REPORT OF THE

COMPTROLLER AND AUDITOR GENERAL OF INDIA

UNION GOVERNMENT (COMMERCIAL)

1980

PART III

THE FERTILIZER CORPORATION OF INDIA LIMITED

(A macro view of overall performance including marketing, manpower and internal audit)

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iv	Ist line of para No. 4	Audit	Auditor
2	Ist line of sub-para (b)	measure	measures
23	5th line from top	potassic	potassium
43	2nd line from bottom	Maratha	Marathe
50	Sl. No. 10 of the table	Gorakhpur	Gorakhpur Expansion
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62	2nd table	(Quantity in lakh of tonnes)	(Quantity in lakhs of tonnes)
75	4th line from top	fertilizer	Fertilizer
81	Last line of para No. 11.4	5.5, 5.4	5.5.5.4
85	5th line of 1st paragraph	Manaager	Manager
90	2nd line of Sl. No. 8	Organisatnios	Organisations
93	Column 6 of Sl. No. 11 (operating units) & 5 (Projects under construction)	P205	P_2O_5

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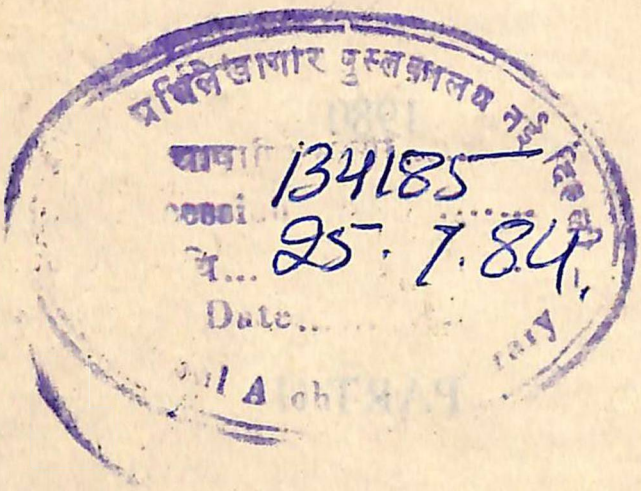

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PREFATORY REMARKS

A reference is invited to paragraph 5 of the Prefatory Remarks contained in the Report of the Comptroller and Auditor General of India—Union Government (Commercial), 1978—Part III—the Fertilizer Corporation of India Limited—Trombay Unit wherein it was *inter alia* mentioned that the Reports on the working of other units of the Corporation and an overall summation of its performance were under various stages of finalisation.

2. This part contains the macro view of the Fertilizer Corporation of India and its place in Fertilizer Industry in India as well as review of marketing activities, manpower and internal audit of the Corporation, as a whole. The Report is based on the results of appraisal undertaken by the Audit Board and has been brought up-to-date by incorporating data upto 1977-78. Audit Board in this case consisted of the following members :—

(1) Shri Y. Krishan, Deputy Comptroller and Auditor General and Chairman, Audit Board upto 10th August 1977.

(2) Shri T. Rengachari, Chairman, Audit Board and *Ex-officio* Additional Deputy Comptroller and Auditor General (Commercial) with effect from 11th August 1977.

(3) Shri A. S. Krishnamoorthy, Member, Audit Board and *Ex-officio* Director of Commercial Audit (Coal), Calcutta (Subsequently, Director of Audit, Eastern Railways, Calcutta).

(4) Shri M. P. Singh Jain, Member, Audit Board and *Ex-officio* Director of Commercial Audit, Calcutta upto 31st October 1978.

(5) Shri A. C. Bose, Member, Audit Board and *Ex-officio* Director of Commercial Audit (Fertilizers and Chemicals), New Delhi upto 8th March 1979.

(6) Shri P. C. Asthana, Member, Audit Board and *Ex-officio* Director of Commercial Audit (Fertilizers and Chemicals), New Delhi with effect from 9th March 1979.

(7) Shri Paul Pothen, Managing Director, Indian Farmers Fertilizers Co-operative Limited, New Delhi—Part Time Member,

(8) Shri T. R. Visvanathan, General Manager (Tech.), Arudra and Company, Madras.

(9) Dr. P. K. Narayanaswamy, Chairman and Managing Director, the Fertilizers and Chemicals, Travancore Limited, Alwaye—Part Time Member appointed in December 1977 in place of Shri Paul Pothen who ceased to be a member in November 1976 consequent upon his appointment as part time non official Director of the Fertilizer Corporation of India Limited.

3. The Report was finalised by the Audit Board after taking into account reply of the Ministry received in November 1978, December 1978 and December 1979 followed by the additional information furnished in May 1980.

4. The Comptroller and Audit General of India wishes to place on record the appreciation of the work done by the Audit Board and acknowledges with thanks the contribution, in particular, of the members who are not officers of the Indian Audit and Accounts Department.

THE FERTILIZER CORPORATION OF INDIA LTD.

1. *Introduction*

1.1 The first fertilizer factory was established in the public sector at Sindri managed by the Sindri Fertilizers and Chemicals Limited—a Government owned company registered on 18th December 1951. Subsequently, Nangal Fertilizers and Chemicals Limited—another Government company—was registered on 27th February 1956 to set up a fertilizer-*cum*-heavy water plant at Nangal. The establishment of Trombay Fertilizer Project was also entrusted to this company and its name was changed to Hindustan Chemicals and Fertilizers Limited with effect from 14th July 1959.

The Fertilizer and Chemicals Companies Amalgamation Order, 1960 was issued by Government to place the responsibility for administration of all fertilizer factories in the public sector, including those being constructed, in the hands of a single company. Sindri Fertilizers and Chemicals Limited was dissolved and the entire undertaking was transferred to and vested in Hindustan Chemicals and Fertilizers Limited in January 1961. Immediately, thereafter, the name of Hindustan Chemicals and Fertilizers Limited was changed to the Fertilizer Corporation of India Limited (hereinafter referred to as the Corporation).

Management and control of certain fertilizer projects conceived and established as one of the constituent units of public sector undertakings (*e.g.*, Rourkela and Neyveli fertilizer plants of Hindustan Steel Limited and Neyveli Lignite Corporation Limited respectively and Khetri Fertilizer project of Hindustan Copper Limited) organised for purposes other than manufacture and distribution of fertilizers, continued to vest with the respective public sector undertakings owning them. In addition,

fertilizer plants operated by the Fertilizers and Chemicals, Travancore Limited (which became a Central Government Company in July 1963) and the Madras Fertilizers Limited (another Central Government Company registered on 8th December 1966 in participation with M/s. AMOCO Inc. USA) were kept beyond the purview of the Fertilizer Corporation of India Limited.

In October 1967, the Ministry of Petroleum and Chemicals appointed a Study Team comprising foreign experts and members nominated by the Ministry to :—

(a) study the organisation, structure, etc. of the Fertilizer Corporation of India Ltd., and the Fertilizers and Chemicals, Travancore Ltd., and

(b) determine the measure necessary for these corporations to cope with the rapidly rising fertilizer needs of the country.

The Study Team's recommendations are given in Appendix I.

After considering the various alternative types of organisation, the Study Team came to the conclusion that there should be one public sector fertilizer corporation charged with the responsibility for planning, development and construction of projects, production of fertilizers and related chemicals and marketing of fertilizers and related chemicals, except for the production of fertilizers by the Units of composite undertakings. For the latter, the Study Team recommended that the single public sector fertilizer corporation should co-ordinate the activities of these units.

When the creation of additional capacity in the Fifth Five Year Plan was considered, Government decided in June 1973

to set up a new public sector undertaking—National Fertilizers Limited, a wholly owned Government Company—to administer three fertilizer projects to be located at Mathura (U.P.), Bhatinda (Punjab) and Panipat (Haryana).

This decision was taken in view of the fact that the Corporation was already having 5 operating units and, in addition, implementing six new plants and five large expansion/rationalisation/modernisation schemes. The World Bank which was likely to be the source of financing had also expressed the view that the Corporation should not be burdened with an additional load in the immediate future.

The question of re-structuring the Corporation to make it more effective, purposeful and objective oriented was also under the consideration of Government since 1972. Finally, Government decided in June 1977 to re-organise the Corporation. Under the scheme of re-organisation, the Corporation and the National Fertilizers Ltd. were re-structured into five companies with effect from 1st April 1978 as indicated below :—

Name of the new company	Units under control
(i) Fertilizer Corporation of India Limited	Sindri including Sindri Modernisation & Sindri Rationalisation, Gorakhpur, Talcher, Ramagundam, Korba and Paradeep.
(ii) National Fertilizers Ltd.	Nangal, Bhatinda and Panipat.
(iii) Hindustan Fertilizers Corporation Limited	Namrup, Haldia, Barauni and Durgapur.
(iv) Rashtriya Chemicals and Fertilizers Ltd. (RCF)	All Units of Trombay.
(v) Fertilizer (Planning & Development) India Ltd.	Planning & Development Division.

1.2. Prior to re-organisation, the Corporation was having the following Units in operation and new and expansion projects :—

Units in Operation ('000 tonnes)

S. No.	Name of the Unit		Date of commencement of production	Installed capacity (in Nutrient contents) Nitrogen (N_2)	Phosphate (P_2O_5)
1.	Sindri I & II	(Bihar)	October 1951	117	—
2.	Nangal	(Punjab)	February 1961	80	—
3.	Trombay I	(Maharashtra)	November 1965	90	35
4.	Namrup	(Assam)	January 1969	45	—
5.	Gorakhpur	(U.P.)	February 1968	80	—
6.	Durgapur	(West Bengal)	October 1973 (Commercial production started in Oct. 1974)	152	—

Note : In case of Namrup, January 1969 represents date of commencement of commercial production.

New and Expansion Projects (000' tonnes)

S. No.	Name of Project	Date of commencement of construction	Anticipated/ actual date of commencement of production	Installed capacity (in terms of Nutrients) Nitrogen (N_2)	Phosphate (P_2O_5)
	(a) New Projects				
1.	Barauni (Bihar)	March 1968	November 1976	152	—
2.	Talcher (Orissa)	July 1971	November 1980	228	—
3.	Ramagundam (Andhra Pradesh)	July 1971	August 1980	228	—
4.	Haldia (West Bengal)	Sept. 1972	April 1981	152	75
5.	Korba (Madhya Pradesh)	x x	Not certain	228	—
	(b) Expansion Projects				
1.	Gorakhpur Expansion	June 1972	April 1976	51	—
2.	Namrup Expansion	March 1968	October 1976	152	—
3.	Nangal Expansion	April 1973	Nov. 1978	152	—
4.	Sindri Modernisation	Sept. 1974	October 1979	152	—
5.	Sindri Rationalisation	February 1969	October 1979	—	156
6.	Trombay Expansion IV	June 1974	January 1979	75	75
7.	Trombay Expansion V	January 1977	April 1981	152	—

Note : Trombay II represents Methanol Plant. Trombay III—Expansion Project was abandoned in favour of Trombay IV.

