56	8.01	10.57
USA	393	7344	242.0	33.40	6.13	6.13	10.73	16.86
France	210	4780	98.0	17.70	4.65	4.65	8.97	13.62
West Germany	210	3900	132.0	21.60	5.65	5.65	8.70	14.35

1/ 20s carded cetton

2/ Productivity is calculated as follows = $\frac{\text{lb/spindle/year}}{\text{hr/spindle/year}}$ x number of hours/day of an operator

3/ $\frac{\text{Average pay/hour}}{\text{productivity}}$

4/ US cents/lb of yarn

Source: Werner Associates, Inc., New York

Table 11: PRODUCTIVITY OF COTTON TEXTILE INDUSTRIES - WEAVING

	Hour/Year loom 1/	Sq. Yard/Year (Shirting)	Average Pay/Hour (US Cents)	Productivity (man pick inches/Yr) 2/	Time hours of operation per year 3/	Weaving costs 4/ (US cents/yard) Wages	Other	Total
India	7488	29,474	19.0	1813	2304	2.75	8.51	11.26
Hong Kong	8664	33,300	32.3	3760	2464	2.72	5.99	8.71
Japan	4896	29,684	41.3	3609	2232	2.40	3.74	6.14
Pakistan	7401	28,801	13.4	1596	2304	1.82	7.61	9.43
USA	7344	37,788	258.0	14914	2400	4.72	5.24	9.62
France	4220	16,122	100.0	4274	2042	5.32	6.98	12.30
West Germany	4020	14,885	139.0	4489	1906	5.92	8.13	14.05

1/ Total hours/year per loom according to number and length of shifts.
2/ Shirting weaving - number of pick inches thrown per operative hour x number of operative hours/year.
3/ Hours of operation per year per shift.
4/ 39.5 inch width basis.

Source: Werner Associates Inc., New York

Table 12: PRODUCTIVITY OF COTTON TEXTILES INDUSTRIES - FINISHING[1/]

(US cents)

	Raw Materials	Labour	Other	Total	Width
India	2.13	1.21	2,29	5.63	56
Hong Kong	2.63	1.02	3.33	6.98	92
Japan	0.93	0.60	1.85	3.38	38
Pakistan	1.70	0.30	1.80	3.80	38.5
USA	1.95	1.06	1.77	4.78	108
France	2.40	1.69	3.15	7.24	92
W. Germany	2.22	1.46	2.68	6.36	92

1/ Sheeting

SOURCE: Werner Associates Inc., New York

II. THE JUTE INDUSTRY

Current Trends

25. Total jute goods production was 1222 thousand tons in 1971, a 16 percent increase over 1970. On a seasonal year basis (July-June), it is generally thought that production in 1971/72 might be about 18 percent above the 1970/71 level. India has benefitted from the disruption of finished jute goods exports from Bangladesh. Also the stoppage of raw jute exports from Bangladesh impeded production of jute goods in third countries and resulted in some raw jute entering the Indian market. In 1971/72 total Indian raw jute production is estimated to be about 10 percent above the rather low crop of 1970/71. Raw jute prices have consequently shown a declining trend in recent months. Another factor which helped the jute industry has been the strong recovery of carpet backing exports (mainly to the United States) which almost doubled. Sacking exports have also increased, obviously helped by the Bangladesh situation. However, hessian production was lower in 1971 than in 1970 (320 thousand tons against 351 thousand tons). Total exports represented 66 percent of jute goods production as compared with 58 percent in 1970.

26. Despite the fact that the industry has been doing well in recent months, it must be noted that the production of jute manufactures in 1971 was not higher than in 1968 and even 1958. Jute goods exports were lower in 1971 than in 1967 and the same holds true for raw jute output. A more positive factor is however the rising trend in jute goods domestic consumption which rose by more than 20 percent from 1968/69 to 1970/71 and now represents about 45 percent of total despatches from the mills. Domestic demand seems to have suffered a temporary setback in the second half of 1971 but the trend is clearly upwards.

27. The jute industry has been able to increase its profitability in 1971 as compared with previous years despite a significant increase in conversion costs (see Table 20). The latter rose by 68 percent for sacking from 1969 to 1971 and by 50 percent for hessian and carpet backing. The main reason for such an increase has been the cost of labor, parts and components. Labor cost has increased from 52 percent of hessian conversion cost in 1969 to 63 percent in 1971. Similar increases have taken place for sacking and carpet backing. Financial charges have also been rising as the low profit industry had to borrow heavily to sustain operations.

28. Despite these heavily increased costs, the industry has achieved in 1971 a higher margin on hessian and sacking than in previous years. This is of course due to rocketing selling prices as sacking is sold now at a price 68 percent higher than in 1969 while hessian rose by 52 percent (see Table 20). Only carpet backing prices have not risen compared to 1969 prices, presumably because of market resistance in the United States, where competition from synthetics is severe.

29. The Indian jute industry is now at a crossroad. Combined action with Bangladesh in order to determine its export strategy is needed. The level of domestic consumption in coming years is another consideration. Only when more is known about these two crucial factors, will the industry be in a position to embark on a clear-cut program of modernization and expansion.

30. In later years, jute mills have been seized with a number of problems and one good year in 1971 will not be enough to solve all difficulties. Labor is a major problem. The jute industry, mainly installed in West Bengal, has about 220,000 workers employed by 86 factories and about 4 million families depend upon it in some way or another. About 20 percent of the workers are unskilled and 80 percent semi-skilled (including some truly skilled workers). Most workers are males, while in the past the industry employed a large number of females, pressure from unemployed men has displaced women. Some mills do not have a recognized union but usually workers are unionized (most plants have two rival unions - Congress and CPIM). Strikes were frequent in 1969 and in 1970 but few days were lost because of strikes in 1971. Labor turnover (through voluntary resignation) is extremely low. In fact, there are too many workers in the mills. Production per worker is not more than 4.6 tons/year, the same as ten years ago. Workers knowledge of this excess labor situation has resulted in resisting modernization and "go slow" tactics. In 1971 the number of workers was 2.5 per sacking/loom and 4.1 per carpet backing/loom, as in 1968. Minimum monthly wages[1/] (for unskilled workers) have risen from Rs. 94 in 1964 to Rs. 140 in 1969 (including a 4 percent bonus) and to Rs. 198 in 1971 (including a 6.5 percent bonus). Wages for semi-skilled workers are now Rs. 250/month (also including a 6.5 percent bonus). However, incentives are sometimes provided and may add another Rs. 50 a month to the worker's wage bill.[2/]

31. Although the absolute level of wages is still low, total labor cost now represents 63 percent of conversion cost in 1971 for hessian and sacking, against 52 percent (for hessian) and 57 percent (for sacking) in 1969. At the same time, the approximate average production per loom/shift in a 200-hour month has declined from 1 ton to 0.9 tons for hessian looms and from 2.2 to 2 tons for sacking looms. It would seem however that the improved social climate in the industry has resulted in some increase in productivity in the second half of 1971.

32. Average utilization of capacity for 55 mills was 78 percent for sacking, 82 percent for hessian, and near 100 percent for carpet backing looms in 1969. Capacity utilization has generally increased since then. The sacking and hessian loomage is usually worked two shifts, whereas carpet backing loomage is worked all three shifts. However, all the installed looms in every unit are not utilized and this idle capacity does not appear in the utilization factor stated above.[3/] The number of broad looms for carpet backing has increased in recent years but demand has not been sufficient for full capacity utilization. Generally excess installed capacity has arisen primarily because of the change and shrinkage in demand and at times the non-availability of raw fibre. The Indian jute industry also suffers to a large extent from over capacity in hessian and sacking

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1/ Jute mills are often providing housing (to about 50 percent of workers), cafeteria, accident insurance programs, provident fund, special allowances or bonuses, etc.

2/ However, incentives are fixed as a proportion of the basic wage rate only and are found to be too low to permit good worker's response. Also only looms are piece-rated while the prime constraint is in spindleage productivity and work on spindles is paid on a time-rate basis only.

3/ Mills visited by the Mission in January 1972 indicated a range of effective utilization from 61 percent to 72 percent for hessian and 66 percent to 70 percent for carpet backing.

manufacturing lines. In addition, even when demand is high (as in the later months of 1971), shortage of spinning capacity prevents full utilization of looms. This year 21,200 fine spindles and 2,080 coarse are likely to be installed.

33. Despite efforts to rationalize production, the jute industry has been prevented from achieving full modernization partly because of its low profitability. Gross profits as a percentage of sales have steadily declined from 3.4 percent in 1965/66 to 1 percent in 1967/68, 2-3 percent in 1968/69 and 2 percent in 1968/69 and 1970. Only in 1971, for the first time after many years, were profits substantially higher, but part of the higher profit margin has been absorbed by an increase in export taxes (see Table 22). The jute industry from 1960 to 1968 had been able to invest as much as Rs. 600 million to improve its spindleage and to install new equipment for manufacturing new products. It indicates that decision makers in the jute industry had a forward looking approach but the financial depression of the past years have so reduced its reserves that the industry is now in poor financial status. Only in recent months has the situation improved. (The index of industry's shares on the stock market went down from 51.7 in 1967 to 46 in 1970 but went up to 49.8 in October 1971).

34. Two other problems have hurt the jute industry, the lack of good quality spares and components, and power cuts. In 1971 the equivalent of seven full days of production was lost due to lack of power. Almost all of the existing equipment is of foreign origin. Substantial maintenance imports are needed. Import licensing is a problem (although not a major one) but manufacturers mainly complain about the quality of locally made spares and the resulting excessive equipment breakdown. This helps to explain why cost of stores increased by 75 percent since 1969 (see Table 21).

35. It is extremely difficult to weigh the relative importance of various factors in production problems. Thus it is not certain that if more power had been available production could have increased proportionally as a number of mills suffer from a shortage of yarn due to insufficient spindleage. However, a general explanation for low productivity, besides all the above factors, seem to be that managerial aspects are very often neglected, even when the technological requirements are adequately met. It is essential for the industry to take positive steps to introduce structured management development schemes for the practicing managers and to induct trained managers from other industries and professional institutions. This step itself would go a long way to remove the existing vacuum and may well improve the profitability of the industry and the individual companies.

Relation of India and Bangladesh's Jute Industries

36. The Indian jute industry is watching with a keen interest the measures that the Bangladesh Government is taking to reorganize its jute industry. The latter has 68 mills equipped to manufacture 620,000 tons of jute goods a year. Before the crisis, it had captured almost the entire sacking export market from India and exported as much hessian as India. It was beginning to compete in carpet backing (see Table 17). The Bangladesh Government has decided to take over the management of the jute mills whose owners or senior managers (being mostly West Pakistanis) are absent. It is reported that there is a shortage of managers in Bangladesh, although some experienced Bengalis who had been with the mills for a long time, have been promoted to managerial positions. The labor force is also said not to be

totally adequate since many workers have left. Raw jute supplies were disrupted for several months in 1971. However, the stocks of goods with the mills could now be in the region of 150,000 tons, since mills have worked only 30 to 35 percent of their capacity in the crisis period. Raw jute available for export is estimated to be at least 900,000 tons. Most observers agree that the Bangladesh industry will not be entirely back on its feet before one year at least.

37. The Bangladesh industry, though equipped with modern machinery appears to suffer from disadvantages in production compared to the Indian industry. Cost data are not easily comparable with those of India (see Table 22) as the Pakistan rupee had a par value of Rs. 4.80 per U.S. dollar but this overvaluation was compensated by an export subsidy (bonus scheme) which raised the effective export rate to near Indian one. However, despite more modern equipment, the Bangladesh industry is not as experienced as the Indian one and does not have the same expertise in such important fields as inspection in plant and prior to shipment. Also, the average Bangladesh unit has 500 looms (although a number of smaller, less economic 250 loom units were installed in the mid sixties). The Indian capacity is on average in the range of 1,000 to 1,500 looms (this size mill accounts for 50 percent of the units). It should also be noted that about 40 percent of the loomage in India is controlled by six large companies. Thus greater economies of scale should be realized in the Indian industry.

38. Bangladesh's quality of raw jute fiber is superior to Indian (whose low grade "mesta" supplies about 20 percent of total fiber consumption) and Bangladesh jute industry enjoys some cost advantage on account of this factor (see Table 22).

39. Until 1971, Pakistan exporters systematically quoted lower prices than Indian exporters for goods of comparable quality and at the same time worked on a much higher profit margin. This pricing policy had reduced India to the position of a residual supplier, in particular for sacking. The export bonus scheme has now been eliminated by the Bangladesh Government, which has also valued its rupee against the U.S. dollar at the same exchange rate as the Indian rupee.[1/] Assuming that Bangladesh maintains a 20 percent cost disadvantage as compared with India, and that no export duty is put on Bangladesh exports, the margin on hessian in Bangladesh would be about equal to the present Indian margin. However, Bangladesh's margin would only be about Rs. 110/ton on sacking against more than Rs. 400 in India (see Table 22). This would indeed create a serious imbalance in favor of India as more than half of Bangladesh exports is in sacking.

40. It is not known whether some form of cooperation is likely to develop between India and Bangladesh. The major factors in sales is price. Where jute is equally priced, there is little consumer preference between India and Bangladesh. The principal factors which have, in past years, adversely affected the exportability of Indian jute products are:

(1) the uncertainty of raw jute supplies
(2) the instability of price
(3) the competition offered by substitutes such as synthetics and paper

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1/ It is not certain that this will be to India's advantage since even with the export bonus the effective Pakistan rate could not have been more than about Rs. 7.

To remove the first obstacle, India plans to expand further its domestic production of raw jute but may find it advantageous to buy better quality, lower cost jute from Bangladesh as the latter has a big exportable surplus.[1] As regards the second factor, a price policy[2] between the two countries might be devised, which may help to prevent the price of the commodity from fluctuating too widely, thus removing the legitimate fears of jute goods consumers.

41. As mentioned above, the second major uncertainty preventing industry from devising precise long-term investment plans is the future level of domestic consumption. Domestic consumption has grown significantly since 1960 from a level of 271,000 tons to an estimated 430,000 tons in 1971. However, the earlier forecast had been that internal demand would be 560,000 tons in 1971 which has not materialized. Increase in internal demand has slowed down in 1971 compared to previous years. Revised IJMA[3] estimates are now that about 800,000 tons of jute goods (mostly sacking) might be consumed in India by 1980. However, on the basis of the growth from 1960 to 1971 only 630,000 tons would be required, i.e. 200,000 tons more than in 1971. But from 1960 to 1969-1971 (average of two bad years and one very good year) exports declined by 200,000 tons. Should this trend continue (which is admittedly a pessimistic assumption if some long-term export price policy can be worked out), total demand for jute goods would not increase. Hence the cautious reaction of the Indian jute industry regarding modernization and expansion. It would thus seem necessary to undertake a detailed and reliable end-use analysis of future domestic jute goods requirements in order to alleviate the industry's present doubts.

42. There are in any case certain steps, such as further modernization of spindleage, which may be found necessary. The principal areas where investment requirements arise is in the carding and pre-drawing operations. Since the equipment can be manufactured internally it should not involve much foreign exchange component. According to jute technicians, there is a possibility of cost reduction in fiber costs to the extent of 10 percent by the installation of this equipment. The second area where fresh investment is required is in the installation of ancillary equipment and the availability of spares, both imported and local, for the manufacture of hessian and sacking. Such investments do not seem to be outside the possibility of the jute industry, with some financial contribution from Government and financial institutions.

1/ In fact, imports are already taking place unofficially. It has also been reported (but not confirmed) that some Bangladesh raw jute is purchased in rupees at a rate as high as Rs. 2,700/ton and then re-exported and sold in convertable foreign money. A tonnage of 180,000 tons is said to be involved.

2/ Which may involve some agreed cut in price and/or a fixed long-term price, care being taken of the alleged higher conversion costs in Bangladesh.

3/ Indian Jute Mills Association.

Table 13: PRODUCTION OF RAW JUTE AND MESTA - INDIA

	Jute (in million bales of 180 kg)	Mesta	Total	Total (in '000 tons)	Jute Price 1/
1949/50 2/	3.20	0.62	3.82	715	
1955/56	4.48	1.17	5.65	1,017	
1960/61	4.13	1.13	5.26	965	
1961/62	6.36	1.88	8.24	1,483	100
1962/63	5.44	1.74	7.18	1,293	72
1963/64	6.08	1.90	7.98	1,436	74
1964/65	6.01	1.60	7.61	1,370	91
1965/66	4.48	1.30	5.78	1,040	132
1966/67	5.26	1.22	6.58	1,184	156
1967/68	6.32	1.27	7.59	1,366	111
1968/69	2.93	0.91	3.84	691	166
1969/70	5.61	1.14	6.75	1,215	144
1970/71	n.a.	n.a.	6.15	1,107	145
1971/72 (est.)	n.a.	n.a.	6.80	1,224	
1972/73 (forecast)	n.a.	n.a.	8.10	1,458	

1/ Wholesale price index (1961/62 = 100)

2/ July - June

Source: Economic Survey 1969-1970 and Estimates of the Jute Commissioner (1970/1971).

Table 14: UNIT YIELDS RATES OF FIBRE IN INDIA, BANGLADESH

(ton per hectare)

	India		Bangladesh
	Jute	Mesta	Jute
1955/56	1.07	0.87	1.51
1960/61	1.17	0.73	1.64
1965/66	1.05	0.67	1.35
1966/67	1.19	0.68	1.37
1967/68	1.29	0.64	1.27
1968/69	1.00	0.75	1.17
1969/70	1.31	n.a.	n.a.

