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Kiev, USSR, 21 September - 1 October 1971
New Delhi, India, 7 - 13 October 1971

Agenda item IX/1

CHOICE AND DEVELOPMENT OF RAW MATERIALS AND FEEDSTOCKS FOR THE FERTILIZER INDUSTRY[1/]

by

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Most countries are not bestowed with all the raw materials that go into the production of fertilizers. The choice of the raw material that goes into the fertilizer manufacture depends on various factors like the requirements of the fertilizers, their product pattern, extent of requirement of the raw materials for the fertilizer production, their local availability and other considerations. While natural gas followed by naphtha is the most preferred feedstock over others that go into the manufacture of nitrogenous fertilizers, the choice of the feedstock will have to depend on the availability of different feedstocks and the national economics. The relative national and commercial economics of manufacture of fertilizers based on different feedstock will not be uniform for all the countries since the costs of the feedstocks vary from country to country and from one source to the other.

In the field of phosphatic fertilizer, while India was entirely dependent on imported raw materials, namely, sulphur and rock phosphate until recently, with the start up of manufacture of nitro-phosphates and availability of smelter gases, followed

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by the discovery and exploitation of the rock phosphate deposits in Rajasthan, a beginning has been made to eliminate/substitute part of the requirements of the imported raw materials with those available locally.

With no known resources for the manufacture of potassic fertilizers in the country, there is no production of this fertilizer in India, but for a small recovery of potassium chloride and mixed salt as a by-product from the salt bitterns obtained in the manufacture of salt from sea water.

In choosing the feedstock and raw material for fertilizer production, the aim will have to be to make maximum use of locally available materials guided by national economics.

CONTENTS

1. Introduction

1.1 In preparing plans for fertilizer production, some of the important aspects taken into account are:

(a) The need to increase fertilizer production to match with the growth in demand;

(b) The relative role of fertilizers in developing agricultural production;

(c) The existing level of offtake and scope for increased fertilizer usage;

(d) The extent of fertilizer requirement to achieve the ultimate object of increased agricultural production;

(e) The planning for increased fertilizer production in relation to the facilities already available;

(f) Availability of finances, feedstock, other inputs and infrastructure facilities for the development of the fertilizer capacity; and

(g) Conditions to be created for the success of the programme.

2. The need to increase fertilizer production

2.1 The urgent need for increased agricultural production to feed the large and growing population in the country needs no specific mention. The magnitude can be realised from the value of the past imports which for foodgrains alone were of the order of $5960 million during the period 1946-1969, while the import during 1967, when the country was facing severe drought conditions, rose to a level of $710 million.

2.2 In order to avoid dependence on imports of agricultural commodities, fertilizers, as an input for agricultural development, assume high priority. In the

context of the limitations for increasing the cultivable land, fertilizer has to play a key role in increasing agricultural production. It is recognised that for every tonne of fertilizer nutrient applied to the soil, 7 to 10 tonnes of foodgrains are produced and the ratio is stated to be even higher in cases where high yielding varieties of seeds have been used. In terms of value, for every rupee spent on fertilizer, an additional production of Rs.2 to 3 is expected in the form of foodgrains which otherwise would have to be imported to meet the requirements.

2.3 While the fertilizer requirements could be met again either by imports or by local production, there is a distinct advantage in undertaking its production within the country. The value of producion in a fertilizer plant with an installed capacity of 150,000 tonnes of nitrogen per year works out to about $27 million c.i.f. whereas it should be possible to take up the manufacture of the fertilizer within the country itself with an initial investment of about $65 million, of which the foreign exchange component may be of the order of $25 million incurred only once. In addition, depending on whether or not the feedstock for the production of the nitrogen is to be imported, there may be additional annual recurring expenditure anywhere from $1 million to $3.5 million.