In regard to Korba, the Ministry have stated (December 1979) as under :—

> "The implementation of the Project was slowed down in the middle of 1974 due to resources constraint. It was also decided that further implementation of the project as well as setting up of additional capacity, based on coal as feedstock, should be considered only after experience became available on the operation of the two coal based plants under construction at Talcher and Ramagundam".

Government have also approved in principle a fertilizer plant at Paradeep (Orissa) to be taken up during Fifth Five Year Plan by the Fertilizer Corporation of India. The capacity of the plant is envisaged at 3.44 lakh tonnes of nitrogen (N_2), 3 lakh tonnes of phosphate (P_2O_5) and 1.5 lakh tonnes of potash (K_2O) per annum.

1.3 In addition to the Central Office at New Delhi and operating Units and Projects under construction referred to above, the Corporation had established certain offices and Divisions for specific purposes, the major ones being ;

(i) Planning and Development Division at Sindri established in 1961 for research and development and planning, designing, engineering, procurement and execution of complete fertilizer projects and other related chemical plants, and production of catalysts and chemicals.

(ii) Marketing Division with zonal offices at Bombay, Calcutta and New Delhi.

(iii) Mining Organisation at Jodhpur for operation of gypsum mines located in Rajasthan for supply of gypsum to Sindri Unit.

1.4 Apart from fertilizers (for details see paragraph 5.5) the Corporation also produced certain industrial products ; the main items being :—

S. No.	Name of the industrial product	Name of the plant	Installed capacity per annum
1.	Heavy Water	Nangal	14,110 Kgs.
2.	Concentrated Nitric Acid	Trombay	20,000 tonnes
3.	Methanol	Trombay	36,000 tonnes
4.	Ammonium Bicarbonate	Trombay & Planning & Dev. Divn. Sindri	7,000 tonnes
5.	Argon Gas	Trombay & Gorakhpur	3.99 lakhs M^3
6.	Catalyst	Planning & Development Division, Sindri	1,230 tonnes.
7.	Sulphuric Acid	Trombay	66,000 tonnes
8.	Methylamines	Trombay	4,000 tonnes.
9.	Sodium Nitrite/Nitrate	Trombay	4,000 tonnes.

1.5 The working of the Corporation, as a whole, upto 31st March 1964 was examined by the Committee on Public Undertakings in its Sixth Report (3rd Lok Sabha—April 1965). The action taken by Government on the recommendations made in the Report *ibid* is contained in the Committee's Forty-first Report (4th Lok Sabha—April 1969). The Committee also examined the working of the Marketing Division of the Corporation upto the period ending 31st March 1973 in its Fiftieth Report (5th Lok Sabha—April 1974).

The operations of the Sindri Unit were reviewed in paragraph 100 of the Central Government Audit Report (Civil) 1962. This paragraph was considered by the Public Accounts Committee *vide* recommendations contained in its Twenty-third Report (1963-64).

The results of review of operations of the Nangal, Trombay and Sindri Units of the Corporation were also included in the Central Government Audit Report (Commercial), 1965 (Nangal Unit) and Central Government Audit Report (Commercial), 1968 (Trombay and Sindri Units). The material relating to Sindri and Trombay Units of the Corporation included in Audit Report (Commercial), 1968 was considered by the Committee on Public Undertakings and the recommendations of the Committee are contained in Twenty-sixth Report (4th Lok Sabha—March 1969) in respect of Trombay Unit and Forty-third Report (4th Lok Sabha—April 1969) in respect of Sindri Unit. Action taken on these reports is contained in Thirty-fifth Report (5th Lok Sabha—April 1973) and Fifty-seventh Report (4th Lok Sabha—December 1969) respectively.

1.6 This Report contains the Introduction and deals with capital structure, objectives, organisation, overall requirement and production of fertilizers, feed-stock, gestation period, Marketing and pricing, Manpower and Internal Audit and overall financial position of the Corporation, as a whole. The performance of six operating Units (including their Expansion Schemes) has been dealt with in the individual Reports which have been presented to the Parliament separately.

2. *Capital structure*

2.1 The authorised capital of the Corporation was initially fixed at Rs. 75 crores. It was raised to Rs. 200 crores in 1968-69, to Rs. 400 crores in 1972-73, to Rs. 600 crores in 1974-75 and to Rs. 700 crores in 1976-77 and to Rs. 800 crores in May 1977. The paid up capital, as on 31st March 1978, amounted to Rs. 750.58 crores and was wholly subscribed by Government. In addition, Government also advanced from time to time un-secured long-term loans which stood at Rs. 525.70 crores (excluding interest accrued and due amounting to Rs. 2.87 crores) as on 31st March 1978.

The Corporation had also availed of the Deferred Credit facilities from the suppliers of plant and machinery and technical know-how, etc. The balances outstanding on 31st March 1978 on this account amounted to Rs. 21.27 crores. Further, the Corporation owed Rs. 5.23 lakhs on the 31st March 1978 to the State Governments of Maharashtra and Punjab for loans given for subsidised housing.

The debt-equity ratio of the Corporation as on 31st March, 1978 was 0.7:1.

2.2 For working capital, the Corporation has cash credit arrangements with the State Bank of India and the State Bank of Hyderabad against hypothecation of raw materials, stores, spare parts, tools, stock-in-trade and book debts. The cash credit limit was raised from Rs. 8 crores to Rs. 10 crores in February 1969, and to Rs. 15 crores in March 1970 upto 1974-75 when it was reduced to Rs. 0.72 crore as a result of credit squeeze. This limit was again raised to Rs. 30 crores in December 1975 and to Rs. 40 crores in March 1977. The

actual cash credit availed of by the Corporation in 1969-70 to 1977-78 was as follows :—

(in crores of rupees)

Year	Limit sanctioned	Amount outstanding at the end of the year
1969-70	15.00	6.70
1970-71	15.00	3.01
1971-72	15.00	13.82
1972-73	15.00	12.82
1973-74	15.00	10.70
1974-75	0.72	0.59
1975-76	30.00	27.04
1976-77	40.00	0.19
1977-78	40.00	5.88

3. *Objectives*

According to the Memorandum of Association, the objects for which the Corporation has been established are broadly as follows :—

(a) To carry on all kinds of business relating to fertilizers, heavy chemicals, heavy water, cement, coke and their by-products and, in particular, manufacturing, storing, packing, distributing, transporting, converting, maintaining and rendering assistance and services of all and every kind of any description, buying, selling, exchanging, altering, improving and dealing in artificial fertilizers, heavy chemicals, heavy water, cement, coke and their by-products, of every description. And also to carry on agency business of every kind of any description connected with the business of the Company.

(b) To acquire or construct and administer factories, townships, etc. connected with the business of the Company.

(c) To establish and operate training institution for chemical engineers, power engineers, civil engineers, mechanical engineers and mechanics.

(d) To carry on the business of colliery proprietors, miners, contractors, merchants, importers, exporters and farmers.

(e) To establish and maintain or otherwise to subsidise research laboratories, design cells and experimental workshops for scientific and technical research, design work and experiments.

The functions of the Corporation could be briefly summed up as under :—

(i) Manufacture and sale of fertilizers (Commercial).

(ii) Building-up of scientific, technological and engineering know-how for the purpose of developing self-reliance in building-up manufacturing capacity (non-commercial).

Consequent on the acceptance of a recommendation of the Administrative Reforms Commission, the Bureau of Public Enterprises, Government of India asked Government Companies in November 1970 to formulate a statement of their objectives and obligations clearly.

Accordingly, the Corporation formulated, in a note submitted to Government in May 1971, the following objectives :—

Social and Economic

(1) To plan, construct and maintain production capacities for fertilizer and allied products upto levels required by the national economy.

(2) To assist the Government in developing a feedstock policy for the fertilizer industry.

Research and Development

To build up and operate research, development and engineering facilities aimed at developing technological self-reliance in the fertilizer and allied industries and develop fertilizers suited to the specific requirements of the crop and region with minimum dependence on imported raw materials or intermediates.

Production

(1) To attain and maintain highest practicable levels of production in the manufacturing units by well planned operation and maintenance.

(2) To aim at minimizing the norms of consumption of various inputs and their input-cost levels.

Marketing

(1) To plan and organise for the availability of the fertilizers of the required grades in time and adequately to the farmers close to the consumption centres.

(2) To ensure availability of fertilizers in regions which from purely commercial considerations are likely to be ignored in marketing strategy aimed at maximising profits.

(3) To organise and promote services including soil testing, fertilizer dosage recommendations, agronomic advice, etc., aimed at maintaining the desired growth rates of fertilizer consumption.

(4) To carry out agronomic studies and market surveys that would be useful in the choice of product patterns and planning for additional capacity in the various regions.

Financial

(1) Consistent with the social and economic obligation as a public sector undertaking, to plan for maximizing the return on the capital employed mainly by minimizing costs, maximizing production and by diversification of products.

(2) To develop a long-term financial plan for the Corporation which would reflect the accrual of internal resources, and the extent to which it would be necessary to supplement by contributions from the Government both as equity and as loans, to meet capital outlay requirements for the expansion of manufacturing capacity.

Personnel

To develop an overall personnel policy which would reflect the role of the public sector as a welfare employer.

The above objectives would need to be re-appraised in view of reorganisation of the Corporation with effect from 1st April 1978.

4. *Organisation*

4.1 *Organisational Set-up*

According to the Articles of Association, the Board of Directors of the Corporation is entitled to exercise all such powers, and to do all such acts and things as the Corporation is authorised to exercise and to do, subject to legal provisions and the directives issued by the President of India from time to time.

The number of Directors is not to be less than two and more than 15. The Directors representing Government are appointed by the President of India. Other members are appointed by the President of India in consultation with the Chairman of the Board.

For the conduct and management of the business of the Corporation in general subject to the control and supervision of the Board of Directors, the President may empower the Chairman to exercise the function of Managing Director or appoint a Director as Managing Director to be the Chief Executive Officer of the Corporation. The President may also appoint Directors as Executive or Functional Directors. The functions, duties and responsibilities of an executive or functional Director are to be determined by the President on the recommendations of the Board.

The Board of Directors appoint General Manager for the conduct and management of the business of each constituent unit or division. The Articles also provide for the appointment of a Director (Finance) for the Corporation and a Finance Manager for each of the constituent unit or division.