Sources: (1) Survey of India's export potential of jute and jute products, Vol.1 page 149. (1970)

(2) Fertilizer Statistics. Fertilizer Association of India, December 1971

Table 15: PRODUCTION OF JUTE MANUFACTURES

(thousand tons)

	Hessian	Sacking	Carpet Backing	Others	Total	Index
1958	413.6	591.7	5.1	68.3	1,078.7	100
1959	465.2	511.9	16.3	75.1	1,068.5	99
1960	429.0	549.5	23.1	82.6	1,084.2	101
1961	355.7	483.7	27.3	103.5	970.3	90
1962	482.7	551.8	44.6	107.7	1,186.8	110
1963	528.6	507.1	87.5	113.0	1,236.2	115
1964	536.6	514.6	94.6	125.6	1,271.4	118
1965	529.4	590.5	96.9	118.5	1,335.3	124
1966	427.0	503.2	107.3	82.1	1,119.6	104
1967	463.6	481.3	124.1	87.4	1,156.4	107
1968	398.0	427.2	170.6	89.1	1,084.9	101
1969	287.1	306.9	228.7	70.9	893.6	83
1970	350.9	418.6	119.6	65.1	954.2	88
1971	320.4	484.0	204.1	78.5	1,087.0	101

Source: Indian Jute Mills Association and one non-member mill.1/

1/ Total Indian jute production is somewhat higher when including all non-members of IJMA. For example, data available on a seasonal year basis (June-July 1970/71) from above source show total production of 979,000 tons while all-India production figure was slightly higher with 1,061,000 tons. Compared with the latter total, production in 1971/72 is forecast to reach 1,200,000 to 1,300,000 tons by the Jute Commissioner assuming about a doubling of the July-December 1971 output of 628,000 tons.

Table 16: EXPORT OF JUTE MANUFACTURES FROM INDIA

(thousand tons)

	Hessian	Sacking	Carpet Backing	Others	Total	Index (1958=100)
1958	399.4	345.8	19.2	41.8	806.2	100
1959	430.5	354.6	30.1	58.8	874.0	108
1960	391.4	312.9	35.3	70.8	810.4	101
1961	357.9	283.7	41.6	76.6	759.8	94
1962	457.4	292.2	57.7	67.1	874.4	108
1963	463.8	242.6	88.3	79.9	874.6	108
1964	487.8	234.9	106.6	101.9	931.2	116
1965	448.1	283.5	100.0	97.6	929.2	100
1966	372.8	173.3	131.5	68.5	746.1	93
1967	382.3	185.5	141.6	59.1	768.5	95
1968	338.2	93.6	179.8	59.8	671.4	83
1969	251.7	48.2	219.3	50.7	569.9	71
1970	282.7	79.1	138.3	48.8	548.9	68
1971	305.9	113.4	245.5	55.7	720.5	89

Source: Indian Jute Mills Association and DCI & S, Calcutta

Table 17: INDIAN SHARE IN TOTAL INDIAN AND BANGLADESH JUTE GOODS EXPORTS

(In percent)

	Hessian	Sacking	Carpet Backing	Total
1958	91	81	100	87
1960	86	71	100	81
1962	87	64	100	79
1964	88	60	99	80
1965	85	61	94	77
1966	79	42	90	67
1967	78	43	87	67
1968	68	28	87	59
1969	56	16	88	54

Source: DCI & S, Calcutta

Table 18: EXPORTS OF JUTE GOODS FROM INDIA

(1967/68 - 1971/72)

	1967/68	1968/69	1969/70	1970/71	1971/72 (first 6 months)
I. Value (million rupees)					
Hessian	109.7	94.5	78.6	104.5	64.2
Sacking	23.8	14.8	11.5	26.7	18.8
Carpet Backing	72.2	104.7	79.0	79.8	61.8
Others	15.0	14.2	10.4	13.7	7.4
Total	220.7	228.2	179.5	224.7	152.2
% of jute goods exports in total Indian exports	17.9	16.4	12.9	14.3	n.a.
II. Volume (tons)					
Hessian	379.0	292.4	244.4	300.6	162.1
Sacking	115.4	71.2	51.8	105.4	63.5
Carpet Backing	160.1	219.2	163.3	189.9	132.5
Others	64.7	53.8	41.4	57.2	28.2
Total	719.2	636.6	500.9	653.1	386.3
III. Export Unit Value (rupees/ton)					
Hessian	2,894	3,231	3,216	3,476	3,960
Sacking	2,062	2,078	2,220	2,533	2,960
Carpet Backing	4,510	4,776	4,830	4,202	4,664
Others	2,318	2,639	2,512	2,395	2,624
Total	3,069	3,584	3,583	3,440	3,939

Source: IJMA monthly summaries

Table 19: PRODUCTION, DESPATCHES AND STOCKS OF JUTE GOODS (1968/69 - 1971/72)

	Production	Despatches 1/				Stocks	
		For export	For domestic consumption	Total	% domestic in total		% stocks in total production
1968/69	916.9	589.8	375.7	965.5	38.9	63.9	7.0
1969-70	953.9	466.7	421.5	888.2	47.5	144.1	15.1
1970/71	963.2	578.5	457.8	1,036.3	44.2	86.8	9.0
1971/72 (July/Nov)	441.2	256.6	180.9 2/	437.5	41.3	102.7	23.3 3/

1/ Despatches have increased from 271,000 tons in 1960 to 378,000 tons in 1965 thus increasing their share in total production from 25 percent in 1960 to 28 percent in 1965 and 47.5 percent in 1970/71.

2/ On a yearly basis the total would amount to 433,000 tons only. Dispatches for July/November 1970 amounted to 182.3 thousand tons.

3/ Stocks are seasonally high in November/December. Total stocks in November 1971 were 102,700 tons against 122,600 tons in November 1970.

Source: IJMA Monthly Summaries

Table 20: THE JUTE INDUSTRY COST STRUCTURE

(Rupees/ton)

	1969 (end year)			1971 (end year)		
	Hessian	Sacking	Carpet Backing	Hessian	Sacking	Carpet Backing
Raw Jute 1/	1,356	1,081	2,066	1,356	1,081	2,066
Conversion Cost	909	583	1,175	1,381	977	1,765
Total Cost	2,265	1,664	3,241	2,737	2,058	3,831
Export Duty	200	-	600	600	150	700
	2,465	1,664	3,841	3,337	2,208	4,531
Selling Price	2,610	1,763	4,765	3,960	2,960	4,660
Margin	145	99	924	623	752	139

1/ Prices of raw jute are for the last quarter of 1969. Prices were at about the same level in October-December 1971.

Sources: (a) Survey of India's export potential of Jute - January 1970 - Administrative Staff College of India, Hyderabad

(b) IJMA

Table 21: APPROXIMATE BREAK UP OF CONVERSION COST OF JUTE GOODS

(Rupees/ton)

	1969			1971		
	Hessian	Sacking	Carpet Backing	Hessian	Sacking	Carpet Backing
Wages & Salaries	472	331	529	871	613	960
Stores	116	78	248	179	128	293
Power	58	47	)	94	63	109
Insurance	19	11	)	24	15	29
Interest	11	8	) 350	55	41	118
Depreciation	44	19	)	44	31	151
Administration	140	52	)	69	47	)
Selling & Distribution	24	22	48	36	30	) 105
Others	25	15	-	9	9	)
	909	583	1,175	1,381	977	1,765

Source: See Table 20.

Table 22: ESTIMATED PRODUCTION COSTS PER TON IN INDIA AND PAKISTAN IN 1969

(In U.S.$ - US$1=7.5 Indian Rupees: US$1=4.8 Pakistan Rupees)

	Raw Jute Cost	Conversion Cost	Total Cost	Adjustment for Export Tax and Effective Exchange Rate	Margin	Selling Price
INDIA						
Hessian	180	121	301	+26	+ 19	346
Sacking	144	77	221	-	+ 13	234
Carpet Backing	275	156	431	+80	+123	634
PAKISTAN						
Hessian	170	194	364	-124	+ 97	337
Sacking	126	137	263	- 89	+ 50	224
Carpet Backing	Date not available, but estimated to be below India's selling price.					

Source: Survey of India's export potential of jute and jute products. Administrative Staff College of India, Hyderabad (January 1970).

Note: End 1971 cost and prices for Indian jute goods, at a rate of exchange of US$1 = 7.2 rupees were as follows:

(In U.S. dollars)

	Raw Jute Cost	Conversion Cost	Total Cost	Export Duty	Margin	Selling Price
Hessian	236	192	428	83	39	550
Sacking	194	136	330	21	60	411

Assuming that Bangladesh maintains a 10 percent disadvantage in total costs as compared with India and taking into account that the former bonus voucher has been eliminated, the margin on Bangladesh's hessian would be about US$36, but only US$15 on sacking (at similar selling prices to those in India). It is to be noted that Bangladesh production is mostly for sacking.

Table 23: NUMBER OF JUTE FACTORIES, EMPLOYMENT AND OUTPUT PER WORKER

	Number of factories	Employment	Output per worker (tons/year)
1960	95	232	4.67
1961	94	220	4.41
1962	96	250	4.75
1963	94	258	4.79
1964	94	271	4.69
1965	94	279	4.79
1966	95	249	4.50
1967	89	250	4.63
1968	86	238	4.56
1971 (est.)	80	240	4.53

Source: Reserve Bank of India Bulletin, July 1971.

Table 24: WHOLESALE PRICES OF RAW JUTE AND JUTE MANUFACTURES

(Index = 1961/62 - 100)

	Raw Jute	Jute Manufactures
1969		
June	174	152
July	178	143
August	148	144
September	110	151
October	108	160
November	124	167
December	132	164
1970		
January	134	157
February	136	155
March	133	156
April	137	152
May	151	161
June	162	165
July	147	165
August	150	172
September	155	178
October	153	176
November	143	174
December	140	179
1971		
January	138	182
February	130	175
March	138	171
April	156	188
May	153	182
June	151	189
July	146	191
August	135	189
September	125	190
October	121	192
November	118	197
December	123	193

Source: Reserve Bank of India Bulletin

III. FERTILIZER

A. Capacity, Utilization and Production

43. Production of nitrogenous fertilizers rose by 15.9 percent in 1970/71 to the level of 830,000 tons while phosphatic fertilizers output increased by 3.2 percent to 229,000 tons. Imports slowed down considerably while stocks were reduced. Consumption increased by about 8 percent for Nitrogen and 25 percent for P_2O_5. Domestic production met only about 56 percent of total consumption for nitrogen fertilizers and 42 percent for phosphatic fertilizers.

44. Nitrogenous fertilizer production capacity now stands at about 1.5 million tons, a remarkable increase since 1967/68 when it was 0.6 million tons. In 1971, capacity rose by 146,000 tons, mainly due to the coming on stream of a new unit in Madras. Phosphatic fertilizers capacity is 0.5 million tons. It has increased by 100,000 tons in 1971 after remaining stagnant in the three previous years.

45. Utilization of capacity was slightly higher in 1971/72 than in 1970/71 for nitrogenous fertilizers (61 percent versus 63 percent) and somewhat lower for phosphatic fertilizers (53 percent versus 52 percent). This low utilization factor is due to: (1) the technical and management problems in existing plants and (2) the increasing number of new plants which cannot be run at full capacity for several years (it is usually assumed that utilization for a new plant is 50 percent the first year, 70 percent the second year and 90 percent the third year[1/] provided no abnormal difficulties are being experienced).

46. Three nitrogen fertilizer plants in the public sector[2/] continued to experience special production problems. They had a combined 34 percent utilization factor[3/] against an average of 69 percent in the rest of the public sector and 70 percent in the private and cooperative sectors. Phosphatic fertilizers capacity was even more under-utilized with an average factor of 53 percent in 1970/71.

47. Low capacity utilization is due to a variety of causes such as power failures, operational constraints in some old plants, excessive maintenance down time, lack of spare parts, transport difficulties in moving materials, improper utilization of

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1/ Optimum utilization for ammonia gas based plants is about 90 percent but goes down to 75 percent for phospheric acid units.

2/ Rourkela, Fact (Kerala) and the lignite based plant at Neyveli (Tamil Nadu).

3/ Rourkela (19 percent), Fact (46 percent), Neyveli (47 percent).

instrumentation and process failures. While some of these problems (shortage of spares and power cuts) are partly outside the control of management, prompt and effective management and government action might have overcome many of them.

48. While lack of power 1/ (and fluctuations in voltage) and spare parts may explain at least one-third of under-utilization of capacity, improper maintenance is another important factor. Usually, maintenance is being done on the basis of one shift/day instead of three shift/day resulting in excessive downtime. Skilled maintenance personnel are scarce and when preventive maintenance is not correctly done, this results in ultimate breakdowns. Even when skills are available, lack of spares or proper materials, prevents correct maintenance. Also, instruments are often not properly operated. This causes losses and high consumption of raw materials and utilities.

49. Spare parts provision is difficult and slow. This creates downtime and therefore production losses. The procedure for import licensing of spares and raw materials needed for makeshift spare parts, is very complicated and time-consuming and takes up to one year to obtain off-the-shelf parts and about two years for non-shelf parts. Many locally made spare parts are said to be of poor quality, to be two to four times as expensive as imports and also to require long delivery times. Plant managers are authorized, subject to later justifications, to import parts up to Rs. 5,000 per order. This, of course, is almost of no use. Plants, therefore, try to keep abundant inventories of spares and some plants have as much as two years supply. This practice not only results in freezing of foreign exchange but also in unbalanced stocks. As an alternative expensive workshops have sometimes been set up. To avoid loss of production, means must be found to assure the timely availability of spare parts. To that effect, a realistic scheme for a common pool of critical spares and components for the plants in production could be worked out. Surplus spares for all plants (where relevant) above a small, say, monthly supply kept at the plants would make up this pool, plus raw materials such as stainless steel for the production of spares. Even then, foreign exchange would be needed for imports of urgently needed spare parts. Plant managers could be authorized to order up to Rs. 100,000 per order subject to strict subsequent justification for replenishment.2/

50. Some time ago, a committee appointed by the Government recommended the establishment of a Material Bank to ensure expeditious installation of new fertilizer plants. The proposal has been accepted by the Government. Import licensing will remain in existence but if delays occur in obtaining imported items, plant managers will be authorized to obtain, at a premium,

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1/ Power interruptions are due to the system design (too high load factors in relation to generation capacity) and the inefficient management of power plants.

2/ The Fertilizer Association of India has recently endorsed such a scheme.

materials (such as steel, sulphur, rock phosphate, etc.) from the Bank. As existing manufacturers have to face identical problems, resulting in either heavy inventories or loss of production, the possibility of extending the scope of the proposed Material Bank to cover existing plants should be envisaged.

51. For many reasons, poor utilization of existing capacity is most acute in the case of the superphosphate plants. There is a worldwide trend in favor of using high analysis complex fertilizers like diammonium phosphate (DAP) and these are gradually replacing superphosphate as a source of P_2O_5. The switch over has been accelerated in India by heavy imports of DAP three years ago. As a result, DAP and complex fertilizers have gained consumer preference over locally produced superphosphates.1/ However, the latter, despite their low analysis, offer certain advantages. Apart from providing P_2O_5 in a water soluble form, they contain secondary soil nutrients such as sulphur and calcium and some micro-nutrients. Also, they are cheaper than imported DAP. Until more complex fertilizer domestic capacity is available, the State Governments may be asked to meet only their requirements of P_2O_5 after superphosphate domestic production has been fully committed. There is no doubt, however, that the superphosphate industry does suffer from some inherent limitations which necessitate a more critical look at its future role. The Fertilizer Association of India has carried out a techno-economic survey of the superphosphate units 2/ and suggested remedial measures including the conversion of some of the units to the manufacture of granulated mixtures. It is to be hoped that official attention will be given to ensure that suitable action is taken to effectively increase capacity utilization of superphosphate plants.

52. Naptha and natural gas are today the most favored raw materials for the manufacture of nitrogenous fertilizers. India is, however, deficient in both these and has to depend upon imports (Naptha is produced by Indian Oil Refineries based on mostly imported crude oil). As the demand of petroleum products rises, additional refinery capacity will have to be established in the country. This could, in certain circumstances, result in a surplus supply of fuel oils. It is now technologically feasible to use fuel oil as feedstock but due to higher capital cost of the processing plant its viability is dependent upon the price of fuel oil vis-a-vis other raw materials. Since the prices of petroleum products, including fuel oil, are largely influenced by taxes, there is a need to review to what extent duties on fuel oil would have to be reduced in order to make its use economically competitive. At the same time, it is essential to explore possibilities of reducing the price of Naphta as a feedstock for fertilizers as a means of reducing the price of the finished product.

1/ Only one plant is now producing DAP.

2/ They now account for 40 percent for total P_2O_5 production.

53. Balanced fertilization depends upon adequate availability of phosphate fertilizers, for which rock phosphate is one of the basic raw materials. Until 1969, rock phosphate was entirely imported. Since 1968, some rock phosphate is available from Udaipur (Rajasthan) and production was 228,000 tons in 1970/71. However, this production currently contributes only about 20 percent of total requirements. Udaipur's large deposits, which are owned by the local State Government, are being exploited at a slow pace. There are no facilities at present for grading, blending and benefication.[1/] Udaipur rock is available at about Rs. 150/ton f.o.b. mine excluding sales tax and other local taxes. This is lower than c.i.f. price of Rs. 150/ton. However, local rock (including local taxes) is sold at the same price as imported phosphate and the tax difference between local and imported price goes to the local State treasury. As a result, financial resources are now lacking for developing Udaipur mines along scientific mechanized lines, thus enabling a large and fast increase in rock production. A possible solution may be to form an autonomous joint Corporation of Government (Central and States) and the industry and to set up a price ex-mine which would be sufficient to cover extra-mining development costs. A step has been taken towards the expansion of Udaipur deposits by asking a private consulting firm to prepare a detailed report. This report is financed by UNDP and the IBRD is the executing agency. Preliminary findings of the report are that the rock should be beneficiated and the cost of the plant would be about US$46 million.

Demand and Supply

54. In the decade ending in 1968/69, the consumption of nitrogen and phosphatic fertilizers increased from 174,000 nutrient tons in 1959/60 to 1.5 million in 1968/69 equivalent to an annual growth rate of 22 percent. Although, starting from a low base, and despite the fact that the rate of increase was slowing down in the latter part of the decade, this was a remarkable growth. Since 1968/69, growth in consumption of N and P_2O_5 has slackened further. In 1969/70, combined consumption of

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1/ Udaipur deposits, proven and inferred, and estimated to contain 100 million tons, count as one of the major finds of phosphatic rocks of recent times. The present mine is open cast extraction from the area of the rock richest in P_2O_5. While reserves for this high grade rock have been estimated at 10 million tons, the vast bulk of the deposit is much poorer in analysis, with figures ranging from 10 percent up. The obvious conclusion is that for most of the rock, beneficiation is necessary - on the other hand, it is obvious that Udaipur mines have a logistic problem. A recent report said that insufficient railway wagons have prevented the shipping of 30,000 tons of materials stockpiled at the mines. Until fuller facilities are available, a virtue must be made of this restraint by establishing a system of stockpiling, analysing and blending so that the buyer and seller both benefit.