2.4 This explains the paramount importance attached to the development of the fertilizer industry in the country.

3. The relative role of fertilizer for increased agricultural production

3.1 Increase in the agricultural production can be achieved by the adoption of any one or a combination of the following measures:

(a) Increasing the cultivable land for increased production,

(b) Improvements in the irrigation facilities,

(c) Conservation of soil,

(d) Reclamation of land,

(e) Increased use of high yielding varieties of seeds,

(f) Adoption of multiple cropping pattern, and

(g) Application of chemical fertilizers.

3.2 It is reported that the potential arable area in India is 175 million hectares of which nearly 85% is already under cultivation and thus, there is a virtual exhaustion of the un-committed land resources for increased food production. Similarly, there are limitations for increasing the irrigation and other facilities. With regard to the propagation of high yielding varieties of seeds, while there has been a break-through in this direction for wheat, the progress in case of the other varieties of foodgrains such as rice is somewhat limited, though promising developments are noticed in this direction also recently. Similarly, multiple cropping programme has also gained momentum.

3.3 However, there are limitations in the adoption of some of the measures discussed earlier for increasing

agricultural production and fertilizer must necessarily play the prime role in the agricultural economy. In fact, even the success of the high yielding varieties programme and multiple cropping pattern is dependent on the timely and adequate availability of fertilizers.

3.4 Starting with 1968-69 as the base year, the production of foodgrains in expected to be increased from 98 million tonnes to 129 million tonnes by 1973-74. The important role that will have to be played by the fertilizers in achieving this increased production can be noted from the fact that out of the 31 million tonnes of extra foodgrains to be produced, 22 million tonnes are expected to be obtained through high yielding varieties programme, the achievement of which depends on the application of high dosages of fertilizers. Similarly, fertilizer will have to play a crucial role in achieving the target production of 159.0 million tonnes envisaged for 1978-79.

4. Existing levels of consumption of fertilizers and scope for the future

4.1 The table below would go to show that the per hectare yield of foodgrains in India is very low compared to many other countries and there is considerable scope for improving the yield; this can be achieved by the adoption of various measures including the application of fertilizers.

(Table I)

Country	Yield per hectare (100 kgs) (Basis 1968)		
	Wheat	Rice	Maize
Bulgaria	24.1	-	31.7
France	36.6	-	52.6
Hungary	-	-	29.9

Germany West	42.3	-	-
Italy	44.2	41.1	41.3
Portugal	-	45.1	12.9
Spain	13.4	60.4	-
U.K.	35.5	-	-
U.S.S.R.	13.9	34.1	20.4
U.S.A.	19.2	49.6	40.3
Japan	31.4	57.2	-
U.A.R.	25.6	51.1	39.2
India	11.0	16.1	10.0

Source: The Fertilizer Statistics published by The Fertilizer Association of India

4.2 In the field of fertilizer application also, the consumption per hectare of arable land during 1968-69 in some of the countries as compared to India is indicated below:

(Table II)

(Kilogrammes)

Continent/ country	N	P_2O_5	K_2O	Total
Belgium	192.09	146.72	197.52	536.33
France	62.73	80.11	61.23	204.07
West Germany	114.04	95.49	127.87	337.40
Netherlands	371.53	113.80	137.02	622.35
U.K.	129.02	60.55	65.63	259.20
Europe (Average)	58.75	45.76	43.92	148.43
U.S.S.R.	15.40	7.79	9.85	33.04
U.S.A.	35.13	23.63	19.88	78.64
North/Central America	28.82	19.18	15.88	63.88
China (Taiwan)	190.00	44.22	68.78	303.00
Japan	159.57	122.62	122.45	404.64
Pakistan	11.31	1.87	0.71	13.89
India	7.46	1.81	1.00	10.27

Source: The Fertilizer Statistics published by the Fertilizer Association of India

4.3 From the tables I & II above, it is clear that the consumption of fertilizer nutrients in India is about the lowest and there is immense scope for increased fertilizer use for achieving higher yields of foodgrain production. In fact, the consumption of fertilizers in India would be nowhere near that of the advanced countries even after an increase in the levels of consumption envisaged for the years 1973-74 and 1978-79 as would be seen from the information furnished below:

(Table III)