The posts of the Chairman and the Managing Director were combined from January 1964. In September 1970, the two

posts were separated and held by different persons till August 1973 from when the two posts were, again, combined.

In September 1962, the Corporation, with the approval of Government, constituted a Management Committee consisting of the top executives of the Corporation and presided over by the Managing Director. The Management Committee was redesignated as 'Internal Consultative Committee' in 1970-71.

An Executive Committee of functional Directors was constituted in 1970-71 to deal with day-to-day problems and policies. In addition, the following sub-committees of the Board were constituted in 1970-71 :

(1) Operations Committee.—for reviewing the problems relating to production, marketing, materials planning, etc.

(2) Projects Committee.—for scrutinizing project reports and reviewing project schedules and other matters relating to Projects.

(3) Personnel Committee.—for reviewing problems of industrial relations, personnel and welfare policies, organisational changes inclusive of creation of additional posts, recruitment, placement and transfers at senior levels, etc.

(4) Finance Committee.—for scrutinizing budgets and periodically reviewing and evaluating financial performance and other financial matters.

The Executive Committee and the sub-committees ceased to function towards the end of 1973.

As on 31st March 1978, the Board consisted of two functional Directors including the Chairman and Managing Director, and eight part-time Directors.

4.2 *Delegation of Powers*

(1) By the Articles of Association, the Board can delegate such of its powers, as it may think fit, to a Committee of Directors, the Chairman, the Managing Director and Executive or Functional Director, a General Manager and to a Finance Manager of any constituent unit or division, subject to such terms, conditions and restrictions as the Board may think fit to impose. The Managing Director as Chief Executive of the Corporation is empowered to sub-delegate his powers to the functional Directors and/or General Managers.

(2) The Board have, from time to time, delegated powers to the Managing Director, the latest such delegation being made in May 1972. According to the delegation made in May 1972 the Managing Director, *inter alia,* enjoys the following powers :

(i) Sanction of capital expenditure where a Detailed Project Report has been approved by the Board and or by Government.

(ii) Authorisation of preliminary works of a capital nature in advance of the preparation and approval of a Detailed Project Report with estimates or otherwise as individual works, involving capital expenditure not exceeding Rs. 10 lakhs.

(iii) Power to declare stores as surplus or unserviceable on the advice of a duly constituted survey committee and power to order their disposal :

(a) upto any value, if the disposal is at or above the book value, and

(b) upto a book value of Rs. 5 lakhs, if the disposal does not exceed 10 per cent below the book value.

(iv) Full powers to sanction expenditure upto the limit of allocation made in the approved Revenue Budget.

(v) Write off of losses not exceeding Rs. 50,000 in value in each case or where an employee of the

Corporation is at fault, not exceeding Rs. 5,000 in value.

(vi) Power to create posts on approved scales of pay carrying an ultimate salary of Rs. 2,250 per month subject to the condition that cases of creation of posts having starting salary of Rs. 1,600 per month and above should be reported to the Board.

The delegation of powers was revised in September 1975 to raise the limit from Rs. 2,250 per month to Rs. 2,500 per month for creating posts on approved scales and from Rs. 1,600 per month to Rs. 1,800 per month for reporting cases of creation of posts to the Board. While approving the proposed revision the Board had also desired (September 1975) that the existing delegation of the Chairman and Managing Director be reviewed to see as to what further powers could be delegated to him for expediting the decisions or smooth operations.

The Ministry stated (December 1979) as follows :—

"This examination has since been completed and a proposal was submitted to the Board in its 224th meeting held on 29th January 1979 and the Board felt that after the re-organisation it was not necessary to review the earlier powers of the Managing Director and as such a revised memorandum be prepared to bring out only such additional powers which were proposed to be delegated to the Managing Director by the Board under the reorganised set up. Subsequently, the Board approved of the delegation of some additional powers to the Managing Director *vide* item 13 of the 226th meeting held on 2nd April 1979".

(3) In May 1969, Government of India, Bureau of Public Enterprises had issued broad guidelines defining the main functions, responsibilities and powers of the Financial Adviser. It

was also mentioned in the guidelines that the Board of Directors should lay down the detailed powers and functions of the Financial Adviser, particularly in regard to matters which should be reserved :

(i) for concurrence of the Financial Adviser ;

(ii) for consultation with the Financial Adviser, and

(iii) those on which Financial Adviser need not be consulted.

Initially, functions and responsibilities of the Finance Managers of the Units/Divisions and Head Office were not clearly defined. On receipt of the above guidelines, the Corporation, however, decided to adopt the functions and responsibilities, outlined in the Bureau's guidelines, *in toto*. No demarcation of functions, as was enjoined, in the Bureau's guidelines, has, however, been made so far. As a matter of fact, all financial powers delegated to the Managing Director/General Manager are required to be exercised by them only after consultation with the Director (Finance)/Finance Managers. The Corporation stated (January 1977) that it had informed the Bureau in January 1973 that it had adopted the main functions and responsibilities outlined in the latter's instructions and no further reference was received from the Bureau.

5. *Overall requirement and production of fertilizers*

5.1. *Classification of Fertilizers*

5.1.1 For normal healthy growth, plants require 16 nutrient elements for synthesising various tissues. Out of these, nitrogen, phosphorus and potassium are needed in larger quantities by the plants. These are called 'primary' nutrients; the other nutrients being known 'secondary' or micro nutrients. Generally, soils are well supplied with secondary and micro nutrients and the need to apply them regularly does not arise except under special soil conditions. However, application of the three primary nutrients to the soil, everytime a crop is raised, is essential. One way of doing this, is to apply organic manures (*e.g.* farm yard manure, compost and green manure, various oil cakes and waste products of animal origin). But apart from the fact that, for various reasons, organised programmes for development and utilisation of natural manures have not yielded results commensurate with our needs, such manures have their own limitation because of their low content of primary nutrients, though they are still needed to supply organic materials to promote microbial activity in the soil and to improve its structure, aeration and water-holding capacity.

Chemical fertilizers are inorganic or synthetic organic materials of a concentrated nature and contain one or more plant nutrients in easily soluble and quickly available forms.

5.1.2 According to the nutrient or nutrients contained therein, the chemical fertilizers are classified as :—

(a) Nitrogenous (also known as N),

(b) Phosphatic (also known as P),

(c) Potassic (also known as K)

(d) Complex, and

(e) Mixed fertilizers.

A brief description of each of the above type of fertilizer is given in the succeeding paragraphs.

(A) Nitrogenous fertilizers : Categorised into four groups on the basis of the chemical form in which nitrogen is present in them *viz.* ammoniacal fertilizers, nitrate fertilizers, combined ammoniacal and nitrate fertilizers and amide fertilizers.

Ammoniacal fertilizers contain nitrogen in the form of ammonium ion, which, when applied to soil, is absorbed by the soil colloids. The ammonium form of nitrogen rapidly transforms into the nitrate form in the soil for absorption by the plants. It is directly taken up by some crops, particularly rice and sugarcane. In *nitrate fertilizers,* nitrogen is in nitrate form. Nitrogen is readily absorbed by the plants in this form. Nitrate fertilizers are alkaline in their effect on the soil. These fertilizers are not manufactured or widely used in India.

Amide fertilizers are carbon-compounds. Nitrogen in this form is not directly available to the plant, but is made available by bacterial action in the soil. Urea is the most common amide fertilizer.

Some fertilizers such as ammonium nitrate contain both ammoniacal and nitrate forms of nitrogen.

Types of nitrogenous fertilizers produced in India are :

(i) *Ammonium Sulphate.*—One of the most widely used nitrogenous fertilizers. It is readily soluble in water and absorbs very little moisture from air. It keeps very well during storage and transport. The commercial product is guaranteed to contain a minimum of 20.6 per cent nitrogen in ammoniacal form; it also contains about 23.7 per cent sulphur which is an important secondary plant food.

It can be applied during or before sowing and also as a top dressing later. Its continued use may increase acidity and lower crop yields.

(ii) *Ammonium chloride.*—Prepared by combining ammonia with hydrochloric acid or obtained as a product in the manufacture of soda-ash. Its properties are similar to those of ammonium sulphate. It is soluble in water and contains 25 per cent of nitrogen in water soluble form. It can be applied to wet land crops but its use for crops which are sensitive to chlorine, such as tobacco, is not recommended.

(iii) *Ammonium sulphate nitrate.*—A mixture of ammonium sulphate and ammonium nitrate. It contains 26 per cent nitrogen, 3/4th of which is in the ammonia element and the rest in the nitrate. It is hygroscopic and becomes damp on exposure; it cakes, if stored for long. Its application with the seed is prohibited.

(iv) *Calcium ammonium nitrate.*—A mixture of ammonium nitrate and powdered chalk, is made into granules coated with soap-stone. It contains 25 per cent nitrogen-half in ammonia and half in the nitrate. It is neutral and quick acting and is useful for top dressing.

(v) *Urea.*—A synthetic organic compound; it is prepared by reacting ammonia and carbon dioxide. It is a concentrated fertilizer and has obvious advantages in storage, transport and handling. Its manufacture has been taken up on a large scale in this country. It is very hygroscopic and, therefore, requires packing in moisture proof polythene lined bags. It contains 46 per cent of nitrogen in amide form. It is suitable for all crops and soils and,

being a concentrated fertilizer, it is advisable to mix it with earth or sand to ensure uniform distribution.

(B) *Phosphatic fertilizers*:—These contain the nutrient element phosphorus (also expressed as phosphate—P_2O_5), and are classified into three groups according to the form in which phosphorus compounds are present in them, namely, (i) water soluble, (ii) soluble in neutral ammonium nitrate solution or dilute citric acid, and (iii) insoluble in either. The types of phosphatic fertilizers manufactured in India are :

(i) *Single superphosphate.*—Manufactured by treating ground phosphatic rock with sulphuric acid. It can be applied with advantage to all crops before or during sowing or transplanting. It contains, in addition to phosphorus, considerable amount of calcium and sulphur.

(ii) *Triple superphosphate.*—A concentrated form of superphosphate produced by the action of liquid phosphoric acid on rock phosphate. It contains 40 to 50 per cent water soluble phosphate and 17 to 20 per cent lime. It is used for preparing high analysis fertilizer mixtures.

(iii) *Dicalcium phosphate.*.—Normally produced by treating rock phosphate with hydrochloric acid. It is soluble for application to acid soils and to long duration crops like sugarcane.