N and P_2O_5 grew by 12 percent and in 1970/71 by 13 percent. Consumption has grown on average by about 11 percent per annum for N and 15 percent for P_2O_5 in 1969/70 and 1970/71. In 1971/72, apparent consumption of N is estimated to have increased by 22 percent to 1.8 million tons and that of P_2O_5 by 9 percent to 0.6 million tons but little is known about stock variations. The Mid-Term Plan Review forecasts an increase to 2.6 million tons of N by 1973/74 and to 0.8 million tons of P_2O_5 for the same year. This would mean an annual growth rate of consumption of 20 percent for N from 1971/72 to 1973/74 and of 16 percent for P_2O_5 (see Vol. I, Chapter III on Agriculture).

55. On the basis of this forecast of future requirements of fertilizers in the next two years, demand for N and P_2O_5 would be far in excess of indigenous production. A comparison of production estimates and demand forecasts indicates the continued need for fertilizer imports in the years ahead. The deficit in fertilizer supplies would be as high as 1 million tons for N and 0.4 million tons for P_2O_5 in 1973/74.

56. Total fertilizer capacity should increase as shown in Table 31.

57. On the basis of capacity figures, production estimates can be derived. The Fertilizer Association of India and the Mid-Plan Review agree that total N capacity in 1973/74 will be around 2.4 million tons. P_2O_5 capacity would be between 0.6 and 0.8 million tons. Delays have occurred in the implementation of fertilizer projects due to shortage of steel, delays in the supplies of equipment by local fabricators, and prolonged negotiations for foreign exchange requirements. More recently, the question of the feedstock policy has created some uncertainty in firming up projects. Corresponding to the shortfall in overall implementation, total expenditure (in the public sector) will be Rs. 4.1 billion during the Fourth Plan period as compared with an outlay originally proposed of Rs. 4.9 billion (see Table 32). It may be assumed: (a) that the utilization factor of existing Nitrogen plants could be increased from 62 percent to 70 percent by 1973/74 while new plants would start with a low initial utilization factor of 50 to 60 percent, and (b) that utilization of capacity would globally remain low for P_2O_5 due to marketing and excess capacity problems of single superphosphate plants while the utilization factors for new P_2O_5 plants would also be initially low in the first year of production. In that case, total capacity utilization for both old and new plants would not show much increase due to the weight of new capacity to be installed, the latter having low initial utilization rate. As a result, N and P_2O_5 production would normally remain considerably below total rated capacity. N output would be around 1.6 million tons in 1973/74 and P_2O_5 production would amount to 0.4 million tons. This compares with the Fourth Plan original target of 2.5 million tons (N) and 1.2 million tons (P_2O_5).

58. In view of the large gap between demand and production of fertilizers in India, it would seem extremely important: (1) to make all efforts to improve existing plant operations before - or at least in parallel with - building new fertilizer capacity, and (2) avoiding excessive construction delays. The economic cost of under-utilized capacity and delays in bringing new capacity on stream is very high. It is not clear that these costs are adequately appreciated at all levels and there is no clear evidence of effective remedial action. **At the same time it should be realized that old and obsolete plants are being kept operating in order to maximize output and this increases the problems of management.**

Table 25 : NITROGEN FERTILIZERS - CAPACITY, PRODUCTION, CONSUMPTION AND STOCK ESTIMATES

(In thousand tons of N)

		1967/68 (actual)	1968/69 (actual(	1969/70 (actual)	1970/71 (est.)	1971/72 (est.)	1972/73 (forecast)	1973/74 (forecast)
1.	Capacity 1/ 2/	632	904	1136	1369	1515	2319	2371
2.	Production	403	563	716	830	950	1477 2/	1600 2/ 3/
3.	% Utilization of Capacity	64	62	63	61	63	64	67
4.	Consumption	1035	1200	1370	1479	1810	2151 4/	2600 4/
5.	Deficit (4 - 2)	632	637	654	649	860	674	1000
6.	% Deficit/Consumption	61	53	48	44	48	31	38
7.	Imports	865	867	667	477	484 5/		
8.	Stock Changes	233	230	13	-172	376		

Note: Years are from April 1 to March 30.

1/ As of September 30.

2/ Capacity and production estimates of the Fertilizer Association of India (FAI). The FAI production forecast, although more conservative than the Plan may, however, prove somewhat optimistic.

3 The Mid-Term Plan Appraisal Report shows a possible output of 1.8 million tons.

4/ See Chapter on Agriculture.

5/ Latest estimates provided by Ministry of Agriculture.

Table 26: PHOSPHATIC FERTILIZERS - CAPACITY, PRODUCTION, CONSUMPTION AND STOCK ESTIMATES

(In thousand tons of P_2O_5)

	1967/68 1/ (actual)	1968/69 (actual)	1969/70 (actual)	1970/71 (actual)	1971/72 (est.)	1972/73 (forecast)	1973/74 (forecast)
1. Capacity 2/3/	319	434	434	434	535	569	569
2. Production 3/	207	213	222	229	280	304	374 4/
3. % Utilization of Capacity	65	49	51	53	52	53	66
4. Consumption	300	410	430	540	590	680 5/	800 5/
5. Deficit (4 - 2)	93	197	208	311	310	375	426
6. % Deficit/Consumption	31	48	48	58	53	55	53
7. Imports	371	91	94	32	255 6/		
8. Stock Changes	278	-106	-114	-279	-55		

1/ Years are from April 1 to March 30.

2/ As of September 30.

3/ Capacity and production estimates of the Fertilizer Association of India.

4/ The Mid-Term Plan Appraisal shows a possible production of 458 thousand tons in 1973/74 and installed capacity of 566,000 tons.

5/ See Chapter on Agriculture.

6/ Estimates provided by Ministry of Agriculture.

Table 27: PRODUCTION AND INSTALLED CAPACITY OF NITROGEN FERTILIZERS

(thousand tons in nutrient tons)

	A/S	ASN	Urea	CAN	A/CI[3]	APS	DAP	NP	UAP	TOTAL	Installed Capacity[2]	Per cent Utilization
						complex fertilizers						
1960/61[1]	82	10	5	11	3	1	-	-	-	112	162	69
1961/62	83	14	6	47	3	2	-	-	-	155	244	63
1962/63	89	15	8	76	3	2	-	-	-	193	n.a.	n.a.
1963/64	88	12	8	102	2	5	-	-	-	217	n.a.	n.a.
1964/65	90	12	8	121	3	8	-	-	-	242	n.a.	n.a.
1965/66	85	15	23	98	4	8	-	4	-	237	324	73
1966/67	90	16	116	58	3	14	-	13	-	310	525	59
1967/68	89	16	114	124	4	15	7	18	9	396	632	63
1968/69	122	12	211	122	4	17	11	17	46	562	904	62
1969/70	123	12	389	102	4	14	11	18	59	732	1136	64
1970/71	129	9	506	80	6	15	9	29	63	846	1515	56

1/ July - June

2/ As on 1st October

Source: Fertilizer Statistics 1970/71 - The Fertilizer Association of India, December 1971.

Note: Abbreviations are:

AS	=	Ammonium sulphate (20.6% N)
ASN	=	Ammonium sulphate nitrate (26% N)
CAN	=	Calcium ammonium nitrate (20.5% N)
A/CI[3]	=	Ammonium chloride (25% N)
APS	=	Ammonium phosphate sulphate (16N - 20P_2O_5 - 0 K_2O)
DAP	=	Diammonium phosphate (20 - 48 - 0)
NP	=	Nitrophosphate (20 - 20 - 0)
UAP	=	Urea ammonium phosphate (28 - 28 - 0)
SP	=	Superphosphate
TSP	=	Triple superphosphate

Table 28: PRODUCTION OF PHOSPHATES 1960/61 TO 1970/71

(July - June)

(in thousand tons Nutrient P_2O_5)

	Single Superphosphate	Triple Superphosphate	Total Nutrients
1960/61	52.4	-	52.4
1961/62	62.7	-	62.7
1962/63	85.7	-	85.7
1963/64	101.8	-	101.8
1964-65	120.4	-	120.4
1965/66	105.4	-	105.4
1966/67	118.0	-	118.0
1967/68	144.0	0.9	144.9
1968/69	100.7	1.2	101.9
1969/70	101.0	3.4	104.4
1970/71	106.2	3.6	109.8

Source: Fertilizer Statistics 1970/71, The Fertilizer Association of India.

Table 29: INSTALLED CAPACITY OF NITROGENOUS FERTILIZERS[1/]
(As on 30th September 1971)

	Location	Products	Installed Capacity (tons N)	
I. In Production				
A. Public Sector				
a) Fertilizer Corporation of India (FCI)				
- Namrup	Assam	AS	24200) 20600)	44800
- Sindri	Bihar	(Urea (AS (ASN	10750) 74500) 31700)	117000
- Nangal	Punjab	CAN	80000	
- Trombay	Maharashtra	(Urea (Nitro- (Phosphate	45000)) 36000)	81000
- Gorakhpur	Uttar Pradesh	Urea	80000	
Total - FCI			402800	
b) Fertilizers & Chemicals, Travancore Ltd. (FACT), Alwaye	Kerala	(AS (A/CL[3] (APS	49350 6250 36200	
Total - FACT			91800	
c) Hindustan Steel Limited (HSL)				
- Durgapur	West Bengal	AS	4370	
- Bhilai	Madhya Pradesh	AS	6720	
- Rourkela	Orissa	(AS (CAN	5770) 120000)	125770
Total - HSL			136860	
d) Madras Fertilizers Ltd., Manali	Tamil Nadu	Urea NPK	96600 71000	
			167600	
e) Neyveli Lignite Corporation Ltd., Neyveli	Tamil Nadu	Urea	70000	
f) TOTAL Public Sector			869060	

1/ Including N share of complex fertilizers.
2/ For meaning of abbreviations, see Table 1.

	Location	Products	Installed Capacity (tons N)
I. In Production (cont'd.)			
B. Private Sector			
a) India Explosives Ltd., Kanpur	Uttar Pradesh	Urea	200000
b) Coromandel Fertilizers, Ltd., Visakhapatnam	Andhra Pradesh	UAP	73000
		Urea	7260
			80260
c) Gujarat State Fertilizers Ltd (GSFC), Baroda	Gujarat	AS	30490
		Urea	166200
		DAP	21600
			218290
d) E.I.D. - Parry Ltd.			
- Madras	Tamil Nadu	AS	7950
- Ennore	Tamil Nadu	APS	8240
			16190
e) Burrakur Coal Co. Ltd., Banjjora	Bihar	AS (by product)	270
f) Tata Iron and Steel Co. Ltd., Jamshedpur	Bihar	AS (by product)	4760
g) Indian Iron and Steel Co. Ltd., Burnpur-Kulti	West Bengal	AS (by product)	4740
h) Shriram Chemical Industries - DCM, Kota	Rajasthan	Urea	111000
i) New Central Jute Mills Co. Ltd., Varanasi	Uttar Pradesh	A/CI[3]	10160
j) TOTAL Private Sector			645670
TOTAL Public and Private Sectors (A + B)			1514730

	Location	Products	Installed Capacity (tons N)
II. Projects Under Implementation			
A. Public Sector			
a) Fertilizer Corporation of India (FCI)			
- Ramagudam	Andhra Pradesh	Urea	229000
- Namrup Expansion	Assam	Urea	152000
- Barauni	Bihar	Urea	152000
- Talcher (coal based)	Orissa	Urea	229000
- Durgapur	West Bengal	Urea	152000
- Trombay Expansion	Maharashtra	NP	132000
Total - FCI			1046000
b) Fertilizers and Chemicals Ltd. (FACT)			
- Cochin (Phase I)	Kerala	Urea	152000
c) TOTAL Public Sector			1198000
B. Private and Joint Sectors			
a) Zauri Agro Chemicals Ltd., Sancoala	Goa	Urea	156400
		UAP(J)	42000
			198400
b) Coromandel Fertilizers Ltd., Visakhapatnam	Andhra Pradesh	Urea	220 0
		UAP (Expansion)	7560
			29640
c) Indian Farmers' Fertilizer Corporation, Ltd., Kandla (Joint Sector)	Gujarat	Urea	182160
		NPK	48000
			230160
d) Vidarbha Fertilizers & Chemicals, Ltd., Kamptee	Maharashtra	Urea	229000
e) Mangalore Fertilizers & Chemicals Ltd., Mangalore	Mysore	Urea	160000
f) Southern Petrochemical Industries Corpn., Tuticorin	Tamil Nadu	Urea	220800
		A/CI	15000
		DAP	27000
			262800
g) Konkan Fertilizers Ltd., Sheva Nova (Phase I)	Maharashtra	DAP	45000
h) TOTAL Private and Joint Sectors			1172300
C. TOTAL (A + B)			2370300

	Location	Products	Installed Capacity (tons N)
III. Projects Approved in Principle			
A. Public Sector			
a) Fertilizer Corporation of India (FCI)			
- Haldia	West Bengal	NP	75800
		Urea	76000
			151800
- Korba (based on coal)	Madhya Pradesh	Urea	229000
- Nangal	Punjab	Urea	229000
- Gorakhpur Expansion		Urea	60000
Total - FCI			669800
b) Fertilizers & Chemicals Ltd. (FACT) Cochin (Phase II)	Kerala	NPK	97000
c) TOTAL Public Sector			766800
B. Private and Cooperative Sectors			
a) Tata Fertilizer Project, Mithapur (Phase I)	Gujarat	Urea	92000
b) Maharashtra Cooperative Fertilizers & Chemicals (cooperative sector) Thana	Maharashtra	A/CI[3]	16500
c) New Central Jute Mills Co. Ltd., Varanasi (Expansion)	Uttar Pradesh	A/CI[3]	27340
d) Konkan Fertilizers Ltd., Sheva Nova (Phase II)	Maharashtra	DAP	45000
e) Coromandel Fertilizers Ltd., Visakhapatnam (Phase II)	Andhra Pradesh	Urea	78200
			47600
			125800
f) Punjab State Industrial Development Corpn., Sirhind	Punjab	Urea	152000
g) Shriram Chemical Industries, Kota	Rajasthan	Urea	42000
h) TOTAL Private and Cooperative Sectors			572640
C. TOTAL (A + B)			1339440

	Location	Products	Installed Capacity (tons N)
IV. Projects Under Consideration			
Fertilizer Corporation of India (FCI)			
- Sindri	Bihar	AS Urea	16500 153500
			170000
V. Grand Total (I + II + III + IV)			5,394,470

Source: Fertilizer Association of India.

Table 30: INSTALLED CAPACITY OF PHOSPHATIC FERTILIZERS

(Tons of P_2O_5)

	Location	Products	Installed Capacity
I. IN PRODUCTION			
A. Public Sector			
a) Fertilizer Corporation of India (FCI) Trombay	Maharashtra	NP[1/]	36000
b) Fertilizers and Chemicals Travancore Ltd., Alwaye	Kerala	APS	36200
c) Madras Fertilizers Ltd., Manali	Tamil Nadu	NPK	92700
d) Superphosphate Factories		SP	35160
e) Total A			200060
B. Private Sector			
a) Gujarat State Fertilizer Co. Ltd., Baroda	Gujarat	DAP	51840
b) Coromandel Fertilizers Ltd., Visakhapatnam	Andhra Pradesh	UAP	73000
c) E.I.D. - Parry Ltd., Ennore	Tamil Nadu	APS	10300
d) Superphosphate Factories		SP	184620
e) Dharamsi Morarji Chemical Co. Ltd., Ambernath	Maharashtra	TSP	12150
f) Atul Products Ltd., Bulsar[2/]	Gujarat	Dicalcium Phosphate	
g) Total B			334710
C. TOTAL (A + B)			534770

1/ For abbreviations, see Table 27.

2/ Not available for agricultural purposes.

	Locations	Products	Installed Capacity
B. Private Sector			
a) Tata Fertilizer Project, Mithapur (Phase I)	Gujarat	DAP	69000) 67500) 136500
b) Konkan Fertilizers Ltd., (DMCC) Sheva Nova (Phase I)	Maharashtra	DAP	45000
c) Coromandel Fertilizers Ltd., Visakhapatnam	Andhra Pradesh	UAP	44600
d) Maharashtra Agro-Industries Corp., Bombay	Maharashtra	SP	7680
e) Total Private Sector			306780
C. Toal Public and Private Sectors (A + B)			479580
IV. GRAND TOTAL (I + II + III)			1,756,360

Source: Fertilizer Association of India

	Location	Products	Installed Capacity
II. PROJECTS UNDER IMPLEMENTATION			
A. Public Sector			
a) Fertilizer Corporation of India (FCI)			
Trombay	Maharashtra	NP	132000
Sindri	Bihar	TSP	156450
Total FCI			288450
b) Hindustan Copper Ltd., Khetri	Rajasthan	TSP	100000
c) Total Public Sector			388450
B. Private and Cooperative Sectors			
a) Zuari Agro-Chemicals Ltd., Sancaola	Goa	UAP	42000
b) Coromandel Fertilizers Ltd., Visakhapatnam (Phase I)	Andhra Pradesh	UAP	7560
c) Konkan Fertilizers Ltd., (DMCC) Sheva Nova (Phase I)	Maharashtra	DAP	115000
d) Southern Petrochemical Industries Corp., Tuticorin	Tamil Nadu	DAP	69000
e) Indian Farmers' Fertilizer Corporation Ltd., Kandla	Gujarat	NPK	120000
f) Total Private and Cooperative Sectors			353560
C. Total Public and Private and Cooperative Sectors (A + B)			742010
III. PROJECTS APPROVED IN PRINCIPLE			
A. Public Sector			
a) Fertilizer Corporation of India Ltd., (FCI) Haldia	W. Bengal	NP	75800
b) Cochin Fertilizer Project, Cochin	Kerala	NPK	97000
c) Total Public Sector			172800

Table 31: EXISTING AND PLANNED CAPACITY IN N AND P_2O_5 FERTILIZERS

	Existing October 1, 1971		Under Implementation		Approved in Principle		Under Consideration		Total	
	No. of Units	Tonnage (thousand)	No. of Units 1/	Tonnage (thousand)	No. of Units 1/	Tonnage (thousand)	No. of Units 1/	Tonnage (thousand)	No. of Units	Tonnage (thousand)
(A) Nitrogen										
Public sector	11	869	7	1198	4	767	1	170	23	3004
Private sector (incl. cooperatives)	10	646	7	1172	7	573	-	-	24	2391
Total	21	1515	14	2370	11	1340	1	170	47	5395
(B) P_2O_5										
Public sector	3 2/	200	2	388	2	173	-	-	7	761
Private sector (incl. cooperatives)	5 2/	335	5	354	4	307	-	-	14	996
Total	21	535	7	742	6	480	-	-	34	1757
(c) Total (A + B)	42	2050	21	3112	17	1820	1	170	81	7152

1/ Including expansion of existing units.