Description	Unit	N	P_2O_5	K_2O	Total
a. Target consumption for the year 1973-74	Million tonnes	3.2	1.4	0.9	5.5
b. Target consumption for the year 1978-79	"	5.2	2.1	1.5	8.8
c. Consumption per hectare of arable land in 1973-74	Kgs	19.4	8.5	5.4	33.3
d. Consumption per hectare of arable land in 1978-79	"	30.5	12.3	8.8	51.8

5. Present position and future requirement of fertilizer for increased agricultural production

5.1 Of the twenty and odd nutrients that are required by the plant, nitrogen, phosphorous and potassium fall under the primary category. There being no known resources for potassium and the scope for its recovery from the salt bitterns being limited, the production of fertilizers in India is confined to nitrogen and phosphorous for the present. The growth in the production and consumption of nitrogenous and phosphatic fertilizers can be judged from the

information furnished in the table below:

(Table IV)

(All figures in '000 tonnes)

Year	Production N	Production P_2O_5	Consumption N	Consumption P_2O_5
1950-51 (Before planning started)	0.3	8.7	55.0	8.0
1955-56 (end of 1st Plan)	80.3	11.[illegible]	132.0	14.0
1960-61 (end of 2nd Plan)	98.0	42.0	210.0	54.0
1965-66 (end of 3rd Plan)	213.0	118.0	575.0	132.0
1968-69	545.0	218.0	1208.0	382.0
1970-71	830.0	289.0	1425.0	511.0

5.2 Though the growth and production of the fertilizer industry in India is impressive, especially in the recent years, the output has lagged behind consumption. This calls for renewed effort not only to bridge the gap between the demand and actual production but also to take care of the increasing requirements in the coming years.

5.3 The targets of capacity, production and requirements laid down for the fertilizer industry for the years 1973-74 and 1978-79, i.e. the end of the 4th and 5th Plan periods respectively are as under:-

(Table V)

(All figures in '000 tonnes)

	Capacity	Production	Consumption
(a) 1973-74			
1) Nitrogenous fertilizer (In terms of N)	3,000	2,500	3,200
2) Phosphatic fertilizer as P_2O_5	1,200	900	1,400
3) Potash as K_2O	-	-	900
	(There is no production of K_2O)		

(b) 1978-79

1) Nitrogenous fertilizer(in terms of N)	6,000	5,200	5,200
2) Phosphatic fertilizer	2,500	2,100	2,100
3) Potash as K_2O	-	-	1,500

5.4 As against the above targets, the present status of the industry is as follows:-

(Table VI)

Installed and planned capacity ('000 tonnes)

Description	Nitrogen	P_2O_5
(1) Installed capacity	1,344	421
(2) Schemes under implementation/firmed up	1,668	531
(3) Schems approved in principle	1,468	608
(4) Schems under active consideration	559	70
TOTAL	5,039	1,630

5.5 The details of the capacities indicated above are given in the Annex. It is anticipated that by 1973-74, the installed capacity and production for nitrogen would be of the order of 2.3 million and 2 million tonnes respectively. The corresponding figures for phosphatic fertilizers will be 0.83 million and 0.67 million tonnes of P_2O_5. While the anticipated production is lower than the targets for various reasons like delays in finalising foreign exchange, financial arrangements, etc., it is expected that the position would considerably improve when most of the schemes presently contemplated are implemented in the first one or two years after 1973-74 leading the country to

self-sufficiency by about 1975-76 and the position will be maintained thereafter.