(iv) Other phosphatic fertilizers are raw or steamed bonemeal, basic slag and rock phosphate. Most of the rock phosphate required is imported. Rock-phosphate ground to a fine particle size is used extensively in the Southern States for crops like tea, coffee and rubber. It is also used for other crops, particularly paddy grown in acidic soils.

(C) *Potassic fertilizers.*—Applied to soil to supply plants with potassium, the third major plant nutrient. The potassium

content of this fertilizer is expressed in terms of potassium oxide (K_2O) or 'Potash'. All commercial potassic fertilizers being salts of potassium and totally soluble in water, are readily available to the plants. The two potassic fertilizers commonly in use in India are muriate of potash (potassic chloride) and sulphate of potash (potassium sulphate). Requirements of the country for potassic fertilizers are met through imports only.

Potassium chloride is marketed and used more extensively than any other potassic fertilizer. It contains 48 to 62 per cent of potassium oxide and 47 per cent of chloride. It can be applied to all soils and to all crops.

Potassium sulphate contains 48 per cent of potash. It can be applied to all soils and to all crops before or during sowing, particularly for crops of tobacco and certain vegetables and fruits which are sensitive to chlorine.

Another potassium fertilizer known as *potassium schoenite*, is prepared from mixed sulphates obtained from solar evaporation of salt bitterns. It contains 22 to 24 per cent of potash, 8 to 10 per cent of magnesium oxide and 2 to 3 per cent of sodium chloride. It can be used for fertilizing crops like sugarcane, pineapple, tomato, etc. in the lateritic soils of Karnataka, Kerala, Tamil Nadu and Orissa, podzolic soils of Himachal Pradesh and magnesium deficient sandy loam and calcareous soils of North Bihar.

The Central Salt and Marine Chemicals Research Institute, Bhavnagar developed a process for the production of potassium schoenite from mixed salt. The Institute released the process to a private company in Tamil Nadu in 1968 through the National Research Development Corporation, a Government of India Undertaking charging a premium of Rs. 10,000 besides a royalty of 2 per cent. The private company set up a 10 tonne per day plant at Vepplodai in 1971 which had to be closed down towards the end of 1976 because of non-availability of the proper quality and quantities of the mixed salt. At the request of the Company, a scientist had been deputed by the

Institute to Tuticorin to give training to the salt manufacturers for production of mixed salt so that the Plant could be re-started in the near future. Moreover, the Ministry of Chemicals and Fertilizers and the Ministry of Industry were also stated to be exploring the possibility of setting up more plants in various salt producing areas in the country as potassium schoenite is an approved fertilizer under the Fertilizer Control Order 1973.

(D) *Complex fertilizers* :—Contain two or more plant nutrients in which Nitrogen and Phosphorus elements are in chemical combination. Complex fertilizers produced in India can be broadly classified as Ammonium phosphates, Nitrophosphates and N.P.K. complex fertilizers.

Complex fertilizers are generally in granular form and provide uniform application of plant nutrients. Because of this advantage, complex fertilizers are becoming popular.

Ammonium phosphates generally manufactured by reacting phosphoric acid or a mixture of phosphoric and sulphuric acid with ammonia, are suitable for use on calcareous and alkaline soils.

Nitro-phosphates, obtained by treating phosphate rock with nitric acid or a mixture of nitric acid and sulphuric or phosphoric acid followed by treatment with ammonia, are being produced at the Trombay factory of the Corporation.

NPK Complex fertilizers are based on either ammonium phosphates or nitro-phosphates. Potash and additional nitrogen generally in the form of urea are added thereto and the mixture is granulated.

(E) *Mixed fertilizers.*—Physical mixtures of fertilizer materials containing two or more major plant nutrients are thoroughly mixed. Such mixtures are usually in powder form, but in recent years a number of granulating units primarily in the Co-operative sector have been set up for producing granulated fertilizer mixtures.

5.2 *Overall requirement and consumption*

Requirements of fertilizers are determined by the Ministry of Agriculture in the Zonal conferences which are attended by the representatives of State Governments. In assessing the requirement, the production programme and the increase anticipated over the quantities utilised in the previous seasons are taken into consideration.

Requirements of fertilizers during the Fourth and Fifth Plans and actual consumption from 1969-70 to 1978-79 were as follows :

All India basis

Nutrients (in lakh tonnes) N+P+K

Fourth Plan Period	N.		P		K		N+P+K	
	Requirement as computed	Actual consumption	Requirement as computed	Actual consumption	Requirement as computed	Actual consumption	Requirement as computed	Actual consumption
1	2	3	4	5	6	7	8	9
1969-70	17.0	13.56	6.0	4.16	3.0	2.10	26.0	19.82
1970-71	17.5	14.79	5.7	5.41	2.6	2.36	25.8	22.56
1971-72	21.2	17.98	8.2	5.58	3.9	3.00	33.3	26.56
1972-73	22.0	18.40	7.3	5.81	3.8	3.48	33.1	27.69
1973-74 (Fifth Plan Period)	25.8	18.29	9.3	6.50	4.8	3.60	39.9	28.39
1974-75	29.7	17.66	9.4	4.71	5.2	3.36	44.3	25.73
1975-76	34.0	21.49	10.4	4.67	6.5	2.78	50.9	28.94
1976-77	39.1	24.57	12.4	6.35	7.5	3.19	59.0	34.11
1977-78	45.0	29.13	14.9	8.67	8.6	5.06	68.5	42.86
1978-79	52.0	34.20	18.0	11.06	10.0	5.91	80.0	51.17

Note : N—Nitrogen, P—Phosphorus, and K—Potash

The overall consumption increased perceptibly in 1970-71 and 1971-72 over the data for 1969-70. Thereafter, it remained static up to 1975-76. It again showed a rising trend in 1976-77 to 1978-79.

The quantum of fertilizers applied per hectare of cropped area was 11 kgs. in 1968-69; it rose to 17.6 kgs. in 1973-74 *i.e.* at the end of Fourth Plan period, as against an annual increase of 28% envisaged in the Fourth Plan. The consumption increased to 25 kgs. per hectare of cropped area in 1977-78, but India still ranks amongst the lowest in the world in per unit application of fertilizers.

Nutrients were utilised in the proportion of 6 : 2 : 1 of N, P and K respectively as against the desirable proportion of 4 : 2 : 1. This imbalance in actual consumption varied widely from region to region. It is generally accepted that steps were necessary to promote the balanced use of fertilizers to maintain soil fertility.

5.3 *Overall capacity and share of the Corporation*

In order to achieve the above projected requirement of fertilizers, the Fourth Plan had envisaged the setting up of capacity of 3 million tonnes of nitrogen and 1.2 million tonnes of phosphate; Potassic fertilizers, as stated earlier, are not produced in the country except a small quantity available from NPK fertilizers and entire requirement is met by import. In the mid-term appraisal of the Fourth Plan in 1971, these estimates were revised to 2.4 million tonnes in respect of nitrogen and 0.6 million tonnes in respect of phosphate.

The table below incorporates the installed capacity for production of nitrogenous and phosphatic fertilizers in plants under the Corporation, under other Central and State Enterprises and

in private sector enterprises during the Fourth Plan period and from 1974-75 to 1977-78 :—

(In lakhs of tonnes)

Year	Installed capacity									
	Fertilizer Corporation of India Limited		Public Sector other than Fertilizer Corporation of India Limited		Private Sector		Cooperative Sector		Total	
	N	P_2O_5	N	P_2O_5	N	P_2O_5	N	P_2O_5	N	P_2O_5
1	2	3	4	5	6	7	8	9	10	11
1969-70	4.12	0.36	2.60	0.63	6.72	3.16	—	—	13.44	4.15
1970-71	4.12	0.36	2.72	0.63	6.60	3.16	—	—	13.44	4.15
1971-72	3.76	0.36	4.48	1.48	6.40	3.16	—	—	14.64	5.00
1972-73	3.76	0.36	4.48	1.48	6.40	3.16	—	—	14.64	5.00
1973-74	5.28	0.36	6.00	1.66	8.10	3.58	—	—	19.38	5.60
1974-75	5.28	0.36	6.00	1.66	8.53	3.58	—	—	19.81	5.60
1975-76	5.79	0.36	6.08	1.60	11.07	3.69	2.15	1.27	25.09	6.92
1976-77	8.83	0.36	6.20	1.87	12.70	4.51	2.15	1.27	29.88	8.01
1977-78	8.83	0.36	6.60	3.06	12.70	4.46	2.15	1.27	30.28	9.15
Percentage (Share in the overall capacity as on 31-3-1978).	29.2	3.9	21.8	33.4	42.0	48.7	7.0	14.0	100.00	100.00

NOTES:—1. The above data are based on the Annual Reports of the Ministry of Petroleum & Chemicals and Indian Petroleum & Chemicals Statistics/Indian Fertilizer Statistics compiled by the Ministry of Petroleum & Chemicals and the data supplied by the Ministry of Petroleum, Chemicals and Fetilizers.

2. According to the Corporation, the installed capacity for Nitrogen for the years 1969-70 to 1973-74 was 4.10 lakh tonnes, and 5.62 lakh tonnes in 1974-75 and 1975-76. It has been explained (January 1977) that attainable capacity for Nitrogen was 3.85 lakh tonnes in 1969-70 to 1971-72, 3.61 lakh tonnes in 1972-73 and 1973-74 and 5.13 lakh tonnes in 1974-75.