2/ Excluding 13 superphosphate factories scattered over the country (no breakdown available between public and private sectors).

Source: Fertilizer Association of India.

Table 32: PUBLIC SECTOR INVESTMENTS IN FERTILIZERS (1969/60 - 1973/74)

(Rs. crores)

	4th Plan Outlay	Mid-Term Appraisal	Actual Expenditures 1969/70	1970/71	1971/72
A. Continuing Schemes					
FACT - Expansion	2.67	3.71			
Cochin - Phase I	21.36	26.85			
Madras Fertilizers	40.09	42.23			
Trombay Expansion	38.64	16.75			
Durgapur	24.18	21.04			
Sindri - rationalization scheme	23.81	20.61			
Sindri - Naphta gasification	0.53	0.13			
Namrup Expansion	38.13	43.39			
Barauni	38.70	46.26			
Kanpur (government share)	0.47	0.47			
Sindri - Sulphuric acid plant	0.42	1.32			
Gorakhpur	2.73	2.04			
Total A	231.73	224.80			
B. New Schemes					
Talcher Plant	(	43.21			
Ramagudam Plant	(	42.99			
Korba Plant	(	5.00			
Haldia Plant	(	20.54			
Nangal Expansion	(262.00	23.58			
Sindri - modernization	(	5.00			
Gorakhpur Expansion	(	11.83			
Cochin - Phase III	(	33.65			
Trombay - Nitric Acid Plant	-	0.72			
Trombay - Phosphoric Acid Plant	-	3.30			
Trombay - Sodium Nitrate Plant	-	0.56			
Trombay - Pollution Control	-	0.40			
Sindri - Ammonium Nitrate Plant	-	0.49			
Total B	262.00	186.27			
C. Total A + B	493.73	411.07	76.19	54.68	65.87 1/

1/ Total for 3 years is then 40 percent of total original Plan outlay and 48 percent of Revised Plan target.

Source: The Fourth Plan Mid-Term Appraisal.

Table 33: FERTILIZERS - PRICES IN INDIA

(Rupees/ton)

	Urea 1/ 3/ (46% N)	Ammonium Sulphate 1/ 3/ (white)	Superphosphate 2/ 4/	Muriate of Potash 5/ (61% K_2O)
1961	716	385	182	295
1962	715	370	193	295
1963	715	370	193	285
1964	615	370	193	285
1965	615	370	211	299
1966	680	405	227	314
1967	840	470	295	392
1968	860	499	309	440
1969	943	534	295	478
1970	943	529	289	483
1971	923	529	296	473

Source: Fertilizer Statistics - Fertilizer Association of India.

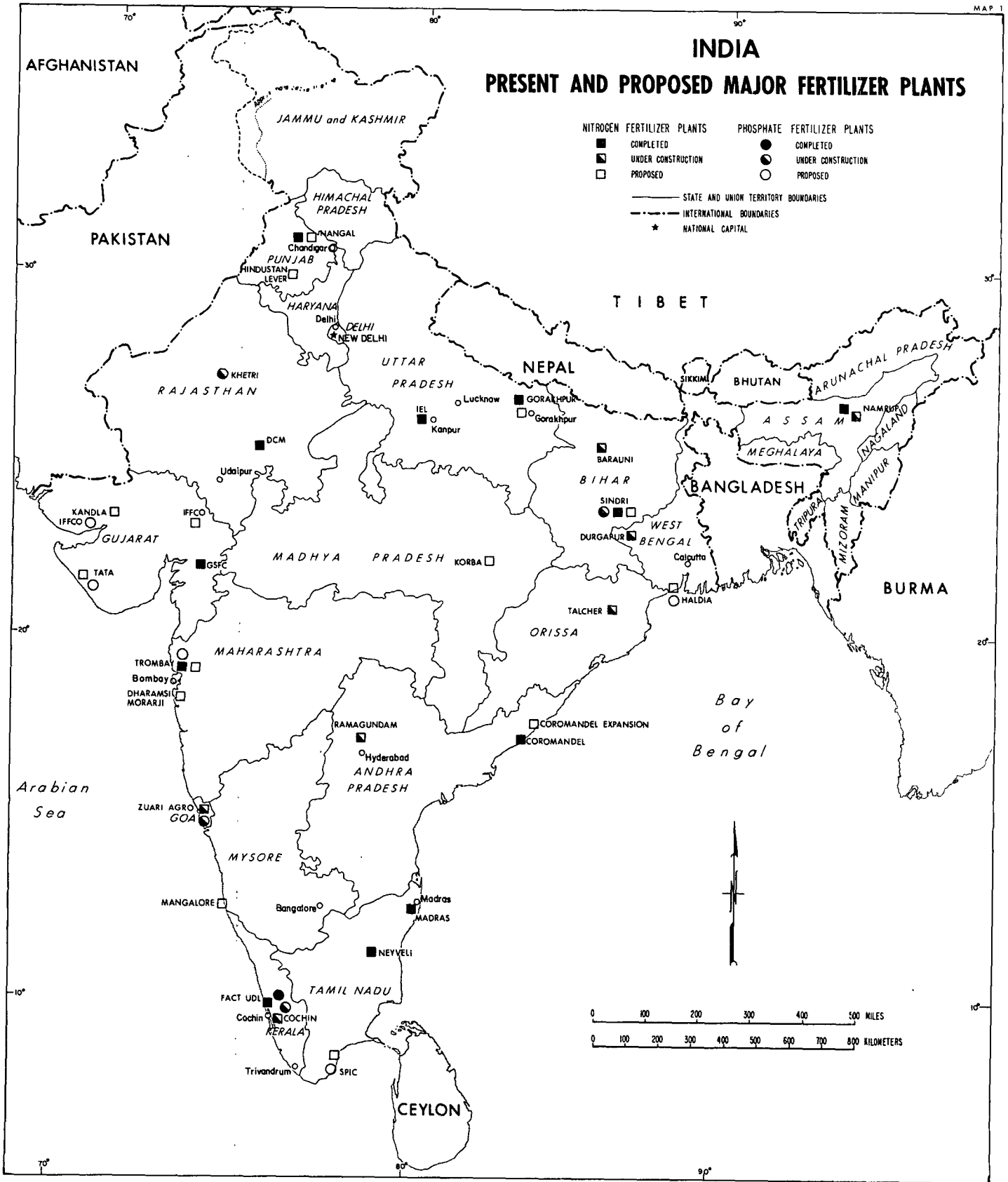
1/ Statutorily controlled price whether handled by the Pool or marketed by the domestic manufacturers.

2/ Non-pool prices.

3/ Retail price for cultivators and plantations and including Rs. 80 (urea) or Rs. 44 (AS) distribution margin - excluding excise tax until March 1969 when a 10 percent excise duty came into force.

4/ Ex-works prices from factories situated within 161 Km of seaports. Those factories situated further in land charge an extra premium to cover transport cost of raw materials - Bagged fertilizers.

5/ Pool price, ex-godown at port and bagged. Sales tax and other taxes extra whatever applicable until March 1969. From then on, prices are FOB despatching station freight prepaid to destination station, and 10 percent excise tax included. Distribution margin is Rs. 50 - so retail price for cultivators is Rs. 523.



APRIL 1971

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IV. STEEL

Production and Demand

59. 1971 has been a disappointing year for the major steel producers. Production of saleable steel of the integrated steel plants fell from 4.543 million tons in 1970/71 to an estimated 4.466 million tons, a drop of 1.7 percent. The worst quarter was July to September when production dropped 14 percent compared with the same quarter of the previous year. Although the last quarter of 1971 showed a rise of 20 percent, it was still 2.6 percent below the previous year.

60. Production of ingots from the five major plants was 6.05 million tons in 1970/71 as compared with 6.18 in 1971/72 (see Table 36). The utilization of steel making capacity in these plants has been as follows:

Table 34: CAPACITY UTILIZATION OF MAJOR UNITS

	1969/70	1970/71	1971/72 1/
Bhilai	75%	78%	78%
Durgapur	51%	40%	44%
Rourkela	61%	58%	46%
TISCO	85%	85%	85%
IISCO	70%	62%	62%
Total	70%	67%	65%

1/ Ministry of Steel estimates

61. A brighter point is the fact that output of ingots from electric furnaces using scrap rose sharply in 1971/72 and will probably total 950,000 and is expected to increase to 1,290,000 tons in 1972/73.

62. The causes of the poor showing in the major plants are varied. Frequent breakdowns occurred in the public sector units at Rourkela and Durgapur. Labor unrest continued in Durgapur and IISCO. Bhilai and TISCO continued to suffer from coke oven problems. The really serious dislocation however, occurred at Rourkela where the roof of the steel-making shop collapsed because of an accumulation of iron dust from the LD converters. In consequence all the LD converters had to be shut down and only the open hearth furnaces could be used. This reduced the output of steel from 3,000 tons to about 1,000 tons per day for 4½ months. The loss from this accident amounted to 350,000 tons. By the end of the year, output had been restored to normal.

63. For 1970/71 the Ministry of Steel originally estimated the steel deficit in India to be between one-half million and one million tons of saleable steel, while the trade estimated it at 0.5 million tons. Since domestic production fell short of the forecast and despite a rather belated liberalization of imports the shortage was probably about one million tons, because of long-term export contracts and imbalance between supply and demand for certain categories of domestic steel and exports were also high. Net imports were only about 100,000 tons in that year. In 1971/72, however, exports were drastically curtailed and imports increased so that net imports were about 600,000 to 800,000 tons of saleable steel. However, if natural growth of the steel demand is 9 percent per annum[1/] the shortage (after imports) in 1971/72 was still over 1 million tons.

64. Last year Indian steel prices to users were rather lower than manufacturers were paying in other countries for their own domestic steel. However, this year steel prices have fallen in foreign countries so that Indian steel using exporters are at a disadvantage when competing with foreign firms in export markets.

65. The landed costs of imported steel are extremely high in India and this raises some doubts about the advisability of exporting certain products with a high steel content. It would appear that there is a net loss of foreign exchange with tubes, and with towers the gain is negligible. This is shown in the following table:

Table 35: PRICES OF IMPORTS OF STEEL BETWEEN APRIL 1970/MARCH 1971[1/]

	Rs/tons (landed cost)
Mild steel bars and rods	1,803
Heavy angles, shapes and sections	1,581
Heavy plates and sheets	1,459

PRICES OF EXPORTS OF CERTAIN STEEL PRODUCTS BETWEEN APRIL 1970 AND MAY 1971[2/]

Mild steel tubes and pipes	1,091 (fob)
Structural steel work	950
Tubular poles for electric lines	1,421
Steel transmission towers	1,428

1/ Monthly Statistics of Foreign Trade of India, Vol.II - Imports March 1971
2/ Monthly Statistics of Foreign Trade of India, Vol.I - Exports March 1971

1/ Normally steel consumption should increase faster than GDP in a developing country. In 1968/69 and 1969/70 value added in the steel using industries increased about 6-6.5 percent a year or about the same as industrial growth generally. However, construction increased by 9.7 percent even in 1968/69. Therefore our assumption that total steel demand would have increased by 9 percent in 1971/72 without supply constraints seems reasonable. It is also close to the long-term demand projection of NCAER cited below.

Table 36: PROJECTED PRODUCTION OF MILD STEEL
(in million tonnes - equivalent ingots)

	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
DURGAPUR												
Total Capacity	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Capacity Steel	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total Output	0.63	0.65	0.74	0.80	0.88	0.96	1.01	1.07	1.12	1.17	1.23	1.28
Steel Output	0.63	0.65	0.74	0.80	0.88	0.96	1.01	1.07	1.12	1.17	1.23	1.28
Steel as % Steel Capacity	39 %	41 %	46 %	50 %	55 %	60 %	63 %	67 %	70 %	73 %	77 %	80 %
ROURKELA												
Total Capacity	1.60	1.60	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Capacity Steel	1.60	1.60	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Total Output	0.93	0.64	1.08	1.13	1.21	1.26	1.35	1.44	1.49	1.57	1.62	1.62
Steel Output	0.93	0.64	1.08	1.13	1.21	1.26	1.35	1.44	1.49	1.57	1.62	1.62
Steel as % Steel Capacity	58 %	40 %	60 %	63 %	67 %	70 %	75 %	80 %	83 %	87 %	90 %	90 %
BHILAI												
Total Capacity	2.50	3.00	3.50	3.50	3.50	3.50	3.50	4.00	4.00	4.00	4.00	4.00
Capacity Steel	2.50	2.50	2.50	2.50	2.50	2.50	2.50	4.00	4.00	4.00	4.00	4.00
Total Output	1.95	2.16	2.63	2.80	2.98	3.05	3.15	3.00	3.20	3.40	3.40	3.60
Steel Output	1.95	1.80	1.88	2.00	2.13	2.18	2.25	3.00	3.20	3.40	3.40	3.60
Steel as % Steel Capacity	78 %	72 %	75 %	80 %	85 %	87 %	90 %	75 %	80 %	85 %	85 %	90 %
TISCO												
Total Capacity	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Capacity Steel	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total Output	1.72	1.63	1.50	1.50	1.60	1.70	1.80	1.80	1.80	1.80	1.80	1.80
Steel Output	1.72	1.63	1.50	1.50	1.60	1.70	1.80	1.80	1.80	1.80	1.80	1.80
Steel as % Steel Capacity	86 %	82 %	75 %	75 %	80 %	85 %	90 %	90 %	90 %	90 %	90 %	90 %

(Continued)

PROJECTED PRODUCTION OF MILD STEEL (Continued)

	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
IISCO												
Total Capacity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity Steel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total Output	0.63	0.60	0.65	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86
Steel Output	0.63	0.60	0.65	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86
Steel as % Steel Capacity	63 %	60 %	65 %	70 %	72 %	74 %	76 %	78 %	80 %	82 %	84 %	86 %
BOKARO												
Total Capacity	-	-	0.80	1.70	1.70	2.50	2.50	2.50	4.00 a/	4.00	5.50	5.50
Capacity Steel	-	-	-	1.70	1.70	2.50	2.50	2.50	4.00	4.00	5.50	5.50
Total Output	-	-	0.80	1.31	1.53	1.88	2.13	2.25	2.80	3.40	3.85	4.13
Steel Output	-	-	-	0.51	1.53	1.88	2.13	2.25	2.80	3.40	3.85	4.13
Steel as % Steel Capacity	-	-	-	30 %	90 %	75 %	85 %	90 %	70 %	85 %	70 %	75 %
VISHAIL HOSPET												
Total Capacity										4.00	4.00	4.00
Capacity Steel										4.00	4.00	4.00
Total Output										1.20	2.00	2.80
Steel Output										1.20	2.00	2.80
Steel as % Steel Capacity										30 %	50 %	70 %
BALANCING MYSORE ETC												
Total Capacity	0.19	0.50	0.60	0.66	0.73	0.80	0.88	0.97	1.00	1.00	1.00	1.00
Capacity Steel	0.19	0.50	0.60	0.66	0.73	0.80	0.88	0.97	1.00	1.00	1.00	1.00
Total Output	0.19	0.50	0.60	0.66	0.73	0.80	0.88	0.97	1.00	1.00	1.00	1.00
Steel Output	0.19	0.50	0.60	0.66	0.73	0.80	0.88	0.97	1.00	1.00	1.00	1.00
Steel as % Steel Capacity	100 %											
TOTAL SUPPLY												
Total Capacity	8.89	9.70	11.30	12.26	12.33	13.20	13.28	13.87	15.40	19.40	20.90	20.90
Capacity Steel	8.89	9.20	9.50	11.26	11.33	12.20	12.28	13.87	15.40	19.40	20.90	20.90
Total Output	6.05	6.18	8.00	8.90	9.65	10.39	11.08	11.31	12.21	14.36	15.74	17.09
Steel Output	6.05	5.82	6.45	7.30	8.80	9.52	10.08	11.31	12.21	14.36	15.74	17.09
Steel as % Steel Capacity	68 %	63 %	68 %	65 %	78 %	78 %	82 %	82 %	79 %	74 %	75 %	82 %

a/ According to Ministry of Steel this will be completed by 1976.

Source: Government of India. Ministry of Steel & Mines.

From estimates of prices on the "free market" given during our conversations with users, it would appear that these are often lower than prices for imported steel.

Organization

66. During the year, management of all three Hindustan Steel plants has been improved. In Bhilai and Rourkela steel production men has been put in charge and in Durgapur an eminent trade union official has been made General Manager. As production problems have been the main trouble in Bhilai and Rourkela and labor problems in Durgapur, these are appropriate moves. However, Bhilai and Rourkela have not been entirely free of labor troubles nor has Durgapur been free of technical problems.

67. The Union Cabinet has approved the Steel Ministry's proposal to form a large holding company in the steel industry. This would essentially be an operating company and take all decisions regarding raw material and inter-works pricing, production programs, deployment of managerial and technical personnel, utilization of material and financial resources. It would control not only the public sector steel plants but also iron ore mines, limestone quarries and coking coal mines. It would also control the substantial equity investments (52 percent for IISCO and 38 percent for TISCO) of the public financial institutions in the private sector plants.

68. The objects of this move are to separate the broad policy-making functions of the Steel Ministry from the running of the plants and thus to give greater autonomy to management at the operating level. This should allow the Ministry to concentrate on shaping the pattern of future steel development A Steel Research and Development Authority, chaired by the Steel Minister, is being set up to coordinate production research.