5.6 In planning the development of further capacity, the accent has been more in favour of creating high nutrient complex fertilizers as against low nutrient straight nitrogenous and phosphatic fertilizers developed in the initial stages of the fertilizer industry in India. This aspect can be better appreciated from an examination of the information furnished below:

(Table VII)

Product	Existing nitrogen capacity		Nitrogen capacity at the end of 1973-74		Nitrogen capacity planned so far	
	Quantity '000 tonnes	per-centage	Quantity '000 tonnes	per-centage	Quantity '000 tonnes	per-centage
Urea	714	53.1	1610	68.2	3759	74.6
Ammonium sulphate	188	14.0	202	8.6	202	4.0
Calcium ammonium nitrate	200	14.9	200	8.5	200	4.0
Ammonium chloride	16	1.2	16	0.7	88	1.8
Ammonium sulphate nitrate	32	2.4	32	1.4	32	0.6
Nitro phosphate	45	3.3	45	1.9	253	5.0
Ammonium sulphate phosphate	37	2.8	45	1.9	45	0.9
Diammonium phosphate	19	1.4	46	1.9	125	2.5
Urea phosphate	73	5.4	73	3.1	128	2.5
Complex fertilizers	-	-	67	2.8	182	3.6
Ammonia	20	1.5	25	1.0	25	0.5
TOTAL	1344	100.0	2361	100.0	5039	100.0

5.7 Similarly, the development of product pattern for the phosphatic fertilisers in the coming years is expected to be as under:

(See table on next page)

(Table VIII)

Product	Existing Capacity		Capacity as at the end of 1973-74		Capacity planned so far	
	'000 tonnes	per-centage	'000 tonnes	per-centage	'000 tonnes	per-centage
Single superphosphate	208	49.4	216	26.2	216	13.2
Triple superphosphate	11	2.6	267	32.4	336	20.6
Complex fertilizer	-	-	85	10.3	367	22.5
Diammonium phosphate	50	11.9	95	11.5	292	17.9
Nitro-phosphate	42	10.0	42	5.1	244	15.0
Ammonium sulphate phosphate	37	8.8	47	5.7	47	2.9
Urea- mmonium phosphate	73	17.3	73	8.8	128	7.9
TOTAL	421	100.0	825	100.0	1630	100.0

5.8 In order to promote the rapid growth of the fertilizer industry, and to attract the flow of capital into it, the Government of India have taken various steps. Among others, these include freedom of marketing, preference in the allocation of funds from term lending institutions and arrangements for speeding decision on all matters concerning the fertilizer industry.

5.9 With the implementation of the various schemes, it is expected that the fertilizer imports involving foreign exchange expenditure, which was as high as $258 million during 1967-68 and $217 million during 1968-69, will completely be eliminated by 1975-76 and the country would achieve self-sufficiency in fertilizer production (except in potassic fertilizers).

6. Availability of finances, feedstock, other inputs and infrastructure facilities

6.1 In the location of fertilizer projects corresponding to the capacities indicated earlier,

consideration has been given to the requirements of fertilizers in particular areas/regions based on the various programmes of development taken up in those areas, the availability of fertilizer raw materials and other inputs, etc. Further, since the country is now mostly dependent on imported rock phosphate for the production of phosphatic fertilizer, their production has been planned in the form of complex fertilizers mostly in the coastal areas though this situation is expected to change to some extent in the context of the recent discovery of rock phosphate deposits in the Northern region.

6.2 Financial resources. In order to develop the additional capacity for nitrogen and P_2O_5 between now and 1978-79 , the capital funds that will have to be invested in the fertilizer industry will be of the order of $2000 million out of which about $600 to 700 million may be in foreign currency.

6.2.1 The foreign exchange requirements of the fertilizer projects that are being set up in the country have been met and are being met largely either under Government-to-Government credit or commercial credits. Credits available from US, AID, U.K., World Bank, Italy, Japan and to some extent from Czechoslovakia, France, Belgium etc. have been utilised in financing the foreign exchange component of the fertilizer plants. Besides, loans have also been arranged by private entrepreneurs

from banks and other financial institutions, both in India and abroad.

6.3 Fertilizer feedstock. In India, the nitrogenous fertilizer industry is using a variety of feedstocks, namely, natural gas, coke oven gas, refinery gas, naphtha, coke/lignite and electrolytic hydrogen. Plans have also been drawn for direct gasification of coal and adoption of partial oxidation for using feedstocks like fuel oil and other heavy stocks obtained from the petroleum refineries.