It may be mentioned that Government had cleared implementation of Durgapur, Barauni, Namrup Expansion, Sindri Rationalisation, Talcher and Ramagundam projects involving a total capacity of 9.12 lakh tonnes of nitrogen and 1.56 lakh tonnes of phosphate in February 1966, January 1967, December 1967 and October 1969. There was, however, considerable delay in not only setting up this capacity as indicated below, but also effective utilisation of the capacity was yet to be achieved :—

Project	*Date of commercial production*
Durgapur	1973-74
Barauni	November, 1976
Namrup Expansion	October, 1976
Sindri Rationalisation	October, 1979
Talcher	November, 1980
Ramagundam	August, 1980

5.4 *Capacity under installation*

The capacity of projects under construction or approved in principle at the end of each of the years 1969-70 to 1977-78 is indicated in the following tables :—

(in lakhs of tonnes)

Year	Fertilizer Corporation of India		Public Sector other than Fertilizer Corporation of India		Private Sector		Cooperative sector		Total	
	N.	P_2O_5	N.	P_2O_5	N.	P_2O_5	N.	P_2O_5	N	P_2O_5
1	2	3	4	5	6	7	8	9	10	11
(a) Projects under construction										
1969-70	4.56	—	5.79	0.85	1.75	—	—	—	12.10	0.85
1970-71	9.14	—	3.64	0.85	1.75	—	2.15	—	16.68	0.85
1971-72	9.14	1.56	1.52	1.18	1.75	0.42	2.15	1.27	14.56	4.43
1972-73	16.24	2.31	1.92	2.22	6.30	0.93	2.15	1.27	26.61	6.73
1973-74	15.04	2.49	0.40	2.04	4.63	0.82	2.15	1.27	22.22	6.62
1974-75	15.65	3.24	2.75	2.24	4.21	0.82	2.15	1.27	24.76	7.57
1975-76	12.68	3.06	5.22	2.31	1.63	—	2.28	—	21.81	5.37
1976-77	10.94	1.50	4.70	0.26	2.78	—	2.28	—	20.70	1.76
1977-78	10.94	1.50	4.70	0.26	5.06	—	2.28	—	22.98	1.76
Share in overall capacity as on 31st March 1978 (as percentage)	47	85	20	15	23	—	10	—	100	100

1	2	3	4	5	6	7	8	9	10	11
(b) Projects approved in principle										
1969-70	8.34	—	—	—	13.12	—	—	—	21.46	—
1970-71	3.61	—	—	—	10.48	—	—	—	14.09	—
1971-72	5.59	2.07	0.48	1.15	8.53	2.22	—	—	14.60	5.44
1972-73	—	—	—	—	—	—	—	—	—	—
1973-74	5.50	3.75	7.05	—	5.73	0.82	2.79	—	21.07	4.57
1974-75	4.75	3.00	4.70	—	5.73	0.82	5.22	0.83	20.40	4.65
1975-76	7.03	3.00	2.35	—	8.46	0.82	0.51	—	18.35	3.82
1976-77	14.15	3.00	3.45	1.50	3.80	0.82	3.96	—	25.36	5.32
1977-78	14.15	3.00	3.45	1.50	1.52	—	3.96	—	23.08	4.50
Share in the overall capacity on 31st March, 1978 (as percentage)	61	67	15	33	7	—	17	—	100	100

Source: Annual Reports of the Ministry of Petroleum & Chemicals.

The overall capacity (installed as well as under installation in respect of projects under construction) works out to 53.26 lakh tonnes of nitrogen and 10.91 lakh tonnes of phosphates. This is far less than the projection of 7 million tonnes of nitrogen and 2.8 million tonnes of phosphates envisaged at the end of the Fifth Plan period. The Ministry have stated (December 1979) that actual consumption of fertilizers at the end of Fifth Plan period also fell substantially short of the target laid down for the year 1978-79.

5.5 *Production Performance*

5.5.1 *Estimates*

The estimates of domestic production are formulated by the Ministry of Petroleum and Chemicals and, after taking into account the stock position, gap between the requirement and indigenous production is met by imports.

The overall actual production of nitrogenous and phosphatic fertilizers was less than the original and revised estimates framed by the Ministry of Petroleum and Chemicals from 1969-70 to 1977-78. The table below indicates the actual production and imports during these years :

Year	Actual production		Imports		
	Nitrogen	Phosphate	Nitrogen	Phosphate	Potash
			(in lakh tonnes)		
1969-70 . .	7.16	2.22	6.67	0.94	1.20
1970-71 . .	8.30	2.29	4.77	0.32	1.20
1971-72 . .	9.52	2.78	4.81	2.48	2.68
1972-73 . .	10.60	3.26	6.65	2.04	3.25
1973-74 . .	10.60	3.23	6.59	2.13	3.70
1974-75 . .	11.85	3.27	8.84	2.86	4.37
1975-76 . .	15.35	3.20	9.50	3.37	2.67
1976-77 . .	19.00	4.80	7.50	0.23	2.78
1977-78 . .	20.00	6.70	7.58	1.64	5.99

Source: Indian Fertilizer Statistics 1974-75 compiled by the Ministry of Petroleum and Chemicals for data relating to imports and figures of actual production were obtained from the Ministry of Petroleum and Chemicals.

5.5.2 *Producer-wise analysis of actual production and installed capacity*

The following table incorporates the analysis of actual production vis-a-vis installed capacity for the years 1969-70 to 1977-78 in respect of the Corporation, Public Sector other than the Corporation and the Private Sector.

Year	Fertilizer Corporation of India			Public Sector other than F.C.I.			Private Sector			Co-operative Sector			Total		
	Installed capacity	Actual production	%age of achievement	Installed capacity	Actual production	%age of achievement	Installed capacity	Actual production	%age of achievement	Installed capacity	Actual production	%age of achievement	Installed capacity	Actual production	%age of achievement
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						Nitrogen							(in lakhs of tonnes)		
1969-70	4.12	3.02	73.3	2.60	1.19	45.8	6.72	2.95	43.9	—	—	—	13.44	7.16	53.3
1970-71	4.12	2.79	67.7	2.72	1.03	37.8	6.60	4.48	67.9	—	—	—	13.44	8.30	61.8
1971-72	3.76	2.86	76.1	4.48	1.61	35.9	6.40	5.05	78.9	—	—	—	14.64	9.52	65.0
1972-73	3.76	2.76	73.4	4.48	2.20	49.1	6.40	5.64	88.1	—	—	—	14.64	10.60	72.4
1973-74	5.28	2.85	54.0	6.00	2.50	41.7	8.10	5.25	64.8	—	—	—	19.38	10.60	54.7
1974-75	5.28	2.81	53.2	6.00	2.54	42.3	8.53	6.38	74.3	—	—	—	19.81	11.85	59.8
1975-76	5.79	3.41	63.8	6.08	3.78	62.16	11.07	7.01	75.9	2.15	1.15	53.5	25.09	15.35	70.0
1976-77	8.83	4.61	73.5	6.20	3.96	63.87	12.70	8.85	76.5	2.15	1.58	73.5	29.88	19.00	72.5
1977-78	8.83	4.30	55.0	6.60	4.04	61.2	12.70	9.62	75.7	2.15	2.04	94.9	30.28	20.00	69.0
						Phosphate									
1969-70	0.36	0.18	50.0	0.63	0.24	38.1	3.16	1.80	57.0	—	—	—	4.15	2.22	53.5
1970-71	0.36	0.25	69.4	0.63	0.26	41.3	3.16	1.78	56.3	—	—	—	4.15	2.29	52.2
1971-72	0.36	0.33	91.7	1.48	0.37	25.0	3.16	2.08	65.8	—	—	—	5.00	2.78	55.6
1972-73	0.36	0.37	102.8	1.48	0.78	52.7	3.16	2.11	66.8	—	—	—	5.00	3.26	65.2
1973-74	0.36	0.32	88.9	1.66	0.83	50.0	3.58	2.08	58.1	—	—	—	5.60	3.23	57.7
1974-75	0.36	0.32	88.9	1.66	0.81	48.8	3.58	2.05	57.3	—	—	—	5.60	3.27	58.4
1975-76	0.36	0.34	94.4	1.60	0.86	53.75	3.69	1.63	47.5	1.27	0.37	29.1	6.92	3.20	50.6
1976-77	0.36	0.45	125.00	1.87	0.91	48.66	4.51	2.50	68.3	1.27	0.94	74.0	8.01	4.80	69.4
1977-78	0.36	0.38	105.50	3.06	1.75	57.10	4.46	3.03	68.0	1.27	1.54	121.2	9.15	6.70*	79.1

*Includes 8000 tonnes of P_2O_5 from trial production in Sindri and Khetri Units.

NOTE:— (1) Actual production of Nitrogen for 1974-75 includes trial production of IFFCO's Plant.

(2) Actual production of P_2O_5 for 1974-75 includes trial production of IFFCO's Plant.

(3) Data included in the table are based on the Indian Fertilizer Statistics compiled by the Ministry of Petroleum and Chemicals and Fertilizer Statistsics published by Fertilizer Association of India. According to the Corporation, the figures of actual production were as follows :—

Year	'69-70	'70-71	'71-72	'72-73	'73-74	'74-75	'75-76	'76-77	'77-78
Actual production (in lakhs of tonnes nitrogen)	3.14	2.92	3.02	2.94	2.96	3.02	3.66	4.50	4.48

Variation in the figures of actual production of the Corporation given in the table and those furnished by the Corporation in its reply of January, 1977 has been analysed. While the Corporation has computed the figures of actual production of nitrogen not only with reference to the nitrogen content present in the fertilizers produced but also nitrogen in ammonia, nitric acid, etc. sold or used for purposes other than manufacture of fertilizers, the Ministry's figures appear to be based on nitrogen present in the fertilizers produced.

5.5.3 *Product-wise analysis*

The various types of fertilizers produced by the Corporation are :

Nitrogenous

(i) Ammonium Sulphate	Sindri and Namrup Units.
(ii) Urea	Sindri, Namrup, Gorakhpur, Trombay, Durgapur and Barauni Units.
(iii) Ammonium Sulphate Nitrate (Double salt)	Sindri Unit.
(iv) Calcium Ammonium Nitrate.	Nangal Unit.

Phosphatic

(i) Nitro Phosphate	Trombay Unit.
(ii) Suphala (N.P.K.)	Trombay Units.

The capacity and production of different types of fertilizers of the Corporation, of other Public Sector and of the Private Sector in 1977-78 were :—

(in lakhs of tonnes)

Sl. No.	Name of the product		Fertilizer Corporation of India	Public Sector Other than Fertilizer Corporation of India	Private Sector	Cooperative	Total
1	2		3	4	5	6	7
1.	Urea	Capacity	14.47	6.92	23.06	3.96	48.21
		Production	6.70	3.69	17.19	3.16	30.74
2.	Ammonium Sulphate	Capacity	4.55	2.93	2.06	—	9.28
		Production	1.34	2.29	1.98	—	5.61

1	2	3	4	5	6	7
3. Ammonium Chloride	Capacity	—	0.25	0.41	—	0.66
	Production	—	0.07	0.20	—	0.27
4. Calcium Ammonium Nitrate	Capacity	3.20	4.80	—	—	8.00
	Production	2.21	2.88	—	—	5.09
5. Ammonium Phosphate	Capacity	—	1.85	0.51	—	2.36
	Production	—	1.11	0.54	—	1.65
6. Nitro-phosphate (NPK)	Capacity	3.30 of 15:15:15 or	—	—	—	3.30
		1.80 of 20:20:0 composition	—	—	—	1.80
	Production	2.14 of 15:15:15 composition. 0.13 of 20:20:0 composition. 0.15 of APSN		—	—	2.42
7. Urea Ammonium Phosphate	Capacity	—	0.40	4.98	—	5.38
	Production	—	0.19	2.90	—	3.09
8. Di Ammonium Phosphate	Capacity	—	1.20	2.18	—	3.38
	Production	—	0.77	1.17	—	1.94
9. N.P.K.	Capacity	—	5.88	—	7.40	13.28
	Production	—	4.43	—	5.01	9.44
10. Single Super Phosphate	Capacity	—	2.37	11.43	—	13.80
	Production	—	1.40	8.48	—	9.88
11. Triple Super Phosphate	Capacity	—	—	0.23	—	0.23
	Production	—	—	0.03	—	0.03

NOTE:— Data compiled by the Ministry of Petroleum & Chemicals. According to the Corporation, capacity and actual production for urea are 6.81 lakh and 3.11 lakh tonnes respectively and capacities for ammonium sulphate and calcium ammonium nitrate are 4.55 lakh tonnes and 3.18 lakh tonnes respectively.