69. This reorganization can be beneficial if the steel plant managers are given greater autonomy. The role of HSL has not yet been decided but if it remains unchanged it may have some undesirable effects. The loss of its policy-making function may lead the Board of HSL to concern itself more with the operation of the plants and these may therefore, in practice, have less autonomy. To avoid just putting another layer in the hierarchy, it would be advantageous to convert HSL into a marketing and distribution company and have the management of the plants report directly to the holding company on production matters.

New Steel Plants

70. The original concept was to build a plant at Bokaro with a steel making capacity of 1.7 million ingot tons per year to be followed later with expansion to 4 million. It was later decided to expand to 2.5 million tons by March 1974 with the installation of an extra LD convertor and connected equipment. It is hoped to have a blast furnace in operation by mid-1972 and some steel making capacity in 1973. The 1.7 million tons capacity should be installed by 1973/74 and 2.5 million tons stage by 1974/75. Production of some 500,000 tons of ingots can be anticipated in 1973/74 rising to almost 2 million tons in 1975/76 and 4 million tons by 1980 after completion of the second stage expansion.

71. At Bhilai both the new blast furnace and the new coke oven battery are now operating so that iron making capacity for the 4 million ingot tons stage will be available once the sintering plant is ready. Unfortunately, the steel making plant to use this additional iron making capacity is still at the planning stage and cannot be in production before 1976/77. The improved supply of coke and coke oven gas should enable the existing plant to work nearer design capacity but there is not sufficient demand for rails and heavy structurals which form a large part of Bhilai's present rolling capacity. If the controlled selling price of billets (semis) could be raised it would be economic for the mill to make semis for further processing at Rourkela or in the private sector. In any case there will be excess production of pig iron at Bokaro until 1974/75 and Bhilai until 1977/78.

72. Feasibility reports have been received by the Government for three new steel plants. These are for two 2 million ton plants at Hospet, Mysore and at Vishakhapatnam, Andhra Pradesh and one alloy-steel plant at Salem, Tamil Nadu with a capacity of 250,000 tons.

Future Supply and Demand

73. The NCAER has carried out a survey of anticipated steel demand for 1975 and 1980. This study projects a growth rate of 8.5 percent between 1969 and 1980 so that total domestic offtake will be 7.9 million tons of saleable mild steel (10.5 million tons ingot steel) in 1975 and 13.6 million tons (18.1 tons ingot steel) in 1980. In the accompanying chart[1] we have inflated this demand projection by 9 percent to allow for imbalances of product mix. This extra production would be available for export.

Table 37: PROJECTED DOMESTIC DEMAND FOR MILD STEEL IN 1980
(Thousand Tons)

Semis for Sale	430[a]
Finished Steel:	
Merchant Mill Products (Bars & Rods)	3,700
Wire Rods	900
Skelp	794
Plates	1,474
HR Sheets/Coils	2,000
GP/GC Sheets	311
CR Sheets/Strips	1,200
Tin Plates	450
Elect. Steel Sheets	282
Pipes	--
Rails	220
Heavy Structurals	429
Light/Medium Structurals	1,350
Wheels, Tyres & Axles	30
Fish Plates	7
Sleepers	75
Total Finished Steel	13,222
Total Saleable Steel	13,652

a/ For Forgings & Seamless Tubes only.
Source: Ministry of Steel, Government of India.

1/ See page 67.

74. The product mix of the three proposed additional plants mentioned above will be based on the NCAER demand study. This study forecasts the pattern of demand up to 1980 but, as the plants will not be operating at full capacity before about that year its time span is hardly long enough. The period of the projection is particularly critical as the report envisages structural changes in steel using industries, which will contribute a greater share of industrial output. Industries, such as packaging which are now small, will absorb quantities of tinplate and hot and cold rolled sheets. The Ministry of Steel is therefore planning to update the report annually and, by better statistics, to improve its accuracy. This will reduce the danger of considerable imbalances between product range produced and required.

Steel in 1980's

75. It is apparent from the NCAER demand study and the projected domestic output that a shortage will persist throughout the 1970's and into the 1980's even with the Hospet and Vishakhapatnam plants in operation. With the abundance of available raw materials, it is frustrating that India cannot supply even its own demand for steel and to see this shortfall persisting into the future is doubly so. With a major steel plant taking more than eight years from conception to operation, a policy must be formulated now for the 1980's.

76. At present there appears to be considerable overcapacity in the re-rolling sector of private industry and a possibility might be to erect plants making only steel and to sell semis to the re-rollers. This would enable a steel plant to be erected at a fraction of the cost of an integrated mill and, because there is some indication of a growth in world trade in semis, there would be possibilities for export.

77. A significant feature of the Fourth Plan Steel Development Programme is that, unlike in the past, the three new steel projects will be completely engineered and designed by the expertise available in the country and will be based mostly on indigenously produced equipment.[1/] While the necessary expertise for design certainly exists in India, the Ministry of Steel is constantly balancing the merits of indigenous as against imported plant and equipment. This must be based on realistic delivery times as well as price. At present a large amount of the indigenous production is done by HEC whose delivery performance is not impressive. If the iron ore were partially reduced prior to smelting to increase output of the blast furnaces then it might be possible to construct high output steel plants quickly and cheaply. The location, size timing and product range of raw steel works is an economic rather than a technical problem at this stage.

Relative Efficiency of Steel Production in India

78. The cost of production of steel in India compares favorably with other countries. A very approximate comparison may be made by taking ex-works prices of India steel and inflating them by 3 percent to obtain the cost of production (assumes a loss of 3 percent on sales). Similarly assuming foreign

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1/ Ministry of Steel Report 1970-71.

steel companies are making 5 percent on sales, then their selling prices may be reduced by 5 percent to give cost.

Table 38: COST OF STEEL PRODUCTION JULY 1970[1/]
Rs. per metric ton

	India	U.K.	USA	Japan
Billets	514	652	997	-
Bars & Rods	654	815	1,204	-
Wire Rods	675	789	1,287	-
Angles (Medium)	705	796	1,169	643
Channels (Heavy)	705	-	1,169	1,010
Beams/Joists	777	765	1,169	851
H.R. Sheets	931	928	1,097	614

1/ Calculated from Joint Plant Committee information

79. While costs of individual categories calculated as above reflect only the pricing policy, the overall picture is that costs of production in India approximate those in the U.K. and Japan while U.S.A. costs are uniformly higher. In fact India should be able to produce steel more cheaply than U.K. or Japan. U.K. has to import part of its iron ore and has generally old plants while Japan has to import its raw materials - iron ore and coking coal. India has indigenous raw materials and new plants. If Indian Plants could produce at 80 percent instead of 65 percent of capacity then costs could be reduced by about 15 percent. This would make Indian steel among the cheapest in the world if coke were available at lower prices.

80. One disturbing feature is that labour productivity has fallen over the years.

Table 39: TONS OF INGOT STEEL PER MAN YEAR

	1965/66	1966/67	1967/68	1968/69	1969/70
Bhilai	70	83	77	75	79
Durgapur	68	50	47	48	45
Rourkela	70	68	50	59	54
Tata Iron & Steel	--	--	67	62	59
Indian Iron & Steel	--	--	41	42	37

Source: Committee on Public Undertakings 1971-72 (Fifth Lok Sabha)

81. Also compared with foreign countries the output of ingots of steel per man year is very low in India. Thus, in 1969/70, in contrast to the figures in Table 39, ingot ton production per man hour was 247 in Japan, 235 in the U.S. and 122 in West Germany. However, if Bokaro can produce say 3.2 million tons of ingot steel per annum (80 percent of 4 million) with 25,000 employees then productivity will be 128 ingot tons per man year which will be fairly good by international standards.

82. The figures are not strictly comparable as the employment is not measured on a uniform basis, for example, Japan does not include coke oven operation as part of steel manufacture and in India there are more ancillary operations such as more extensive workshop facilities. Thus, the labor content in India is likely to be overstated. When comparative labor costs are considered, the output per unit of labor cost is in India's favor.

83. If the original capital costs of Indian plants are updated to present value, the capital costs of the four plants in the public sector are comparable. Rourkela is more capital intensive than the other three but this is mainly because the product mix is more complex and has a higher added value per ton.

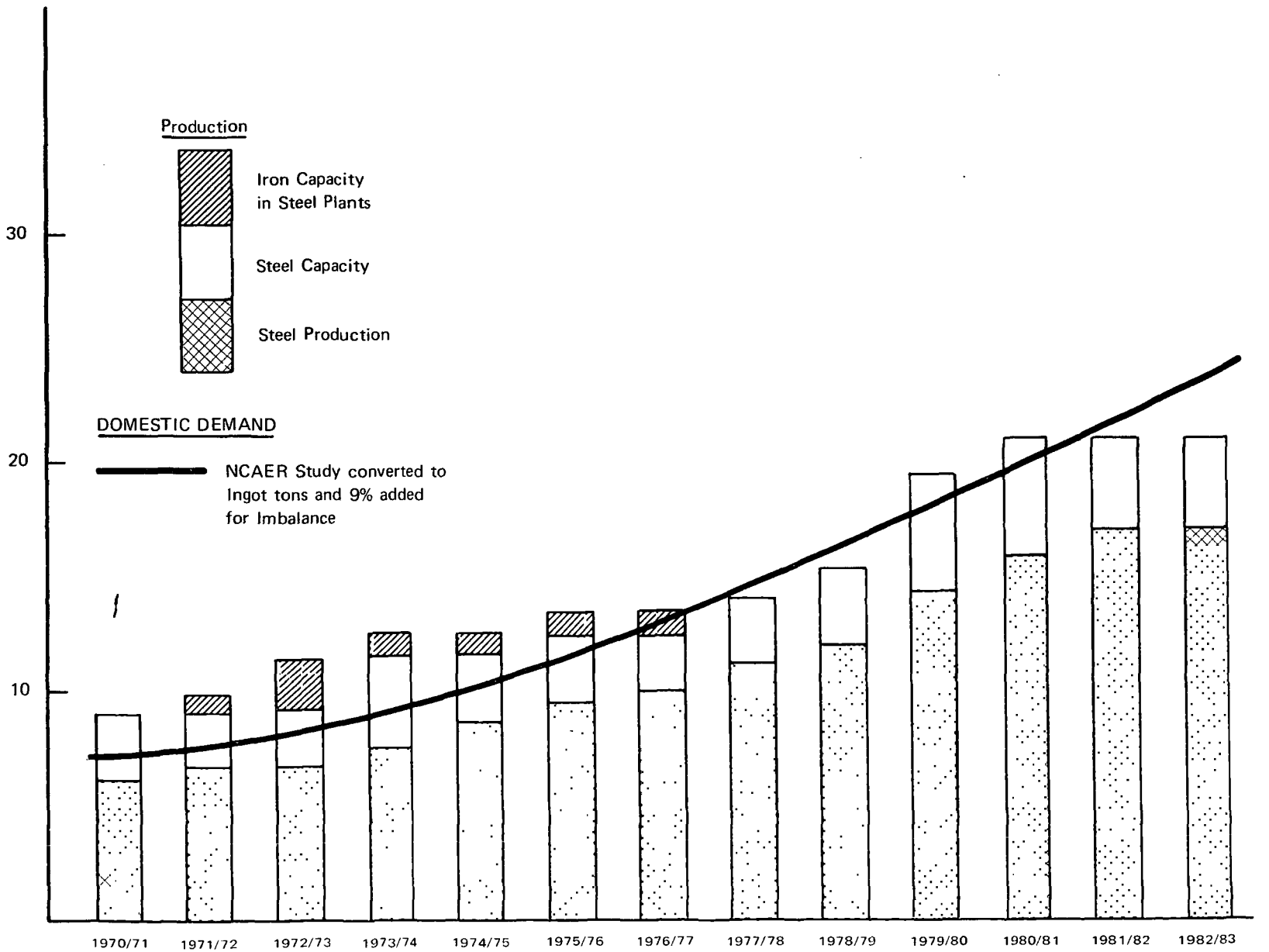
Table 40: COST OF PUBLIC SECTOR STEEL PLANTS IN INDIA

Plant	Capital Cost/ ton[1/] Installed Capacity	Utilization (1971/72)	Actual Capital Cost/ton Output
Rourkela	3,578	46%	7,778
Bhilai	2,366	78%	3,033
Durgapur	2,999	44%	6,816
Bokaro	2,500	-	-

1/ This has been calculated by inflating the original capital cost by 7 percent per annum.

INDIA: STEEL PRODUCTION AND DOMESTIC DEMAND

ALL EXPRESSED AS MILLIONS OF INGOT TONS



World Bank—6739

KEY TO CHART - PRODUCTION AND DEMAND OF MILD STEEL

DEMAND (Table 37)

Line based on Domestic Demand as forecast in NCAER Study "Demand for Steel 1975 and 1980" converted to ingot equivalent by dividing by 0.75 with additional of 9 percent for imperfect matching of product output with requirement. This 9 percent would be available for export.

PRODUCTION (Table 36)

Assumptions are

(a) Only expansions in existing steel plants will be at Bhilai, raising capacity to 4 million ingots tons per year by 1977/78.

(b) Utilization will rise to 80 percent at Durgapur by 1981/82, 85 percent at IISCO and 90 percent at Rourkela, Bhilai and TISCO.

(c) Bokaro will have steel-making capacity of 1.7 million tons by 1973/74, 2.5 million by 1975/76 and 4 million by 1978/79.

(d) Vishak and Hospet Plants will be in production by 1979/80.

V. ELECTRONICS

84. Electronics industries have been growing at the impressive rate of 34 percent a year between 1964/65 and 1970/71 and total output was of the order of Rs. 1,750 million in 1970/71; production is expected to reach Rs. 3,740 million at the end of the Fourth Plan. Electronic products being manufactured in India cover an increasingly wide range, including entertainment, telecommunication, defence equipment and components. Production increase has been particularly impressive in radio receivers, the production of which increased from 600,000 units in 1965/66 to 3,200,000 units in 1970/71[1/]: 35 percent of this production is manufactured in the small scale sector. Production of components have been included under the core sector of the Fourth Plan and here also production increase has been rather substantial from Rs. 40 million in 1964/65 to Rs. 370 million in 1970/71. The target of Rs. 800 million by 1973/74 is expected to be achieved.

85. About 124 computers are now in service in India and it is estimated that the needs of the government sector could be over 150 at the end of the Fourth Plan and private sector requirements could be of the same order of magnitude. International Business Machine and International Computers India Ltd. with the collaboration of Bharat Electronics Ltd., Bangalore, are already assembling computers of the third generation. An important program now included in the Plan is the substantial expansion of the public sector company, Electronic Corporation of India, for the production of highly specialized equipment, including computers, whose know-how has been developed by the Bhabha Atomic Research Center.

86. Exports of electronic equipment are still modest and amounted to about Rs. 43 million in 1970/71 (radio and components, communication equipment and chiefly punching card machines produced by IBM, which exports 95 percent of this production line into 45 countries). An export project sponsored by the Trade Development Authority is now under active consideration: located near the International Airport of Bombay, it would allow the import "under bond" of airfreighted electronic components for conversion in India and reexport. With her abundant and comparatively cheap skilled labor force, India should become more than a marginal exporter of electronic equipment. Recognizing the need for a well directed program for the rapid development of the electronics industry, the Government has recently constituted the Electronics Commission with a wide range of functions and powers. The Commission is currently engaged in drawing up a long term program of development for the electronic industry.

87. Apart from its considerable growth potential and its export possibilities, the industry is particularly labor intensive. The Bhabha Committee has calculated that a Rs. 3 billion output would require a labor force of 400,000 persons.

1/ The Bhabha Committee set up in 1963 forecasted a production of 3 million radio receivers in 1975.

Table 41: PRODUCTION OF ELECTRONICS EQUIPMENT

(in Rs. million)

Year	Entertainment Equipment	Defense Equipment	Communication Equipment	Other instruments, computers etc.	Components	Total
1964/65	170	57	30	8	40	305
1968/69	480	213	47	110	210	1,060
1970/71	800	320	60	200	370	1,750
1973/74 (target)	1,850	530	140	420	800	3,740

VI. THE OIL SECTOR

88. In 1971 crude oil production reached 7.15 million tons (about a third of requirements), a 5 percent increase over the previous year. Since 1969, output has risen at a relatively slow rate as compared with the substantial growth which took place from 1960 to 1968 (see Table 42).

89. Most of the increased oil production has come from the Oil and National Gas Commission (ONGC) fields. ONGC is a government owned statutory body which operates oil fields in Gujarat and to a minor extent in Assam. More than half of Indian oil output is produced by ONGC. The two other producers are Oil India Ltd., equally owned by the government of India and Burmah oil, and the Assam Oil Company, a Burmah Oil subsidiary. Both companies operate oil fields in Assam, but the Assam Oil Company which started production more than seventy years ago, has only a very small output (about 0.1 million tons.)

90. The largest inland refinery is located at Koyali, in Gujarat and is processing 3.4 million tons/year, i.e. the amount of crude produced by ONGC oil fields in Gujarat.[1/] In 1975, ONGC production in Assam will find an additional outlet with the commissioning of a new inland refinery at Bengaigon (1 million tons capacity). However, before this new refinery can operate (by the end of 1974), work will have to proceed on a crude conditioning plant at the well in order to eliminate excess wax, and pipeline capacity will have to be increased through the installation of additional pumps. No decision has been made yet on the expansion of the Gujarat refinery but, should the expansion take place, additional crude oil might have to come from the Rann of Kutch, through the pipeline to be installed. Such a development would not take place before 1975. On the basis of present plans, prospects are that total Indian oil production will not be more than about 8 million tons in 1975 which would mean a further drop in the country's sufficiency in crude oil.

91. Exploration work is continuing to discover potential new oil resources in three main areas, Bombay High (offshore western coast), Gulf of Cambay and Tripura. The hopes raised around 1966 for the likely large discovery of oil at the Bombay High have yet to materialize. Some time has been spent deciding how exploration work should be undertaken - through having a foreign collaboration with equity participation or the public sector agency, ONGC, doing the job on an ownership-assisted basis. The decision was taken only in 1970 in favor of the latter alternative and now a floating platform is being built in Japan for the purpose. It is expected to be delivered by the end of 1972. The results of the exploration effort might be available in about two years. If success is achieved, commercial exploitation may be expected to start around 1975.

1/ Also the largest ONGC field in Gujarat, Anshalawar, has now reached maximum production level.