6.3.1 Of the planned capacity for nitrogenous fertilizer production, while naphtha occupies the primary place as feedstock, it is followed by coal/coke lignite, fuel oil/heavy stock, natural gas, coke oven gas, electrolytic hydrogen and refinery gas. The production of local crude oil being limited, the country is dependant on imported crude to meet part of its requirements and consequently there is a limitation to the extent to which the country can base its fertilizer production on hydrocarbon feedstocks like naphtha, fuel oil/heavy stock and natural gas. India is bestowed with large reserves of low grade non-coking coals which can be conveniently used for fertilizer production. Towards this direction, schemes have already been drawn for setting up three fertilizer plants in the public sector and one in the private sector, each with an installed capacity of 1500 tonnes of urea per day which are expected to go into production during the next four or five years' time. In addition,

there is also a working unit with an installed capacity of 70,000 tonnes of nitrogen based on lignite and another unit of equal capacity based on coke. The latter is likely to switch over to petroleum feedstock in the next few years.

6.3.2 The break-up of the capacity planned on the basis of different feedstocks for the units in operation as also for the units that are expected to be in operation by 1973-74 and for the total capacity planned so far is indicated below:

(Table IX)

Feedstock	Capacity of N based on different feedstocks*					
	As on 1.8.1971		As on 1.4.1974		As on 1.4.1979	
	Quantity '000 tonnes	percentage	Quantity '000 tonnes	percentage	Quantity '000 tonnes	percentage
1. Naphtha	803	59.7	1668	70.6	2261	44.9
2. Coal/coke/lignite/ coke oven gas	257	19.1	257	10.9	1056	21.0
3. Fuel Oil/LSHS/HSHS	-	-	-	-	776	15.4
4. Natural & Associated gas	131	9.8	283	12.0	568	11.3
5. Refinery gas	45	3.3	45	1.9	45	0.9
6. Electrolytic hydrogen	88	6.6	88	3.7	88	1.7
7. Imported ammonia	-	-	-	-	225	4.4
8. Bye-product from coke oven gas	20	1.5	20	0.9	20	0.4
TOTAL	1344	100.0	2361	100.0	5039	100.0

*This represents the position on the basis of the capacity so far planned. The actual capacity on 1.4.1979 is expected to be around 6.0 million tonnes. The specific schemes and their feedstock are yet to be determined.

6.3.3 The other raw materials and inputs for the nitrogenous fertilizer industry are sulphuric acid, gupsum and calcium carbonate. Sulphuric acid is

produced making use of imported sulphur. The rest are locally available, though certain problems are experienced in getting gypsum of suitable quality required for the manufacture of ammonium sulphate. Some of the units are also making use of bye-product gypsum obtained in the manufacture of phosphoric acid in their own works.

6.4 Raw materials for phosphatic fertilizers. In the field of phosphates these are presently produced in the form of superphosphate, ammonium sulphate phosphate, diammonium phosphate, urea ammonium phosphate, nitrophosphate, etc. India was, until recently, entirely dependent on imported raw materials, namely, sulphur and rock phosphate for their manufacture. However, a beginning was made in reducing the dependance on imported raw materials with the commissioning of the Tromba fertilizer plant for the manufacture of nitrophosphate in the latter part of the year 1965. To some extent, attempts have also been made to utilise sulphurous gases from the non-ferrous metal smelters as also waste sulphuric acid available from industrial units for the production of phosphatic fertilizers. A beginning has been made in the exploitation of rock phosphate available in Rajasthan and action is under way for increasing its production at least to meet a significant portion of the total requirements of the country. Schemes have also been drawn up for making use of pyrites available in Bihar and Rajasthan for the manufacture of phosphatic fertilizers.

6.5 Infrastructure facilities for the fertilizer industry.

By and large, there is no problem for any of the fertilizer plants in getting their requirements of water and power. The problems of power dips experienced in some of the fertilizer plants are being rectified by incorporating certain modifications in the distribution system and taking other preventive measures. So far, there had been no problem either for transport of the raw material or the finished fertilizer produced in the country. Fertilizers and fertilizer raw materials are given higher priority over many of the other commodities for transport by railways. It would, however, be necessary to expand infrastructure facilities in future commensurate with the needs of additional fertilizer capacity and this is fully taken into account in the formulation of five year plans.