The above analysis indicates the following :—

(a) A comparative study of the fertilizers import statistics from 1969-70 to 1977-78 (details given in Appendix II) indicated that, in quantity and value, imports were mainly of urea followed by muriate of potash, di-ammonium phosphate, calcium ammonium nitrate and ammonium sulphate.

As the under-utilisation of capacity in respect of ammonium sulphate, urea and calcium ammonium nitrate was more or less equal to or in excess of the quantities imported, fuller utilisation of capacity would have obviated the necessity for imports of these products all these years.

(b) Di-ammonium-phosphate is not only used as a complete fertilizer but also as a raw material for suphala produced in the Trombay Unit of the Corporation. Its use as a raw material was to be discontinued on the commissioning of the Phosphoric Acid Plant which was approved by Government in August 1968. The Plant was commissioned in January 1975 but it hardly achieved about 60% of capacity by 1977-78. A detailed analysis about the performance of this Plant appears in the Report of the Comptroller and Auditor General of India—Union Government (Commercial) 1978—Part III. Fertilizer Corporation of India Ltd. (Trombay unit).

5.5.4 *Unitwise production performance of the Corporation*

Unit-wise break-up of production and capacity utilisation for the years 1970-71 to 1977-78 is given in Appendix III.

It will be seen from the details given in the appendix that ;

(a) there has been progressive decline in the production performance of Sindri Unit, (all the old plants

except Ammonium Sulphate plant have since been retired) ;

(b) the production at Nangal has been fluctuating widely ranging from 51% to 101% of the capacity (This was mainly due to availability of power) ;

(c) there has been improvement in the production performance at Trombay from 1975-76 onwards, the capacity utilisation of Urea being more than 100% in 1976-77 and 1977-78 ,

(d) similarly, there has been continuous improvement in the production performance of Namrup Unit from 1972-73 onwards, the capacity utilisation in respect of Urea having reached 100% from 1974-75 onwards ;

(e) capacity utilisation at Gorakhpur Unit reached the peak of 95% in 1971-72, thereafter there has been a downward trend, particularly after 1974-75 ; and

(f) the production at Durgapur ranged from 15% of the capacity in 1974-75 to 34% of the capacity in 1977-78.

A detailed analysis of production performance of the operating Units covering the period upto March 1978 has been made in the individual Reports relating to these Units which have been presented to Parliament separately.

5.5.5 *Other statistics pertaining to the Corporation's Units*

5.5.5.1 *Investment per unit.*—Capacity, cost of project and investment per tonne of finished products and nutrient of Opera-

ting Units and projects under construction are mentioned in Appendix IV.

The following facts emerge :—

(i) *Operating Units.*—Investment per tonne of urea at Trombay, Namrup, Gorakhpur and Durgapur was estimated at between Rs. 1105 and Rs. 1828 based on estimates of costs envisaged when each project was approved. Actually, investment per tonne ranged between Rs. 1606 and Rs. 3934. The investment per tonne of urea at Nangal Expansion was the highest at Rs. 3934 followed by Durgapur at Rs. 3095, Barauni at Rs. 2798, Namrup at Rs. 2438 and Gorakhpur at Rs. 1992.

(ii) *Projects under construction or expansion.*—Based on the revised estimates of capital cost, investment per tonne of nutrients at Rs. 14,283 would be highest in Trombay V Project, followed by Sindri Modernisation (Rs. 11,768), Talcher (Rs. 9150), Ramagundam (Rs. 8979), Haldia (Rs. 7591) and Sindri Rationalisation (Rs. 4051). In all these cases, there was a steep increase in the estimate of investment per tonne over that formulated at the time the projects were approved.

5.5.5.2 *Investment turnover ratio.*—An analysis of the ratio of the turnover to investment made for the years 1972-73 to 1977-78 indicated that the turnover in all the Units (except Nangal in 1977-78) was less than a rupee for each rupee invested. Amongst the Units *inter se,* ratio of turnover to investment at Trombay was consistently higher than other Units though the ratio for Nangal improved considerably in 1975-76 and 1977-78; such ratio was the lowest in Durgapur and Barauni. Details are given in Appendix V.

5.5.5.3 *Cost of feed-stock per tonne of ammonia*

The cost of different types of feed-stock used in producing ammonia was as follows during the last six years :—

Sl. No.	Name of the Unit	Feed-stock	Incidence of cost of feedstock per tonne of ammonia during (in rupees)					
			1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
1.	Sindri	Coal and Naphtha	306	377	627	840	906	1166
2.	Nangal	Electri-city	347	357	332	359	708	703
3.	Trombay	Naphtha	126	203	456	545	506	510
4.	Gorakhpur	Naphtha	175	242	419	537	612	607
5.	Durgapur	Naphtha	—	—	—	1150	974	992
6.	Namrup (excluding Expansion)	Natural gas	60	59	60	173	182	178

It will be seen that natural gas has been the cheapest feed-stock as compared with other types of feed-stock.

5.5.5.4 *Staffing Pattern* : The following table indicates the number of employees per 100 tonnes of nutrients (installed capacity and actual production) for the years 1974-75 to 1977-78 :

Name of the Unit	Number of employees per hundred tonnes of nutrient							
	1974-75		1975-76		1976-77		1977-78	
	Ins-talled capa-city	Actual pro-duc-tion	Ins-talled capa-city	Actual pro-duc-tion	Ins-talled capa-city	Actual pro-duc-tion	Ins-talled capa-city	Actual pro-duc-tion
Sindri	8.5	11.4	8.3	12.4	6.3	20.9	6.2	36.4
Nangal	4.0	7.4	4.0	3.9	3.8	3.7	3.6	5.1
Trombay	3.3	4.0	2.9	3.0	2.5	2.2	2.7	2.5
Namrup	5.0	5.7	5.0	5.0	1.1	2.9	1.1*	2.2*
Gorakhpur	2.7	3.0	2.7	3.7	1.7	2.4	1.7	2.5*
Durgapur	Went into commercial production in October 1974		1.0	4.0	1.0	3.2	1.0	2.9

*Figures based on staff strength as on 31-12-1977.

5.5.5.5 *Cost of production versus Sales realisation*

The following table indicates the cost of production of various fertilizers and the average sales realisations for the last 5 years :

Name of the Units/Products	Feedstock	1973-74		1974-75		1975-76		1976-77		1977-78	
		Total cost	Net sales realisation	Total cost	Net sales realisation	Total cost	Net sales realisation	Total cost	Net sales realisation	Total cost	Net sales realisation
1	2	3	4	5	6	7	8	9	10	11	12
		(Rupees per tonne)									
1. *SINDRI*											
(*a*) Ammonium sulphate	Gypsum, Naphtha, coke	745	448	1013	556	1283	596	1992	617	3251	631
(*b*) Double Salt	Coking coal and sulphur	996	593	1509	867	2105	946	6432	949	Not in	operation
(*c*) Urea		1118	8 9	1604	1065	2313	1124	5530	1357	—do—	
2. *NANGAL*											
Calcium Ammonium Nitrate	Electrolytic hydrogen and lime stone	341	470	441	611	361	672	518	690	666	761

1	2	3	4	5	6	7	8	9	10	11	12
3. *TROMBAY*											
(*a*) Urea	Rock Phosphate, Di-ammonium phosphate, naphtha, potash and sulphur	1069	833	1621	1071	1811	1174	1380	1240	1392	1339
(*b*) Complex Fertilizer 15:15:15		766	1106	1378	2219	1481	1548	1218	1390	1225	1304
4. *NAMRUP*											
(*a*) Urea	Natural gas and sulphur	698	793	739	1058	983	1167	1089	1217	1188	1209
(*b*) Ammonium sulphate		564	436	675	564	774	578	758	601	753	669
5. *GORAKHPUR*											
Urea	Naphtha	844	813	1076	1101	1460	1206	1480	1243	1615	1499
6. *DURGAPUR*											
Urea	Naphtha	Commercial production started with effect from 1-10-1974		3366	1100	2774	1186	2341	1245	2443	1414

The following facts emerge from the above data :—

(i) The cost of production of urea which is produced in the five units, was the lowest at the Namrup Unit and highest at the Durgapur Unit which went into commercial production in October, 1974. Similarly, the cost of production of ammonium sulphate at Sindri was much higher than that at Namrup.

(ii) While the production of calcium ammonium nitrate at Nangal, Urea at Namrup, and complex fertilizer (suphala) at Trombay was economical with reference to the average sales realisation, in other cases cost of production was higher than the average sales realisation. The Ministry have stated (December 1979) that with the introduction of fair retention price of fertilizers based on the recommendation of the Maratha Committee, the position has undergone a change for the better.

6. *Feed-stock*

6.1 *Nitrogenous fertilizers* : Feed-stock is the most important factor in the economics of fertilizer manufacture. Numerous items are used as feed-stock by the Corporation and other producers. Installed capacity as on 31st March, 1978 considered in terms of the feed-stock was as follows :—

Nitrogen

(in lakhs of tonnes)

Sl. No.	Feed-stock	Overall capacity	Share of Corporation	Share of other public sector undertakings	share of private and co-operative sector
1.	Naphtha	21.50	5.36	4.54	11.60
2.	Natural Gas/Associated Gas	5.08	1.97	—	3.11
3.	Coke	0.80	0.70	—	0.10
4.	Lignite	0.70	—	0.70	—
5.	Coke Oven Gas . . .	0.96	0.20	0.72	0.04
6.	Electrolytic hydrogen .	0.84	0.80	0.04	—
7.	Imported	0.40	—	0.40	—
	TOTAL: .	30.28	9.03	6.40	14.85

NOTE :— The data given above are based on Indian Fertilizers Statistics 1974-75 issued by the Ministry of Petroleum and Chemicals and that furnished by the Ministry.