92. In the Gulf of Cambay, a fixed platform made in India was installed in 1970. Another well is to be drilled towards the end of 1972. Whether oil will be produced from this field in commercial quantities will be known after the various tests are completed but it seems that only a small structure has been found.

93. The ONGC's drilling operations in Tripura will commence in 1972. The exploration program has been delayed because of procurement problems.

94. A capital expenditure allocation for oil development of Rs. 1.87 billion has been made in the Fourth Plan of which Rs. 1.81 billion was for ONGC. It is now anticipated that ONGC will spend its entire Plan allocation by 1973/74. (See Table 47). However, the rising trend in the world price of crude and also an improvement in ONGC operations should now help to raise the tempo of oil exploration activity. The services of Oil India might be utilized to a greater extent by asking this organization to undertake exploration outside its present small concession in Upper Assam. The beneficiary of this would be the Government of India, for under the Charter of the Oil India Company, the British partner - the Burmah Oil Company - is entitled only to a fixed dividend on its equity investment.

95. In addition to exploration in India, ONGC is in partnership with the National Iranian Oil Company (NIOC), Philips Petroleum (USA) and ENI (Italy), in two oil fields in Iran at Rostam and Kaksh. ONGC's share in the crude produced is 16.6 percent and it has been able to lift 0.6 million tons in 1971. This tonnage may rise to 1 million tons in 1974. Because of its high sulfur content, this crude is sold abroad. However, with the modification of Barauni refinery in Bihar (the third unit of 1 million tons is at present lying idle for lack of domestic crude oil), the Rostam oil will be processed in India in 1974 (See Table 44).

96. Crude oil imports have increased from 6.8 million tons in 1965 to 12.7 million tons in 1971 (See Table 45). In value terms the increase has been from $54 million to about $187 million. By 1975, such imports are likely to increase to 18 million tons[1/] as India's domestic production will not be more than about 8 million tons and refinery throughput would be about 25 million tons.

97. The cost of crude imports will be more as a result of recent international agreements on prices. Following the Tehran Agreement of early 1971 which led to a price hike of about 30 US cents per barrel, the international oil companies asked for an additional increase of 5 cents per barrel in July 1971 and for further 12 cents in December 1971. The new rates would range from $1.82 to $1.85 per barrel. In January 1972, a dispute arose between the government of India and Burmah Shell, Esso and Caltex (which own three large

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1/ Including oil from ONGC concessions in Iran i.e. about 1 million tons.

refineries at Trombay and Visakhapatnam) as the government was prepared to grant oil companies foreign exchange only at the rate of 1.68 per barrel prevalent in June 1971. The combined capacity of Burmah Shell, Esso and Caltex refineries is 11 million tons but they processed only 8 million tons of crude oil in 1971. Should these refineries be allowed to import an additional 3 million tons of crude, important foreign exchange savings could be realized. The government's position was partly weakened by the fact that the Madras refinery (jointly owned by GOI, NIOC and Amoco) is supplied with NIOC crude at a rate which is higher than even the prices now asked by the international oil companies. It is understood that NIOC has now offered a ten cents per barrel discount but such discount would bring NIOC price only to the new price level asked by the international companies.

98. Another disturbing factor is the rising shortage of refining capacity in India. The Fourth Plan had allocated only Rs. 850 million for expansion, debottlenecking and constructing of new refineries in the public and joint sectors. The Mid-Term Appraisal of the Plan has now proposed the increase of such allocation to Rs. 1.2 billion. Initial provision has been made now for two new refineries at Bengaigaon (Assam) and in North West India[1/]. The Bengaigaon refinery will start production only late in 1974, and the North West India's refinery (4 to 5 million tons capacity) would not be in production before 1976 as the final location has not yet been chosen and a pipeline will have to be built to bring the crude from the coast. In the meantime, refinery throughput would only increase from 20.3 million tons in 1972 to 22.8 million tons in 1973 from the new 2.5 million tons ONGC Haldia refinery in West Bengal. This represents a significant shortfall from the Plan target of 28 million tons. In 1975, refinery throughput may rise to about 26.2 million tons with the coming into production of the Bangaigaon refinery and expansion in various existing refineries (See Table 44). On the basis of present plans and given the foreseen increase in consumption (31 million tons in 1975) supplies of petroleum products from domestic refining capacity will thus become tight. Already, in 1971, imports of refined products more than doubled as compared with 1970 (from 0.97 million tons to about 2 million tons). As the projected refinery throughput would be only 26 million tons in 1975 oil products imports will inevitably continue to grow, resulting in substantial foreign spending (already about $57 million were spent for that purpose in 1971). Oil products imports may reach 5 million tons in 1975.

1/ See Table 47.

Table 42: CRUDE OIL PRODUCTION - INDIA
(Thousand tons)

	1960	1965	1966	1967	1968	1969	1970	1971	1972 Forecast	1973 Forecast	1974 Forecast	1975 Forecast
ONGC 1/	-	1,122	2,352	2,778	2,965	3,522	3,632	3,950				
Oil India Ltd. 2/	275	1,742	2,143	2,752	2,771	3,074	3,070	3,100				
Assam Oil Co., Ltd 3/	179	158	149	134	117	112	107	100				5/
Total:	454	3,022	4,644	5,664	5,853	6,708	6,809	7,150	7,340	7,430	7,430	8,430
ONGC (Iran) 4/	-	-	-	-	-	-	100	600	na	na	1,000	1,000

1/ ONGC = Oil and Natural Gas Commission, formed in August 1966 and Government owned. Oil fields belonging to ONGC are located in Gujarat (Ankleshwar, Kalol, Nawagam,etc.). Smaller fields are located in Assam (Rudrasagar, Lakwa) but represent less than 10 percent of ONGC output.

2/ OIL INDIA Ltd. = Incorporated in 1961 as a 50/50 partnership enterprise between the Government of India and Burmah Oil Ltd. - Oil India operates oil fields in Upper Assam (Nahorkatiya, Moran).

3/ ASSAM OIL COMPANY LIMITED = Registered in 1899. Since 1921, under commercial and technical management of Burmah Oil. The Company operates the Digboi oilfield in Assam.

4/ ONGC owns the Rostam and Kaksh oil fields in Iran in partnership with National Iranian Oil Company (50 percent), ENI (16.6 percent) and Philipps (16.6 percent), ENI operates the fields - Above data relate to ONGC share in total production. ONGC share is marketed abroad but plans are made to refine it in the Barauni refinery by the end of 1973.

5/ The MID-TERM APPRAISAL REPORT of the Fourth Plan gives a tentative production forecast of 8.5 millions tons in 1974. Increase in production from 1971 to 1974 is expected to come from ONGC field in ASSAM mostly.

Table 43: REFINERY THROUGHPUT OF CRUDE OIL - INDIA

	Date Of Installation	Location	Source Of Crude Oil Refined	Throughput 1960	1965	1970	1971
I. PRIVATE SECTOR:							
Burmah Shell	1965	Trombay (near Bombay)	Iran	2.82	4.00	3.45	3.90
Esso	1954/55	Trombay	Middle East	1.95	2.60	2.35	2.77
Caltex	1957	Vishakapatnam	Iran	0.88	1.12	1.18	1.25
Assam Oil Co.	1901	Digboi (Assam)	Assam	0.45	0.49	0.49	0.47
				6.10	8.21	7.47	8.29
II. PUBLIC SECTOR:							
IOC 1/	1964/69	Barauni (Assam)	Assam	-	0.61	2.20	2.24
IOC	1962	Gauhati (Bihar)	Assam	-	0.79	0.70	0.76
IOC	1965/67	Koyali (Gujarat)	Gujarat	-	0.15	3.44	3.62
				-	1.55	6.34	6.62
III. JOINT SECTOR:							
Cochin (CRL) 2/	1966	Cochin (Kerala)	Iran	-	-	2.59	2.44
Madras (MRL) 3/	1969	Madras (Tamil Nadu)	Iran	-	-	2.07	2.15
				-	-	4.66	4.59
IV. TOTAL (1+11+111): 4/				6.10	9.76	18.47	19.50

1/ Indian Oil Corporation Limited created in 1964, wholly owned by the Government of India.

2/ Cochin Refineries Limited established in 1963 in partnership between the Government of India (52.4 percent), Philipps (26.4 percent), Duncan Brothers (2 percent). The balance of the shares is owned by the State of Kerala and the public.

3/ Madras Refineries Ltd. established in 1965 as a joint venture of the Government of India (74 percent), National Iranian Oil Company (13 percent) and Amoco (13 percent).

4/ Excluding Lubrizol India Limited, (51 percent GOI and 49 percent Lubrizol Co. of the US) with a 6,000 tons capacity of chemical additives and a 145,000 tons/year lube base oils plant equally owned by GOI and Esso.

Table 44: PROJECTED OIL REFINING THROUGHPUT (1973 - 1975)
(million tonnes)

	1972	1973	1974	1975	Source of crude oil
I. NEW REFINERIES:					
Haldia (W. Bengal) 1/	-	2.50	-	-	Iran
Bengaigaon (Assam) 2/	-	-	-	1.00	Assam
Sub Total	-	2.50	-	1.00	
II. EXPANSION AND/OR MODIFICATIONS:					
Cochin (Kerala)	0.21	-	1.00	-	Iran
Barauni (Assam) 3/	-	-	0.90	-	Assam
Koyali (Gujarat) 4/	-	-	-	0.50	Gujarat
Madras (Tamil Nadu)	0.60	-	-	-	Iran
	0.81	-	1.90	0.50	
III. ANNUAL THROUGHPUT OF EXISTING PLANS:	19.50	20.30	22.80	24.70	
IV. TOTAL (1+11+111)	20.30	22.80	24.70	26.20 5/	

1/ Indian Oil Corporation Ltd. Set up in collaboration with French and Rumanian technical assistance. To be supplied by Total (International) with a minimum quantity of 9 million tons of light Iranian crude oil.

2/ To process additional Assam crude. In order to process that crude, existing pipeline capacity will be increased through installation of additional pumps, which will also be installed on the crude pipe linking Bengaigaon and the Barauni refineries. Also a crude conditioning plant will be installed at the oil field to eliminate excess wax.

3/ Utilization of the additional capacity of 0.9 million tons which is lying idle for want of crude oil but which is expected to be modified to use Rostam crude from the ONGC's concession in Iran.

4/ Revamping and "debottlenecking."

5/ This total does not take into account possible fuller utilization of the Private Sector's Refineries. Also a new 4 to 5 million tons inland refinery (North West India) is not included as it is unlikely to come on stream before 1976.

Table 45: EXTERNAL TRADE IN OIL AND PRODUCTS - INDIA

	Crude Oil Imports	Oil Products Imports	Oil Products Exports 1/	Total (net)	Crude Oil Imports	Oil Products Imports	Oil Products Exports	Total (net)
	(in million tons)				(in million Rupees)			
1960	5.72	2.03	0.23	7.52	405.7	410.2	46.1	769.8
1965	6.81	2.88	0.34	9.35	403.8	447.3	39.2	811.9
1968	10.45	0.93	0.56	11.94	938.8	407.5	82.5	1,263.8
1969	10.70	1.05	0.74	11.01	940.1	382.3	107.7	1,214.7
1970	11.67	0.97	0.41	12.23	1,023.6	305.3	57.2	1,271.7
1971p	12.66	1.94	0.15	14.45	1,399.2	434.0	25.5	1,807.7

1/ Mostly paraffin wax and fuel oil and gasoline. However, no fuel oil was exported in 1970 and 1971. Oil products exports will increase somewhat in 1972, mainly to Bangladesh. However, with the growth in demand within the country exports are likely to be progressively reduced and there are not much prospects for increasing exports in the foreseeable future.

Source: Indian Petroleum Statistics - Ministry of Petroleum and Chemicals.

Table 46: CONSUMPTION OF PETROLEUM PRODUCTS

(Thousand tons)

	1960	1965	1968	1969	1970	1971p	1975 (forecast)
Motor gasoline	833	1,093	1,256	1,330	1,411		
Liquefied Petroleum Gas	8	43	100	126	166		
Naphta	-	30	460	665	837		
Kerosene	1,972	2,526	2,816	3,036	3,262		
Diesel Oil	1,879	3,052	4,177	4,495	4,782		
Fuel Oil 1/	1,745	3,191	4,087	4,428	4,651		
Lubricants	368	444	487	502	535		
Bitumen	408	589	623	658	751		
Others 2/	456	900	1,001	1,089	1,194		
Sub Total	7,669	11,868	15,007	16,329	17,589	20,400	
Refinery Fuel Oil	115	411	822	999	1,147	1,215	
Total:	7,784	12,279	15,829	17,328	18,736	21,615	31,000 3/
Refinery Throughput	6,091	9,754	16,096	17,495	18,459	19,600	26,300 4/

1/ Excluding boiler fuel used in refineries.

2/ Aviation fuel, petroleum coke, wax, turpentine, others.

3/ Estimates of the Ministry of Petroleum.

4/ Assuming no increase in utilization of private refineries capacity and that the proposed 4 to 5 millions tons North West Refinery does not come on stream before 1976.

Source: Indian Petroleum Statistics - Ministry of Petroleum and Chemicals.

Table 47: CAPITAL EXPENDITURES IN THE PUBLIC AND JOINT OIL SECTOR

(1969-1970 - 1973-1974)

(Rs crores)

	Fourth Plan	Mid-Term Appraisal Report
I. Continuing Schemes:		
1. Exploration		
Exploration (ONGC)	181.00	181.00
Exploration (Oil India)	6.00	4.84
Sub Total	187.00	185.84
2. Refining		
Refining (IOC)		
- existing refineries	20.80	1.71
- new Haldia refinery	55.00	61.94
Refining (joint sector)		
- Cochin Refinery (expansion)	4.00	5.74
- Madras Refinery	4.61	6.26
- GOI/ESSO Lube Oil plant	0.61	0.60
Sub Total Refinery	85.02	76.25
3. Marketing (IOC)	30.28	40.00
4. Total (1+2+3)	302.30	302.09
II. New Schemes:		
1. Pipelines		
Barauni - Kanpur expansion	-	0.50
Haldia-Rajbandh	-	5.00
Salaya/N.W. Refinery crude line	-	5.00
Telecommunication system for pipeline	-	1.25
Sub Total pipeline	-	11.75

	Fourth Plan	Mid-Term Appraisal Report
2. Refining		
Bengaigaon Refinery (Assam) :	-	6.75 1/
North West Refinery :	-	20.00
Madras Refinery wax project :	-	3.28
Processing of imported crude at Barauni :	-	5.20
Additional facilities at Gauhati, Barauni & Gujarat refineries :	-	6.40 2/
LUBRIZOL	0.40	1.60
Sub Total refining :	0.40	43.23
3. Feasibility studies (IOC) :	0.50	-
4. Total (1+2+3) :	0.90	54.98
III. Total I+II :	303.20	357.07

1/ Refinery under construction. However outlays will continue beyond 1974 for completion of the project.

2/ No decision made on expansion of the Gujarat refinery. If approved, additional 1 million tons capacity to be installed by 1975. But ultimate decision will depend on new domestic sources of crude oil.

Source: The Fourth Plan Mid-Term Appraisal, December 1971.

Table 48: FINANCIAL RESOURCES, SALES AND PROFITABILITY OF OIL COMPANIES IN THE PUBLIC AND JOINT SECTOR

(Rs crores)

	1966/67	1967/68	1968/69	1969/70
ONGC (crude production)				
Paid up capital and reserves	128.0	143.2	160.1	179.0
Sales	28.4	35.2	34.8	39.1
Net Profit	11.1	12.8	12.9	10.7
Percent net profit on capital and reserves	8.7	8.9	8.1	6.0
Percent net profit on sales	3.9	3.6	3.7	2.7
INDIAN OIL CORPORATION Ltd. (refining and marketing)				
Paid up capital and reserves	75.3	81.3	94.7	110.2
Sales 1/	338.7	431.2	526.8	635.7
Net Profit	6.9	10.8	18.5	20.4
Percent net profit on capital and reserves	8.4	13.3	19.5	18.5
Percent net profit on sales 1/	-	-	-	-
COCHIN REFINERIES Ltd. (Refining) 2/				
Paid up capital and reserves	8.1	10.0	11.1	13.6
Sales	25.5	41.5	39.5	37.4
Net Profit	1.1	3.4	2.5	2.5
Percent net profit on capital and reserves	13.6	34.0	22.5	18.4
Percent net profit on sales	4.3	8.2	6.3	6.7

1/ Including marketing of petroleum products, plus presumably including taxes at the retail trade level. Hence ratio of net profit to sales, not comparable to others.

2/ The Madras Refineries Co. Ltd. has a paid up capital of Rs. 12.9 crores, and sales of Rs. 26.9 crores in 1970. However it made a loss of Rs. 3.7 crores.

Source: Yearbook of public sector, 1971.

VII. COAL MINING

100. In 1971/72 coal and lignite production was 75.5 million tons, less than 1 percent above the level of 1970/71 and practically the same as in 1968/69. Production capacity is about 96 million tons. The Plan target (1973/74) is 99.5 million tons. A substantial shortfall is likely to occur both for coking and other coal.

101. Despite the small increase in production, pithead stocks have been piling up. Demand for coal has been lower than expected due to the slow-down in industrial activity, particularly in the steel plants. An all-round increase in the costs of labor, machinery, spare parts, and other material required for maintenance of production has further aggravated the situation. The coal industry has tried to raise prices but large consumers such as the railways and the public sector steel plants have agreed only to small increases.

102. The coal industry is also facing lack of spares and components. The shortage of spares is partly due to problems in supply from the Mining and Allied Machinery Corporation, Durgapur. As a result, spares and components of the desired quality have to be imported.

103. Together with lack of demand, and other difficulties, rail transportation bottlenecks have been a major cause of stockpiling and reduced production. Coal wagon loadings decreased from a monthly average of 222,000 in 1969 to 204,000 in 1970 and 202,000 in 1971. Transport bottlenecks have resulted in coal shortages in various parts of the country. The coal industry reckons that even taking into account the relatively low demand for coal, output could nevertheless increase substantially with only marginal investment if enough transport were available.