6.6 Indigenous fabrication industry and its role in fabrication of fertilizer equipment.

India has already made substantial progress in developing the fabricating capacity for a major part of the equipment required for the fertilizer industry This is evident from the fact that whereas the development of the fertilizer industry in the early 1950s was essentially on a turn-key approach based on imported plants, the foreign exchange component of the total capital cost of the various projects presently under implementation is on an average no more than 40 per cent.

Further, the gaps in domestic fabricating capacity have been identified and various schemes have been taken up by securing a larger measure of indigenisation. With the completion of these schemes, many items of equipment which are currently imported like compressors (centrifugal and reciprocating), high pressure and high capacity pumps, air separation and nitrogen wash plants, multi-layer high pressure vessels etc. are expected to be available from within the country. As a result, the foreign exchange component is expected to be brought down to a level of not more than 25 per cent of the total cost of the fertilizer project during the next two to three years' time and further to about 10 per cent before the turn of the decade.

6.7 Design & Engineering services in India. With the development of fabrication facilities in the country, consultancy services for putting up certain sections of the fertilizer plants also got developed gradually from mid 1950s. The detailed design and engineering of the fertilizer plants are now taken up by Planning & Development Division, Fertilizer Corporation of India, and Fertilizers & Chemicals, Travancore Ltd. Engineering and development organisation with basic know-how obtained from reputed collaborators abroad. Two plants completely engineered and erected with minimum supervisory assistance from abroad are presently under commission, while two others are in an advanced stage of erection. Besides, a few other projects are also being taken up for erection under the responsibility of the Fertilizer Corporation of India and Fertilizers & Chemicals,

Trav ncore Ltd. In addition to these two agencies, there are also other consultancy firms engaged in engineering, construction and erection of fertilizer projects. The country is largely self-reliant in this field.

7. Conditions for the success of the programme

7.1 As mentioned earlier, the primary objective of planning increased fertilizer production is to secure the targets of agricultural production. This calls for a co-ordinated effort not only in the direction of fertilizer production but also in creating conditions for its offtake covering the institutional and other arrangements for distribution and consumption.

7.2 Towards this end, the Government have identified areas in which concentrated efforts are required to increase the growth rate in the consumption of fertilizers and a large number of measures are being implemented to achieve the objective. Among the important steps taken by the Government may be mentioned - the setting up of a Credit Guarantee Corporation for fertilizer and other agricultural inputs, increasing the transport facilities and allocation of higher priority for the movement of fertilizers and foodgrains, adoption of a policy of support price for foodgrains, purchase of surplus foodgrains through public sector food corporations, promotional programmes for increased production, processing and storage of agricultural produce, distribution of improved varieties of seeds through National Seeds Corporation, supply and servicing

of agricultural machinery through Agro-Industries Corporation, etc.

8. Developmental work in the field of fertilizers

8.1 Though there has not been much progress in the direct application of ammonia to the soil, experiments are being carried out in its application under different climatic, soil and cropping conditions. If these are found to be successful and application of ammonia is economically feasible, it is expected that the accent on future development of nitrogenous capacity would be geared to make available increasing quantities of ammonia for direct application.

8.2 Addition of micro nutrients to the fertilizers. Though this is not extensively done, certain mixture manufacturers have taken up the addition of boron, manganese, copper and zinc as micro-nutrients in the fertilizer mixtures produced by them with encouraging results. Simultaneously, soil analysis is also being carried out in the country to determine areas which are deficient in micro-nutrients and it is expected that in future, this would gain importance with the depletion of the soil arising out of the increased use of chemical fertilizers.