It will be seen that about 72 per cent of the effective capacity was based on naphtha as the feed-stock and that the Corporation's installed capacity was well distributed between different types of feed-stock.

6.2 In November 1970, the Feed-stock Committee, appointed by Government examined the relative economics of manufacture

using different types of feedstock. The Committee came to the following conclusions in this regard :—

(a) Coal and electricity involved the minimum outflow of foreign exchange. In the case of electricity, the available technology, however, made the fertilizer plant more capital intensive than for any other feed-stock, even when power is supplied at cost. As regards coal, the Committee had noted the steps taken by Government to set up 2 or 3 plants based on coal.

(b) Availability of natural and coke-oven gases limited the scope for their utilisation. The use of imported liquified natural gas was not considered practicable immediately because of the high cost of processing and transportation.

(c) Imported ammonia would entail higher outgo of foreign exchange as compared with import of naphtha or fuel oil. Besides, its use would place certain limitations on the product pattern when straight nitrogenous fertilizers were required to be produced. Hence its use could be considered only to a limited extent for production of complex fertilizers at ports.

(d) Naphtha and fuel oil were, thus, the major alternatives available in the choice of feed-stock. The Committee, however, recommended fuel oil or heavy petroleum fraction as the major feed-stock for fertilizer plants to be developed in the Fifth Plan because :

(i) naphtha would be in short supply even to meet the committed requirements of the fertilizer and petro-chemical projects in the foreseeable future, and

(ii) while foreign exchange needed for the setting up of fuel oil based plants would be higher than that

of naphtha based plants, the former would need much less foreign exchange later.

The Review Committee set up by Government to examine the recommendations of the Feed-stock Committee also confirmed (July 1971) the findings in favour of fuel oil as the feed-stock. Considering all the pros and cons, Govt. decided to develop the additional fertilizer capacity in the Fifth Plan based on mainly fuel oil or heavy petroleum fractions. Although coal was considered as an integral part of fertilizer strategy, particularly in the areas close to coal fields, Government wanted to obtain experience on its use in the large-sized plants being set up at Talcher, Ramagundam and Korba by the Corporation before putting up new plants.

Plants being installed or approved in principle are based mainly on fuel oil, heavy stock, coal and natural gas and, to a much lesser extent, on imported ammonia and naphtha as on 31st March 1978 as given below :—

Feed-stock	Over all capacity	Projects under implementation			Projects approved in principle			
		Share of the Corporation	Share of other public sector undertakings	Share of private sector and co-operative sector	Over all capacity	Share of the Corpn.	Share of other public sector undertakings	Share of private and co-operative sector
	(in lakh tonnes of nutrient)							
Fuel oil/heavy stock	11.76	4.33	4.70	2.73	2.28	—	—	2.28
Coal . . .	4.56	4.56	—	—	—	—	—	—
Natural Gas/Associated Gas .	1.30	1.30	—	—	8.35	8.35	—	—
Imported Ammonia	0.75	0.75	—	—	—	—	—	—
Naphtha . . .	2.28		—	2.28	1.00	—	—	1.00
TOTAL: . . .	20.65	10.94	4.70	5.01	11.63	8.35	—	3.28

Taking note of the hardening situation in the prices of petroleum products in the world market, Government reviewed its

feed-stock policy during April 1974 and felt the need to move away from petroleum products to the maximum extent possible and base the additional capacity on coal as feed-stock ; the Ministry informed Audit (July 1976) that :—

(a) While the need for development of additional capacity was recognised, the extent would depend on the off-take. Government had, therefore, recently commissioned National Council of Applied and Economic Research to survey and project fertilizer requirements for the next decade.

(b) It was expected that by 1977 more reliable data would be available both of the demand pattern and availability of petroleum products for use as feed-stock. If at that stage, it was found necessary to develop further nitrogenous fertilizer capacity after fully exploiting the petroleum fractions available, it was intended that the possibility of using coal as feed-stock would be considered.

The Ministry have, further, stated (December 1979) that as a result of availability of gas from Bombay High Off-shore Wells, Government have revised the feed-stock policy again in 1977. The salient features of this policy are as under :—

"(i) Where gas is available, it should be the preferred feed-stock upto the limit the domestic demand permits it.

(ii) Consideration should be given to the further use of coal as fertilizer feed-stock as soon as it can be confirmed on the basis of experience of operation of the coal based Talcher and Ramagundam Plants that the coal gasification technology is established and is viable.

(iii) Thereafter, the use of gas and coal should be arranged on economic consideration *e.g.* area of consumption, logistics of transportation, viability, availability, etc.

(iv) Use of naphtha as fertilizer feed-stock for entirely new plants should be considered only in case of long term disposal problem in an inland location, after decisions have been taken on petro-chemicals projects based on the use of naphtha as feed-stock, where existing plants at inland location can be expanded at relatively lower capital costs and completed in quick time.

(v) Use of fuel oil as fertilizer feed-stock should be excluded for all new projects."

6.3 *Phosphatic fertilizers* : Imported phosphoric acid and sulphur, nitric acid, smelter gases, by-product and waste sulphuric acid, constitute the raw materials for manufacature of phosphatic fertilizers.

Rock phosphate is also used for manufacture of phosphatic fertilizers. Indigenous production of this raw material being inadequate, the balance is met through import; imports in 1971-72 to 1973-74 averaging around 9 lakh tonnes per year.

6.4 *The capacity of the Corporation in terms of feed-stock*

The different types of feed-stock used in different Units of the Corporation in operation, under construction and approved in principle were as under :—

Name of the Unit	Feed-stock	Product	Capacity in terms of product (in lakh of tonnes)	Remarks
1	2	3	4	5
		Operating Units		
1. Sindri	Gypsum, naphtha, coke, coking coal and sulphur	Urea	0.23	The Plant has since been retired
		Ammonium sulphate	3.55	
		Ammonium sulphate nitrate	1.22	The Plant has since been retired

Name of the Unit	Feed-stock	Product	Capacity in terms of product (In lakh of tonnes)	Remarks
2. Nangal	Electrolytic hydrogen and lime stone	Calcium Ammonium Nitrate	3.18	
3. Nangal Expn.	fuel oil	Urea	3.30	
4. Namrup	Natural gas and sulphur	Urea Ammonium sulphate	0.55 1.00	
5. Namrup Expn.	Natural gas	Urea	3.30	
6. Gorakhpur	Naphtha	Urea	1.74	
7. Gorakhpur Expn.	-do-	Urea	1.11	
8. Trombay	Rock phosphate, Di-ammonium phosphate, naphtha, potash and sulphur	Urea Nitro-phosphate 20:20:0	0.99 1.80	
9. Trombay-IV	Ammonia and rock phosphate	Nitro-phosphate	3.61	
10. Durgapur	Naphtha	Urea	3.30	
11. Barauni	-do-	Urea	3.30	
Projects under construction				
1. Talcher	Coal	Urea	4.95	
2. Ramagundam	Coal	Urea	4.95	
3. Haldia	Furnace oil, rock phosphate and sulphur	Urea Nitro-phosphate	1.65 5.00	
4. Sindri Modernisation	Fuel oil/heavy residue	Urea	3.30	
5. Sindri Rationalisation	Rock/Pyrite/ Sulphur	Triple Super-phosphate	3.26	
6. Trombay-V	Naphtha with a provision to changing for natural gas	Urea	3.30	
Projects approved in principle				
Paradeep	Fuel oil, rock phosphate, sulphur, muriate of potash	Urea N.P.K. N.P.	0.243 8.825 5.360	

7. *Gestation period*

In its Sixth Report (Third Lok Sabha), the Committee on Public Undertakings had commented on the time taken in the erection and commissioning of Trombay, Namrup and Gorakhpur Plants of the Corporation. It was mentioned in the Report that, in the opinion of the United Nations Fertilizer Mission (1960-61), the normal time required to complete a fertilizer project in Indian conditions should be 35 to 47 months and that, with the experience gained, the Corporation would be in a position to reduce the time required to set up future projects to 40 to 50 months from the date of approval.

In fact, in the feasibility reports prepared by the Planning and Development Division of the Corporation for new projects, a time schedule of 36 months was mentioned. This schedule, proved to be highly un-realistic; the time actually taken or likely to be taken by the Corporation in completing projects under implementation was much longer as given below :—

Name of the Project	Date of clearance by Government	Anticipated/ actual date of commissioning/ completion	Total period (months)
1. Durgapur . .	Feb. '66	*October 1974	105
2. Barauni . . .	Jan. '67	November 1976	119
3. Talcher . . .	Oct. '69	November 1980	133
4. Ramagundam . .	Oct. '69	August 1980	130
5. Haldia . . .	Nov. '71	April 1981	113
6. Paradeep . .	Still awaited	Project has been approved in principle only.	
7. Namrup Expn. . .	Jan. '67	October 1976	118
8. Nangal Expn. . .	April' 73	November 1978	68
9. Trombay IV Expansion	July' 70	January 1979	103
10. Gorakhpur . .	Jan. '72	April 1976	52
11. Sindri Rationalisation	Dec. '67	October 1979	143
12. Sindri Modernisation	Nov. '73	October 1979	72
13. Trombay V Expansion	Nov. '73	April 1981	89

*Represents the date on which Plant was deemed to have gone into commercial production.

8. *Financial Results*

8.1 *Financial Position*

The financial position of the Corporation over the last five years may be summarised as follows :—

	1973-74	1974-75	1975-76	1976-77	1977-78
					(In crores of rupees)
A. *LIABILITIES*					
(*a*) Paid up capital including advances for shares	301.06	426.46	551.75	662.74	750.58
(*b*) Reserve & Surplus	16.84	16.12	0.92	0.98	0.98
(*c*) Borrowings:					
Unsecured					
(*i*) Government of India	80.45	121.94	233.38	418.71	525.70
(*ii*) Foreign loans guaranteed by Govt. of India	5.92	3.62	1.43	—	—
(*iii*) Deferred credits	49.51	46.46	36.88	28.43	22.40
Secured					
(*i*) Cash Credit	10.71	0.60	27.04	0.19	5.88
(*ii*) Maharashtra and Punjab State Govts. for subsidised housing	0.07	0.07	0.06	0.06	0.05
(*d*) Current Liabilities & Provisions	52.19	76.72	64.92	82.11	103.74
	516.75	691.99	916.38	1193.22	1409.33

1	2	3	4	5	6
B. *ASSETS*					
(*e*) Gross Block	236.12	359.98	395.83	495.19	518.38
(*f*) Less Depreciation	135.70	152.08	170.44	195.16	228.09
(*g*) Net fixed Assets	100.42	207.90	225.39	300.03	290.29
(*h*) Capital-work-in-progress including machinery at site, under erection and in transit, un-allocated expenditure, advances for capital works etc.	346.30	384.22	561.38	687.42	850.35
(*i*) Investments	0.06	0.07	0.06	0.07	0.06
(*j*) Current assets, loans and advances	59.52	85.97	106.54	148.53	144.96
(*k*) Deferred Revenue Expenditure	10.05	13.51	13.57	13.29	12.53
(*l*) Development Expenditure	0.40	0.32	0.31	0.31	0.34
(*m*) Debit balance in Profit and Loss A/c	—	—	9.13	43.57	110.80
	516.75	691.99	916.38	1193.22	1409.33
Capital employed	107.76	217.16	267.02	366.45	331.50
Net worth	307.46	428.75	538.79	605.55	627.90

NOTES : 1. Capital employed represents net fixed assets plus working capital.