104. The Fourth Plan gave high priority to the coking coal program. Coking coal output was projected to increase from 17 million tons in 1968/69 to 23 million tons in 1973/74[1/], 9 million in the public and 14 million in the private sector. In addition to the various coking coal miles in production[2/] at the start of the Plan, two new public sector mines (Sudamdih and Monidih, in Bihar) with a capacity of about 2 million tons each were expected to come into production during the Fourth Plan. However, production by public sector coking coal mines has remained stagnant mainly because increased demand from the steel mills has not materialized. Also the two above mentioned modern underground mines will not

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1/ Of which 21.8 million tons for the steel industry and the balance for other cokeries.

2/ Whose production was to increase from 3.5 million tons in 1968/69 to 5 million tons in 1973/74.

start production before 1974/75 and will not reach their projected capacity before 1976/77 for Sudamdih and 1978/79 for Monidih. Development works have not progressed according to the original schedule due to adverse geological conditions (Sudamdih) and delays in the receipt of essential equipment such as locomotives, ventilation fans, etc., from indigenous manufacturers (for both mines).

105. Besides low profitability, a second cause of anxiety is the long-term availabilities of coking coal. Reserves are not abundant and they may not be sufficient to feed the growth of the steel industry until the end of the current century unless very judicious use is made of them. Until now, coking coal resources have not been satisfactorily exploited as only about 40 percent of the coal reserve is recovered from a mine, the rest being left as pillars. With proper sharing the rate of recovery could be raised to 75 percent. Crude exploitation methods have also led to frequent spontaneous combustion. In order to rationalize coking coal mines, formerly mainly in the private sector, the Government took over 214 coking coal mines and coke oven plants in October 1971, pending nationalization. As a result, about half of the private coking coal production will be transferred to the public sector. It is now planned that, as a result of nationalization, coking coal would be produced by ten to twelve big mines. As demand for coking coal increases, deeper seams will have to be tapped as coal reserves in the top seams are getting depleted. Development of collieries takes considerable time and it would therefore be necessary to plan for the exploitation of untapped sources right now. But before such a program is launched, it would be worthwhile to make a fresh assessment of future demand so that development programs can be suitably tailored. Similarly, there is an urgent need to improve the quality of coking coal supplied to consumers (particularly the steel industry) as the ash content has been going up steadily. For every 1 percent increase in the ash content there is likely to be an 8 percent rise in coking coal consumption, besides operational difficulties in the production of pig iron. Linked to this is the need to improve the performance of the coke oven plants which has been far from satisfactory.

106. In respect of non-coking coal, the capacity in both public and private sectors is about 67 million tons. As the Fourth Plan envisaged a requirement of only about 68 million tons for 1973/74, only marginal investments were planned to meet the requirements of specific consumers such as the power plants. Provision was made to develop coal fields for meeting the additional requirements of power stations, taking into consideration the needs to minimize rail transport to the plants. The main project was to develop the Silewara mine in Maharashtra. This project will be completed by 1973/74. Total non-coking coal production may not be above 61 million tons in 1973/74.

107. Due to low utilization of production capacity, transport difficulties and coal prices insufficient to offset the rise in labor cost (not 60 percent of total cost as against 40 percent in 1960), public sector corporations (National Coal Development Corporation and Singarani Collieries Company) have been incurring losses. The overall profitability of the coal mining industry (including the private sector) is substantially lower than the average in Indian industry.

Table 49: COAL PRODUCTION

(million tons)

	Non-Coking Coal	Coking Coal	Sub-Total Coal	Lignite	Total
1961/62	40.1	17.0	57.1	-	57.1
1962/63	46.3	17.3	63.6	0.2	63.8
1963/64	47.8	17.5	65.3	1.0	66.3
1964/65	46.1	16.5	62.6	1.8	64.4
1965/66	50.7	17.0	67.7	2.6	70.3
1966/67	51.9	16.6	68.5	2.5	71.0
1967/68	52.5	16.1	68.6	3.4	72.0
1968/69	54.2	17.2	71.4	4.0	75.4
1969/70	57.6	18.1	75.7	4.3	80.0
1970/71	54.3	17.6	71.9	3.4	75.3
1971/72 (est.)	52.7	16.5	69.2	3.5	72.7
1972/73	n.a.	n.a.	75.0	4.0	79.0
1973/74	61.0	21.0	82.0	5.0	88.0
4th Plan Target (1973/74)	68.1	25.4	93.5	6.0	99.5

1/
Source: National Coal Board, Calcutta; Ministry of Mines; Mid-Term Appraisal Report, December 1971.

Table 50: COAL PRODUCTION IN THE PUBLIC AND PRIVATE SECTORS

(million tons)

	Public Sector 1/			Private Sector			Total Public and Private Sector			% Private Sector in Total		
	Non Coking Coal 2/	Coking Coal	Total	Non Coking Coal	Coking Coal	Total	Non Coking Coal	Coking Coal	Total	Non Coking Coal	Coking Coal	Total
1965/66	13.4	2.8	16.2	39.9	14.2	54.1	53.3	17.0	70.3	74.9	83.5	77.0
1966/67	13.1	2.9	16.0	41.3	13.7	55.0	54.4	16.6	71.0	75.9	82.5	77.5
1967/68	14.5	3.0	17.6	41.3	13.1	54.4	55.9	16.1	72.0	73.9	81.4	75.6
1968/69	17.1	3.5	20.6	41.1	13.7	54.8	58.2	17.2	75.4	70.6	79.7	72.7
1969/70	18.1	3.7	21.8	43.8	14.4	58.2	61.9	18.1	80.0	70.8	79.6	72.8
1970/71	17.6	3.7	21.3	40.1	13.9	54.0	57.7	17.6	75.3	69.4	78.9	71.8
1971/72 (est.)	18.6	10.0 3/	28.6	37.6	6.5	44.1	56.2	16.5	72.7	66.9	39.3	60.7
Production Capacity	22.5 4/	5.5	28.0	48.8	19.4	68.2	71.3	24.9	96.2	68.4	77.9	70.9

1/ National Coal Development Corporation, Singareni Collieries and Neyveli Lignite Company.
2/ Including lignite
3/ Including production from the private coking mines taken over by the Government in October 1971.
4/ Including 4.5 million tons of lignite

Source: Coal Directory 1970 and Ministry of Mines.

Table 51: COAL CONSUMPTION

(million tons)

	Mines own Consumption	Coke oven plants	Other Consumers	Total
1960/61	2.5	2.9	46.6	52.0
1961/62	3.4	3.1	49.6	56.1
1962/63	3.0	3.6	54.3	60.9
1963/64	3.0	4.1	56.8	63.9
1964/65	3.0	4.0	57.0	64.0
1965/66	2.9	4.6	61.4	68.9
1966/67	3.0	5.0	62.1	70.1
1967/68	2.4	4.9	64.6	71.9
1968/69	2.8	4.8	62.4	70.0
1969/70	2.8	5.8	69.2	77.8

Source: Ministry of Steel and Mines - Monthly Review of coal production and distribution - 1971.

Table 52: INDUSTRY WISE DESPATCHES OF COAL

(million tons)

	1951	1956	1961	1965	1967	1968
Railways	10.72	13.36	16.40	17.82	17.35	16.29
Iron and steel	3.89	3.41	8.93	11.68	11.29	11.55
Power plants	2.37	3.17	5.31	6.66	7.92	8.35
Brick kilns	1.31	2.22	1.60	3.10	3.81	3.89
Cement factories	1.23	1.75	2.61	2.85	3.00	3.0
Domestic soft coke	1.21	1.88	1.53	2.95	2.74	2.69
Cotton mills	1.63	1.81	1.88	1.77	1.55	1.61
Paper mills	0.49	0.59	0.70	0.95	0.96	0.96
Export and bunker	2.42	2.01	1.55	1.07	0.35	0.47
Others	6.55	6.98	11.88	20.85	21.90	26.08
Total Despatches	31.82	37.18	52.39	69.70	70.67	74.96
Total Production	34.98	40.06	56.10	64.46	71.14	74.93

Source: Ministry of Mines and Metals (Office of the Coal Controller).

Table 53: CAPITAL EXPENDITURES AND PRODUCTION IN COAL MINING (PUBLIC SECTOR - 1969/70 to 1973/74)

	Fourth Plan Allocation	Estimated Expenditures (as per Mid-Term Appraisal)
CAPITAL EXPENDITURES (Rs. crores)		
Coal Board - Ropeways Scheme	3.14	3.14
National Coal Development Corporation (NCDC)	37.97	42.31
Neyveli Lignite Corporation (mine expansion)	4.50	11.93
NCDC/Coking Coal Mines and Washeries	54.42	32.29
NCDC/other programs	5.00	4.07
Coal Board - Sand Transportation Scheme 1/	10.00	-
NCDC/new schemes	-	7.00
Total	115.03	100.74
PRODUCTION (Million tons)		
Non Coking and Blendable Coal	68.1	n.a.
Coking Coal	25.4 2/	21.0
	93.5	n.a.
Lignite	6.0	n.a.
Total	99.5	n.a.

1/ The Coal Board planned to transport sand by rail and ropeways from rivers to selected coal mines with a view to providing sand for shoring purposes, thereby augmenting the output of coal and also ensuring conservation of high grade coking and non-coking coals. A feasibility report is under preparation to study the possibility of transporting sand by pipelines rather than ropeway. No decision has been made yet on which technique will be used.

2/ Of which 21.8 million tons for the steel industry and 3.6 million tons for Durgapur and other cokeries.

Source: The Fourth Plan Mid Term Appraisal - December 1971.

VIII. IRON MINING

108. Production of iron ore rose from 31.4 million tons in 1970 to 33.5 million tons in 1971. Most of the 6.7 percent increase came from private mines in Goa and Mysore. Production in Bihar/Orissa fell slightly (see Table 55).

109. Production is by three main groups; the Government-owned National Mineral Development Corporation (NMDC), the iron and steel companies and the private sector. In 1971, NMDC produced about 8.5 million tons, i.e. a quarter of total Indian output. The captive mines of the iron and steel companies produced slightly less (8 million tons) and the private mining sector about half of the total (16.5 million tons)1/.

110. In 1971 about two-thirds of production or 22 million tons was exported, a million tons increase over 1970. Japan is the main buyer. In April 1970, an agreement was signed with the Japanese steel mills for the export of 62 million tons of ore with a delivery schedule from 1971/72 to 1980. The ore is to be largely supplied by the NMDC Bailadila mines in Madhya Pradesh.

111. The Fourth Plan envisaged that ore production would be stepped up from 28 million tons in 1968 to 51.4 million tons in 1973/74. Of this 31 million tons were planned for export (as compared with 16.5 million tons in 1969 and 21.2 million tons in 1970) and just over 20 million tons for domestic consumption. As noted above, the bulk of the increase in output to supply export requirements was to be provided by NMDC. The latter had a production of about 7 million tons at the beginning of the Plan and was asked to make plans to double this by 1973/74. To achieve this ambitious target, the Plan made provision for a Rs. 883 million investment for NMDC. This is now estimated at Rs. 975 million. Besides some improvements to increase production at the existing Kiriburu mine (Orissa) and the Bailadila mine (Madhya Pradesh)2/, major work was to start on the expansion of the Kiriburu mine, for the supply of ore to the Bokaro steel plant, with the aim of adding 2.5 million tons to the existing capacity. Also work was to start on a new deposit at the Bailadila mine in order to develop a 4 million tons production capacity for export to Japan.3/ Finally a new project was approved for the establishment of a mine at Donimalai (Mysore) with an annual production capacity of 1.8 million tons of lump ore and an equal quantity of fines for export.

112. The commissioning of the new deposit at Bailadila will not take place before 1974/75. The state-owned Heavy Engineering Corporation (HEC), which was to produce the principal equipment, is reported to be unable to deliver on time. The Kiriburu expansion scheme is also experiencing difficulties. Again HEC has not succeeded in fulfilling its commitment on time. Also the scheme was undertaken primarily with a view to meeting the

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1/ A Mysore State-owned iron ore corporation produced 0.5 million tons in 1971.

2/ Capacity of the Kiriburu mine is 3.3 million tons and that of Bailadila (deposit 14) is 6 million tons (including fines). In 1971 they produced 2.5 million and 6 million respectively.

3/ To which must be added 2 million tons of fines, either for domestic consumption or export after pelletization.

ore requirements of the Bokaro steel plant. Bokaro had agreed to buy both lump ore and fines - mostly for stockpile purposes - when exports to Japan come to an end. But no agreement has yet been reached between Bokaro and NMDC over price. However, it is still hoped that Kiriburu mines might produce about 5 million tons by 1974.

113. Construction work has also been delayed at Donimalai for various technical reasons. Moreover, it appears that NMDC has not, so far, been able to conclude arrangements for the marketing of ore. Negotiations are being held with the Common Market and tests are being conducted in France, Germany and the United Kingdom. The mine was slated to start production in 1973/74 but is now expected to be commissioned in 1974/75.

114. In view of the difficulties experienced by NMDC, its iron ore production is likely to be 3.3 million tons short of the 14 million target for 1973/74. Captive mines of the steel companies might produce 10 million tons by that year. Private sector iron ore production might also increase from 16.5 million tons in 1971 to 19.5 million tons in 1973/74. Another public sector mine owned by the Orissa State Government at Daidari might also start production in 1973/74 with 1 million tons.1/ Consequently, total ore output could reach 42 million tons by the end of the Plan, if everything goes according to present plans. This compares with an original Plan target of 51.4 million tons.

115. In view of the increased domestic requirements, exports of iron ore are now forecast to grow from 22 million tons in 1971 to about 25 million tons in 1973/74. NMDC exports would increase from only 5 to 5.5 million tons as the Kiriburu mines will cease to export since their production is to be diverted to the Bokaro steel plant. **Consequently two-thirds of increased exports will come from the private sector mines which are scheduled to bring their exports from 16.5 million tons in 1971 to 18.5 million tons in 1973/74. Other exporters will be the Mysore and Orissa State-owned mines which would export some 1.0 million tons.**

116. The long-term possibility of sizeable production and exports from the ore deposits at Kudremukh in Western Mysore is still being studied. This project envisages the production of about 20 million tons of magnetite quartzite ore to yield 7.5 million tons of slurry for export. A detailed project report on Kudremukh has been prepared and the Government's decision on it is awaited. A condition would be that NMDC make firm marketing arrangements for the export of ore. If negotiations can be rapidly concluded, the project would be completed in 1977.

117. The Fourth Plan had not made any provision for pelletization plants which could utilize iron ore fines. NMDC has now submitted to Government a feasibility study for a pelletization plant at Donimalai. The possibility of another plant at Bailadila is also being studied by NMDC. A provision of Rs. 40 million has been made for the two projects for the remainder of the Plan period but NMDC would not produce the projected 3.8 million tons of pellets before 1977.

1/ Capacity is 1.5 million tons.

118. India has vast resources of iron ore and should do her utmost to exploit them. However, experience in the last two years has shown that because of delays in construction, high inland transport costs and also delays in implementation of the port programs (in particular at Madras Outer Harbour and at Vishakhapatnam) oridinal planned targets could not be met. This is all the more regrettable as such competitors as Australia and Brazil are making strong efforts to increase exports by improving port handling and export ore in very large carriers. India is lagging behind them in this field.

119. This underlines the importance of coordinated planning and implementation among the different bodies involved (NMDC, Ministry of Mines, Railways, Port Authorities). The management of NMDC should also be given more latitude in decision-making. It is reported that the setting up of a special agency with wide powers is now envisaged to ensure adequate medium and long-term planning and coordination between various agencies involved in production and export of iron ore. It is to be hoped that a decision will be taken quickly.

Table 54: INDIAN IRON ORE PRODUCTION, 1950-1971

(million tons)

	India (excluding Goa)	Goa	All India
1950	3.0	0.1	
1957	5.2	2.9	
1960	10.7	5.8	
1961	12.3	6.4	
1962	13.3	6.4	
1963	15.0	6.1	21.1
1964	14.9	6.0	20.9
1965	17.2	6.6	23.8
1966	20.1	6.7	26.8
1967	19.1	6.8	25.9
1968	21.1	6.9	28.0
1969	22.0	7.6	29.6
1970	22.3	9.1	31.4
1971	23.2	10.3	33.5

Source: Department of Mines and Metals.

Table 55 : INDIAN IRON ORE PRODUCTION BY STATES 1967-71

(million tons)

	1967	1968	1969	1970	1971
Andra Pradesh	0.15	0.18	0.11	0.11	0.11
Bihar	5.30	5.68	5.30	5.10	4.81
Madhya Pradesh	4.50	5.40	6.40	7.20	7.67
Maharashtra	0.20	0.20	0.30	0.40	0.61
Mysore	3.10	3.40	3.00	3.00	3.52
Orissa	5.70	6.10	6.80	6.40	6.39
Others (Punjab, Rajasthan)	0.15	0.99	0.09	0.06	-
Sub Total	19.10	21.05	21.96	22.27	23.12
Goa	6.80	6.90	7.60	9.10	10.34
Total	25.90	27.95	29.56	31.37	33.46
(of which fines)	(1.30)	(4.60)	(6.30)	(8.00)	(10.50)

Source: Department of Mines and Metals.

Table 56: INDIAN PRODUCTION AND EXPORTS OF IRON ORE, 1950-1971

(million tons; million rupees)

	Production	Exports		Exports as % of Production
	Quantity	Quantity	Value	(in terms of quantity)
1950	3.0	0.06	2.0	2.0
1957	5.2	2.3	117.6	44.2
1960	10.7	3.4	172.8	31.8
1961	12.3	3.4	174.4	27.6
1962	13.3	3.8	198.2	28.6
1963	21.1	9.9	363.8	46.9
1964	20.9	10.6	372.1	50.7
1965	23.8	12.3	421.0	51.7
1966	26.8	13.4	695.7	50.0
1967	25.9	13.7	747.8	52.9
1968	28.0	15.7	884.2	56.4
1969	29.6	16.5	945.6	55.7
1970	31.4	21.2	1,172.4	67.5
1971	33.5	22.0	n.a.	65.7
1973/74 1/	42.0	25.0	n.a.	58.1

1/ Mid Term Plan Appraisal Forecast. Original Plan targets were that production would reach 51.4 million tons and exports 31 million tons.

Source: Abstract of Statistics - Central Statistical Organization.