8.3 Granulated fertilizers. With the increased use of mechanical appliances, there is a growing preference in favour of granulated fertilizers. Since there is a limitation for the large scale primary producers of fertilizers to manufacture tailor made N, P and K

fertilizers for specific needs, in the granulated form, a large number of processing units are being established for the manufacture of granulated fertilizers of different composition specified by the respective State Agricultural Departments.

8.4 Plant protection chemicals. Since some of the high yielding varieties recently released are relatively easily susceptible to pest and in order to derive maximum advantage out of the various measures taken to increase agricultural production, the importance of using plant protection chemicals has been recognised and their production is being developed within the country to lend support to fertilizer consumption.

9. Thus over the last two decades substantial progress has been made in the production and consumption of fertilizers. Fertilizer industry is conceived as an integral part of the total programme for increasing agricultural production. along with the diversification of the industry in terms of range of production, and larger unit sizes, considerable advancement has been made on the technological front. Modern technologies for the production of ammonia, phosphoric acid and different fertilizers have been outlined or developed, a strong base for design engineering and construction of fertilizer plants established and a great degree of self-sufficiency attained in the capital equipment

and machinery in the setting up of fertilizer projects. A great deal of experience has been gained in the use of a variety of feedstocks for fertilizer production. The programmes under way would enable the achievement of self-sufficiency in fertilizers (with the exception of potassic fertilizers) by the middle of seventies and to be maintained thereafter.

Annex

INSTALLED AND PLANNED CAPACITY

(All figures in '000 tonnes)

	Capacity in terms of N	Capacity in terms of P_2O_5
A. Projects in production		
Public sector		
1. Sindri	117.0	
2. Nangal	80.0	
3. Rourkela	120.0	
4. FACT (Alwaye)	70.0	33.8
5. Trombay	90.0	42.5
6. Neyveli	70.0	
7. Gorakhpur	80.0	
8. Namrup	45.0	
9. Bye-product from public sector coke oven plants	12.0	
10. Superphosphate capacity at different locations		29.1
	684.0	105.4
Private sector		
11. Gujarat	216.0	50.0
12. Ennore	16.0	10.3
13. Vizag	80.0	73.0
14. Kota	130.0	
15. Varanasi	10.0	
16. Kanpur	200.0	
17. Bye-product from private sector coke oven plants	8.0	
18. Superphosphate capacity at different locations		171.5
19. DMCC, Bombay		10.8
	660.0	315.6
TOTAL OF (A)	1344.0	421.0

B. **Projects under implementation/slipped up**		
Public Sector		
1. Durgapur	152.0	-
2. Cochin Phase I	152.0	-
3. Madras	190.0	85.0
4. FACT, Alwaye(Expansion)	22.0	10.0
5. Namrup	152.0	-
6. Barauni	152.0	-
7. IFFCO, Kalol/Kandla	215.0	127.0
8. Talcher	229.0	-
9. Ramagundam	229.0	-
10. Sindri rationalization programme	-	156.0
11. Khetri	-	100.0
	1493.0	478.0
Private Sector		
12. Goa	175.0	45.0
13. Superphosphate unit at Bombay	-	8.0
	175.0	53.0
TOTAL OF (B)	1668.0	531.0
C. **Projects approved in principle**		
Public sector		
1. Korba	229.0	-
2. Trombay Expansion	132.0	132.0
3. Cochin Phase II	48.0	115.0
	409.0	247.0
Private sector		
1. Mangalore	160.0	-
2. Vizag Expansion	155.0	55.0
3. Kamptee	229.0	-
4. Tuticorin	255.0	53.0
5. DMCC	45.0	115.0
6. Mithapur	160.0	138.0
7. Kota Expansion	22.0	-

8. Veraraasi Expansion	27.0	-
Total private sector	1059.0	361.0
TOTAL OF (C)	1468.0	608.0

D. Projects under active consideration

Public sector

1. Haldia	152.0	70.0
2. FCI, Mangal	229.0	-
3. FCI, Gorakhpur	40.0	-
4. FCI, Sindri (Expansion)	138.0	-
	559.0	70.0
GRAND TOTAL (A + B + C + D)	5039.0	1630.0


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