Table 57: NATIONAL MINERAL DEVELOPMENT CORPORATION LTD.
PRODUCTION AND SHIPMENTS

(million tons)

	1967/68	1968/69	1969/70	1970/71	1971/72 (est.)
I. Bailadila Iron Ore Project					
(Deposit 14 Orissa)					
Manual	0.46	0.45	0.44	1.05	1.75
Mechanized	-	1.70	2.19	2.22	2.25
Total output	0.46	2.15	2.63	3.27	4.00
Shipments	0.37	1.62	2.93	3.29	4.00
II. Kiriburu Iron Ore Project					
(Madhya Pradesh)					
Manual	0.21	0.11	-	-	-
Mechanized	1.71	1.72	1.57	1.64	1.20
Total output	1.92	1.83	1.57	1.64	1.20
Shipments	1.90	1.79	1.48	1.65	1.00 1/
Total (I + II):					
Output 2/	2.38	3.97	4.20	4.91	5.20
Shipments 2/	2.27	3.41	4.11	4.94	5.00

1/ The Kiriburu iron ore project production is being diverted from exports to Japan to supplies for the Bokaro steel plant. As a result, shipments abroad have been declining in 1971/72.

2/ Ore lumps only.

Table 58: PUBLIC CAPITAL EXPENDITURES - IRON ORE
(1969/70 - 1973/74)

(Rupees crores)

	Fourth Plan Allocation	Estimated Expenditures 1/
Bailadila 14 (Bihar/Orissa)	4.94	11.00
Bailadila 5 (Bihar/Orissa)	33.00	30.00
Kiriburu expansion (Madhya Pradesh)	10.00	15.00
Donimalai	15.00	20.00
Kudremukh	15.00	15.00
Pelletization studies	0.50	) 2.50
Other feasibility studies	0.50	)
Iron ore crushing and screening plants	9.40	-
Pelletization plants (Donimalai and Bailadila)	-	4.00
Total 2/	88.34	97.50

1/ Mid Term Appraisal of the Fourth Plan - December 1971

2/ All expenditures to be made by the National Mineral Development Corporation (NMDC).

IX. NON-FERROUS METALS, MINING AND PRODUCTION

Aluminium

120. Aluminium production reached about 169,000 tons in 1971/72 and, in contrast to most industries, existing capacity was being fully exploited. At present, aluminium is produced entirely in the private sector. There are two major companies with a capacity of 65,000 and 80,000 tons each while two smaller concerns have a combined capacity of 24,000 tons.

121. India's aluminium production has increased considerably in the last twenty years, taking advantage of the ample bauxite reserves (200 million tons of good grade deposits). As a result, aluminium imports have fallen from 73% of total aluminium availability in 1950/51 to 1.8% in 1969/70.

122. By 1973/74, however, production should increase to about 210,000 tons but demand may reach 270,000 tons; a tight supply situation will thus develop until sufficient additional capacity is available. Already imports trebled between 1970/71 and 1971/72 and might increase further. In order to limit imports priority will be given to the production of aluminium grades used in electricity distribution and in various high priority industries. Demand for commercial grade aluminium (used mainly in the manufacture of household utensils and corresponding to about half of total aluminium consumption) may have to be restricted. Plans are being made to alleviate possible shortages through recovery of aluminium scrap.

123. Shortage of aluminium would not have developed to such an extent had the two public sector projects envisaged in the Fourth Plan been ready on time. These two projects are located one at Korba (Madhya Pradesh) and at Koyna (Maharashtra). The Korba project will produce 200,000 tons/year of aluminium, and 100,000 tons/year of aluminium metal. The alumina plant is being built by the Bharat Aluminium Company in technical association with an Hungarian firm. It should be commissioned in the first half of 1972. However, the Korba smelter which is being undertaken with the technical and financial assistance of the USSR under a 1966 Ruble Credit Agreement, is not expected to be commissioned before September 1974 and will not reach full capacity until September 1975. In the meantime the aluminium plant will remain unutilized unless some short term export contracts or some local sales to private smelters can be made. As regards the Koyna project, delays have also occurred in the preparation of the feasibility reports and late sanctioning of the project. Shortages of steel have also been experienced. NIDC is implementing the project with Hungarian technical and financial assistance. The 50,000 tons Koyna smelter would be commissioned in September 1974 and the alumina plant 1/ by the end of 1975.

1/ Alumina (aluminium oxyde is the raw material for aluminium smelters).

Initially, the Koyna smelter will be able to use surplus alumina from the Korba alumina plant.1/ However, the fact remains that the latter will be commissioned in 1973 without ready outlet as neither the Korba nor the Koyna smelters will be ready until the end of 1974.

124. The progress in the construction of private sector projects has generally been satisfactory. Total capacity will increase from 169,000 tons in 1971/72 to 245,000 tons in 1973/74. However, due to delays in the clearance for the expansion of the Renukoot plant of Hindalco, the expected additional 20,000 tons production in 1973/74 will not start before early 1974.

125. By about 1975/76, the total aluminium manufacturing capacity on the basis of the schemes already under implementation should be 415,000 tons (see Table 60). This would make the country self-sufficient till about 1977/78 by which time domestic demand is expected to grow to 400,000 tons. Some marginal surplus might be exported. To meet the growth in demand thereafter, further capacity will have to be planned well on time so that shortages do not occur again. In fact, in view of good prospects for exporting aluminium, further expansion of the industry should be studied immediately. Two new projects are under consideration at present - one to be located in the public sector in Gujarat and the other in the private sector at Goa - the Gujarat project would initially produce 200,000 tons of alumina for export. The feasibility report is ready. However, firm long-term contracts for export will have to be concluded before a final decision is made. But the timing of these contracts is important as more smelting capacity must also be erected to supply future domestic needs. Provision for expansion of the Koyna smelter from 50,000 tons to 100,000 tons has already been made.

126. Apart from the lack of strict planning schedules, the aluminium industry at present suffers from some other handicaps. These include the cost of electric power2/, the high price and irregular supplies of calcined petroleum coke and the difficult world supply of aluminium fluoride. Part of the industry is unable to import this item on time in spite of import authorizations. Another problem is the shortage of caustic soda, an important ingredient in alumina production.3/

127. The financial position of private aluminium producers is so far satisfactory. Profitability ranges from 10 to 12 percent on capital employed.

1/ Korba and Koyna are 240 miles apart.

2/ Despite a cheaper rate than for other industries, electricity is paid 2 to 4 paisas/Kwh, i.e. 3 to 5 US cents/Kwh. Since 17,000 Kwh are needed to produce 1 ton of aluminium, power represents from 340 to 680 rupees per ton, i.e. from 8.5 to 17 percent of total aluminium ex-factory price (3990 Rs/ton).

3/ 300 Kg of caustic soda used per ton of alumina. Since 1 ton for caustic soda costs Rs. 1100, caustic soda enters for Rs. 365 or 9 percent in the cost of 1 ton of aluminium metal.

However, price control has been established in 1970 to limit increasing prices of aluminium supplied to electricity distributors and other priority industries where aluminium is in use. A delicate balance will have to be achieved between the need to encourage further large-scale expansion, in the private sector which has to face problems of high power cost and highly capital investment operations while keeping the price of aluminium at reasonable levels.1/

Copper

128. India is heavily dependent on imports for meeting its copper requirements (48,000 tons were imported in 1970/71). The present production from the only copper smelter in the country, the Indian Copper Corporation at Ghatsila in Bihar, in the private sector is only about 13,000 tons. The Corporation operates its own copper mine. The government has taken over the management of the mining operation.

129. The Fourth Plan envisaged an increase in capacity for the production of copper to 47,500 tons in 1973/74, through the expansion of the existing unit of ICC to 16,500 tons and the establishment of a new copper smelter in the public sector at Khetri (Rajasthan).

130. The Khetri project was assumed to produce 31,000 tons of electrolytic grade copper metal in 1973/74. The project is based on two mines (Khetri and Kolihan). The Khetri mine was to produce 3,000 tons of ore per day in 1972 to be gradually increased to reach its optimum level of production of 7,600 tons/day in 1976/77. The Kohilan mine was expected to commence regular production in 1972 with 1,600 tons/day and to reach full production with 2,000 tons of ore per day by mid-1973.2/ However, due to delays in finalizing the details of the project and in placing contracts, the development of the mines is not expected before 1974/75.

131. In view of the fact that even on the completion of the Khetri project India will be nowhere near self-sufficient in copper despite large existing reserves of copper ore3/, it is imperative that concerted efforts be made to exploit the other known copper deposits. Some action in this regard, indeed, has been initiated in the Rakha areas, in Bihar.

1/ Indian aluminium price is reported to be somewhat higher than c.i.f. price.

2/ Thus in a first phase, the new copper mines were to produce 4,600 tons/day of ore equivalent to about 16,000 tons of metal per annum by 1972.

3/ The copper potential in Rajasthan alone is estimated at 100 million tons. This estimate is limited only to a depth of 400 meters. The ore-rich zones continue beyond this depth and the resources are likely to be much more important than what has been estimated at present.

In a first phase it is envisaged to produce 1,000 tons per day of copper ore to yield 3,500 tons of copper metal per annum. Production would start in 1974. The deposits under Phase II have the potentiality of producing 20,000 tons of copper metal per annum. A Canadian grant is being sought to finance the preparation of a feasibility report.

Zinc

132. The zinc capacity is spread over two units - the public sector Hindustan Zinc Ltd. smelter at Dabari (Rajasthan) - 18,000 tons - and the private Cominco Binani smelter at Alewaye (Kerala) - 20,000 tons. Despite the fact that these are new plants, production has been much below capacity and has not increased beyond 25,000 tons since 1968/69. Production of zinc by the Dabari smelter has been below rated capacity mainly due to delays in increasing mine production with additional ore beneficiation capacity, and design deficiencies in certain sections of the plant. To augment the supply of concentrates to the smelter, pending increases in mine production and commissioning of the new ore beneficiation plant, arrangements had to be made for import of 20,000 tons of concentrates. The Alewaye smelter is entirely based on imported zinc concentrates. Due to prolonged technical troubles, the plant has not been able to reach rated capacity. Production is getting stabilized, and in 1972/73 the combined output of the two smelters may reach 29,000 tons to increase to 32,000 tons by 1973/74. This compares, however, with an original Plan Target of 70,000 tons.

133. The Fourth Plan had envisaged that production would reach the planned level not only through fuller capacity utilization of the two existing smelters but also the expansion of the Dabari smelter from 18,000 to 36,000 tons and of the Alewaye plant from 20,000 to 40,000 tons. Thus total rated capacity would have been 76,000 tons in 1973/74. The expansion of the Dabari smelter will be completed only by the end of 1974. As also some difficulties may occur in synchronizing the expansion of the Zawar mine to match the smelter, additional production in 1974/75 would initially be 15,000 tons only.1/ As regards the Alewaye smelter, which will continue to use imported concentrates, it does not appear likely that the expansion program will materialize during the Fourth Plan. Total zinc output in 1974/75 may thus not be more than 47,000 tons.

134. A third smelter to be located at Visakhapatnam (Andhra Pradesh) with a capacity of 30,000 tons of zinc metal was approved early in 1971

1/ Capacity of the Zawar mines (Rajasthan) is being stepped up to the level of 2,000 tons/day. A new ore beneficiation plant is also being installed. The Zawar mines are the only ones producing zinc in India. Until the Zawar expansion is completed, the Dabari smelter will partly use imported concentrates. This will enable the smelter to work up to 80 percent of its capacity. Further increase in smelter capacity would be achieved after removing the design deficiencies which are being attended to along with the expansion of the plant.

with an initial allocation of Rs. 100 million by diversion of funds from other mining and metals projects.1/ It will be based on imported zinc concentrates but will also make use of the sludge arising in the existing zinc smelters, which contains about 16 percent of zinc and is not presently being treated.

135. Hindustan Zinc Limited has obtained a mining lease over the Dariba-Rajpura deposits in Rajasthan, which have a probable reserve of 10 million tons. This deposit, if mined at the rate of 400,000 tons per year, could save more than $10 million annually in foreign exchange. Important deposits are also known to exist in the Ambarnate-Deri zone of Gujarat-Rajasthan. In view of the existence of substantial zinc ore reserves, it is therefore clear that along with undertaking intensive and careful exploration work, efforts should also be made to exploit them quickly and develop improved methods of processing zinc ores to make exploitation economically feasible.

1/ This smelter had not been originally included in the Fourth Plan.

Table 59: ALUMINIUM PRODUCTION AND IMPORTS

(in tons)

	Production	Imports	Total Availability	Share of Imports in Total Availability (%)
1950/51	4,045	10,800	14,845	72.7
1955/56	7,450	16,100	23,550	68.3
1960/61	18,317	25,400	43,717	58.1
1965/66	62,058	20,300	82,358	29.3
1966/67	72,959	32,900	105,859	31.0
1967/68	100,362	38,800	139,162	27.8
1968/69	125,285	9,800	135,084	7.2
1969/70	135,054	2,500	137,554	1.8
1970/71	168,784	6,000	174,784	3.4
1971/72	169,000	20,000	179,000	11.3
1973/74 (forecast)	210,000 /a			
4th Plan Target (1973/74)	220,000			

/a Installed capacity will be 244,850 tons in 1973/74, but the new 20,000 tons smelter (Hindalco) will be commissioned only by December 1973, and the Aluminium Corporation of India's 15,000 tons smelter in Orissa will not reach full capacity before 1974/75.

Sources: (1) Planning Commission, Statistics and Survey Division, Basic Statistics Relating to the Indian Economy, (1950/51 to 1965/66).

(2) Ministry of Foreign Trade - Journal of Industry and Trade, (1966/67 to 1970/71).

(3) Department of Mines and Metals.

Table 60: ALUMINIUM MANUFACTURING CAPACITY - EXISTING AND UNDER IMPLANTION

Name of Company	Existing Capacity	1972/73	1973/74	1974/75	1975/76
PRIVATE SECTOR					
India Aluminium Company (Indalco)					
Hirakund (Orissa)	20,000	20,000	20,000	20,000	20,000
Alwaye (Kerala)	15,850	15,850	15,850	15,850	15,850
Belgaum (Mysore)	30,000	40,000	40,000	50,000	50,000
Sub-Total	65,850	75,850	75,850	95,850	95,850
Hindustan Aluminium Corp. (Hindalco)					
Renukoot (Uttar Pradesh)	80,000	100,000	120,000	120,000	120,000
Madras Aluminium Company					
Methur (Tamil Nadu)	14,000	14,000	25,000	25,000	25,000
Aluminium Corp. of India					
Asansol (West Bengal)	9,000	9,000	9,000	9,000	9,000
Orissa	--	--	15,000	15,000	15,000/a
Sub-Total	103,000	123,000	169,000	169,000	169,000
Total Private Sector	168,850	198,850	244,850	264,850	264,850
PUBLIC SECTOR					
Bharat Aluminium Company					
Korba (Madhya Pradesh)	--	--	--	50,000/b	100,000
Konya (Maharashtra)	--	--	--	50,000/c	50,000
Total Public Sector	--	--	--	100,000	150,000
TOTAL PRIVATE AND PUBLIC SECTOR	168,850	198,850	244,850	364,850	414,850

/a The initial project for a capacity of 30,000 tons has been split into two stages and onl import of capital goods for the first 15,000 tons plant is presently under consideration

/b The alumina plant (200,000 tons) is expected to be commissioned in 1972 but the 100,000 tons smelter would be commissioned in September 1974 and reach full capacity by March 19

/c The 50,000 tons plant is expected to be commissioned in September 1974 and the project would be completed by 1975/76.

Table 61: PUBLIC CAPITAL EXPENDITURES IN NON-FERROUS METAL INDUSTRIES
1969/70 - 1973/74
(Rs. Crores)

	4th Plan Provision	Estimated Expenditures	Total Project Cost	
I. Aluminium				
Korba & Koyna Aluminium Plants	125.00	90.00 /a	66.00 185.00 251.00	Koyna Korba
Gujarat Alumina Project (central share)	1.00	1.00		
Sub-Total	126.00	91.00		
II. Copper				
Hindustan Copper Corp. (incl. Khetri and Rakha)	71.28	88.69 /b	115.00	Khetri Complex
Hindustan Copper (Rakha, Agnigundala)	25.00	-		
Sub-Total	96.28	88.69		
III. Zinc				
Hindustan Zinc Limited	7.42	6.78		
Doubling the capacity of Dabari Zinc Smelter	5.00	10.26		
Hindustan Zinc Limited (expansion and development of mining)	11.52	10.98		
Feasibility studies for Hindustan Zinc	0.30	-		
Vizag Zinc Smelter	-	9.60		
Sub-Total	24.24	37.62		
IV. Total Non-Ferrous Metals (I + II + III)	246.52	217.31		

/a Includes only expenditures under the Fourth Plan period.
/b Includes Rakha and Agnigundala projects of HCC.

Table 62: PRODUCTION AND IMPORT OF COPPER

(in tons)

	Production	Import	Total Availability	Share of Imports in Total (%)
1950/51	7,067	38,200	45,267	84.3
1955/56	7,754	20,200	27,774	72.7
1960/61	8,459	62,700	71,159	88.1
1965/66	9,420	53,400	67,820	86.1
1966/67	9,097	34,600	43,697	79.1
1967/68	9,257	38,900	48,157	80.7
1968/69	9,253	43,100	52,353	82.3
1969/70	9,806	46,500	56,306	82.5
1970/71	9,330	48,000	57,230	83.8
1971/72	12,600			
1973/74 (forecast)	14,000 /a			

/a Fourth Plan Target = 47,500 tons.

Source: See Table 59.

Table 63: PRODUCTION AND IMPORT OF ZINC

(in tons)

	Production	Import	Total Availability	Share of Imports in Total (%)
1950/51	-	38,500	38,500	100.0
1955/56	-	29,500	29,500	100.0
1960/61	-	72,200	72,200	100.0
1965/66	-	80,200	80,200	100.0
1966/67	-	48,000	48,000	100.0
1967/68	9,064	65,900	74,964	87.9
1968/69	24,981	89,900	114,889	78.2
1969/70	23,346	36,600	59,945	61.0
1970/71	22,895	36,000	58,895	61.1
1971/72	25,000			
1972/73 (forecast)	29,000			
1973/74 (forecast) /a	32,000			
1974/75 (forecast)	47,000			

/a Fourth Plan Target = 70,000 tons.

Source: See Table 59.