2. Net worth represents paid up capital (including advances towards capital) plus reserves less intangible assets.

The following facts are mentioned for a fuller appreciation of the financial position :—

(a) The Corporation failed to pay several instalments of Government loans and interest on them which were due between October 1964 and February 1969 and again between March 1974 and March 1978. As a result, the Corporation had to pay Rs. 202.24 lakhs as penal interest and forego rebate aggregating Rs. 113.85 lakhs upto March 1978. The Corporation had informed the Ministry in May 1975 that loans could not be repaid because of shortfall in resources, credit squeeze, etc.

(b) Fixed assets as on the 31st March 1978 include 21469 acres of land, out of which agreements for

4,282.45 acres had not been executed and possession of 112 acres of land at Sindri had not been obtained (December 1979). These also included lands booked at a provisional value of Rs. 3.08 crores pending finalisation of awards and/or court decisions and lands valued at Rs. 0.84 crore and 1,439.91 acres for which value was not ascertainable, received free of cost from Government and other authorities. Out of Rs. 84 lakhs, land notionally valued at Rs. 23 lakhs has been brought into account.

(c) Current assets include surplus stores and spares (some of which are obsolete) valued at Rs. 1.72 crores on the 31st March 1978 which, on disposal, might not fetch the full book value. In addition, these included spares worth Rs. 3.38 crores relating to the Plants at Sindri Unit which have since been retired. A provision of Rs. 2.90 crores was made on this account in the Profit and Loss Account for the year 1977-78.

(d) Current assets also include Sundry debtors amounting to Rs. 26.19 crores as on 31st March 1978. The outstandings included debts aggregating Rs. 8.07 crores which were more than 1 to 3 years old.

(e) Deferred Revenue Expenditure as on 31st March 1978 included Rs. 1.91 crores being expenditure of a revenue nature incurred by Durgapur Unit from the normal commissioning date of 31st March 1973, till 30th September 1974, the date when commercial production was actually deemed to have commenced.

8.2 *Profitability trends*

As on 31st March 1978, the Corporation had six operating Units in addition to the Planning & Development Division, Sindri.

The Corporation has been earning profits since inception (except for 1966-67) till 1974-75, which aggregated Rs. 28.84 crores upto 31st March 1975, after adjusting loss of Rs. 1.36 crores incurred in 1966-67. From 1975-76 onwards, the Corporation sustained losses. The actual loss for 1975-76, 1976-77 and 1977-78 aggregated Rs. 22.30 crores, Rs. 33.26 crores and Rs. 50.40 crores respectively before prior period adjustments and Rs. 24.56 crores, Rs. 34.45 crores and Rs. 67.20 crores respectively after prior period adjustment.

Unit-wise picture of profit or loss for the last five years ending 31st March 1978 was as follows :—

Sl. No.	Unit	1973-74	1974-75	1975-76	1976-77	1977-78
						(In crores of rupees)
1.	Sindri	(—)7.18	(—)8.93	(—)14.79	(—)17.85	(—)22.44
2.	Nangal	(+)4.36	(+)5.11	(+)9.90	(+)6.96	(+)3.13
3.	Trombay	(+)7.94	(+)10.29	(—)0.58	(+)7.33	(+)7.91
4.	Namrup (including Namrup Expansion in production from 1-10-1976)	(—)0.34	(+)1.07	(—)0.62	(—)2.85	(—)5.90
5.	Gorakhpur (including Expn.)	(—)0.07	(+)0.42	(—)3.37	(—)4.45	(—)4.21
6.	Durgapur	Commenced commercial production in Oct. '74				
			(—)5.63	(—)12.70	(—)10.87	(—)11.65
7.	Planning & Development Division	(+)0.22	(+)0.19	(+)0.30	(—)2.40	(—)2.82
8.	Mining Organisation, Jodhpur	was part of Sindri Unit upto 1974-75		(—) 0.02	(—) 0.05	(+)0.02
9.	Central Office	(—)0.37	(—)1.24	(—)0.42	(—)1.73	*
10.	Barauni	Was under construction upto 1975-76			(—)7.35	(—)14.44
	Corporation as a whole	(+)4.56	(+)1.28	(—)22.30	(—)33.26	(—)50.40

*Charged in the respective units.

NOTE : (+) indicates profit and (—) indicates loss.

A detailed analysis of the working results of the six operating units appears in individual reports on these units, which have been presented to the Parliament separately.

9. *Summing up*

The statistics given in the preceding paragraphs, particularly paragraphs 5.5, 7 and 8, bring out the following :—

(i) Delay in the execution of the projects and substantial cost over-runs with reference to the initial anticipation of the capital cost.

(ii) Poor production performance.

(iii) Low profitability.

An in-depth analysis of the various factors leading to the above situation in respect of the six operating units including their expansion schemes, has been made and the results thereof have been included in the individual Reports on these Units, which have been presented to the Parliament separately. The notable features emerging from the analysis are deficiencies in the planning and the execution of the projects, technological problems and equipment failures and ramification of the pricing policy which allowed an inadequate ex-factory realisation. The Ministry have stated (December 1979) that the following corrective action has been taken to over come the various constraints and deficiencies :—

(i) *Delay in the execution of the projects and substantial cost over-runs in their implementation.*

The Institute of Financial and Management Research, Madras was engaged by the Corporation to make a study in this sphere. The Institute submitted its report in November 1977. According to this report, the main factors responsible for delay in execution of projects and over-run in cost were :

(a) Constraints on foreign exchange and consequent necessity to choose technology and consultants from specific sources.

(b) The need to use indigenous engineering capabilities and equipment manufacturing facilities to reduce dependence on imported equipment and delays in grant of approval.

(c) Inadequate project preparation and planning, slackness in monitoring and lack of coordination between Planning and Development Division of the Corporation and its site authorities.

The above aspects were considered by Government which also took into account the circumstances that prevailed at the time when the projects were taken up for implementation and various constraints that had compelled Government to ask the Corporation to take a particular line of action and the following steps have been initiated in this direction to avoid recurrence of the past experience :—

(a) Detailed cost estimates should be prepared after a project is sanctioned. Normally, it should be possible to do so within a year of the sanction as by that time detailed planning is likely to be completed and even quotations for most of the works received. The instructions have been issued that it should be obligatory on the project authorities to bring up revised estimates for sanction as soon as it is clear that the expenditure would exceed the sanctioned amount by the prescribed percentage.

(b) The project authorities should not be permitted to make any changes in the scope of the project without obtaining the clearance of the Public Investment Board.

(c) The multiplicity of credits should be avoided in the case of projects financed out of foreign loans.

(d) Until indigenous know-how is fully established, only one project should be taken up with such

know-how and in the mean-time foreign know-how should be arranged for other projects.

(e) Development of indigenous equipment should be undertaken independently of the requirements of the project under execution and indigenous equipment should be used only after the production has been established.

(f) In all cases, responsibility for the execution of the project should be clearly defined soon after the project is sanctioned.

(g) Considering the mammoth size of the Corporation and the consequent difficulty in according the required management attention at higher levels to the problems faced in the implementation of the projects and the operation of the plants, the Corporation has been re-structured into a number of companies with effect from 1st April 1978.

(ii) *Poor production performance* :

The main reasons for poor production performance of various Units of the Corporation have been (a) the initial inability to choose the best technology and the best engineering consultants and the subsequent difficulties arising out of credit considerations in buying the best and proven equipment, (b) instability in the supply of power and (c) lack of maintenance.

As regards (a) above, this was due to severe constraints of foreign exchange resources at a time when there was urgency in setting up fertilizer capacity. With the improvement in the foreign exchanage position, the Government have allowed fertilizer industry to go in for global bidding. While in regard to (b) Government have decided, as a matter of policy, to allow captive facilities for power generation, in respect of (c) a high powered Committee has been set up to study the maintenance aspect and recommend corrective measures.

(iii) *Low profitability*

In addition to the measures mentioned above to improve capacity utilisation, Government have, on the basis of the report of the Marathe Committee, introduced a retention price scheme for nitrogenous fertilizers with effect from November 1977, with reference to stipulated levels of efficiency so as to yield a fair return.

10. MARKETING AND PRICING

10.1 *Introduction*

Upto September 1966, the straight nitrogenous fertilizers produced by indigenous manufacturers were purchased by the Central Fertilizer Pool for distribution through State Governments. A Marketing organisation was, therefore, not considered essential by the Corporation.

Government progressively liberalised the marketing of nitrogenous fertilizers from October 1966 onwards and the manufacturers have been permitted to market their entire production on their own from April 1969, subject to the right of the Pool to acquire upto 30 per cent of the production at a negotiated price.

Initially, a nucleus marketing organisation was set up by the Corporation at Durgapur in 1965 to market products from the factories in the Eastern Zone. This was followed in 1966 by an establishment at Trombay to market the suphala produced by its Trombay factory, which was a complex fertilizer and, therefore, not handled by Government through the Pool. This organisation was developed and expanded later.

In April 1970, the Board of Directors appointed a Committee (reconstituted in November 1970) to review the organisational and staffing pattern of the marketing activities of the Corporation. The recommendations made by the Committee in its report of April 1971 were accepted in full by the Board in June 1971 and the re-organisation of the marketing organisation was taken up in a phased manner.

Before the restructuring of the Corporation with effect from 1st April 1978, the Marketing organisation functioned under the

control of Director (Marketing). In addition to the Headquarters Office, the organisation had three Zonal Offices and an Industrial Products Division for the marketing of fertilizers and industrial products respectively, as in the details given below :—

Zones	Production Unit	Principal marketing areas
1. Eastern Marketing Zone	Sindri Namrup Durgapur	States of West Bengal, Orissa, Bihar, Madhya Pradesh, Assam, Meghalaya, Arunachal, Mizoram, Nagaland, Tripura, Manipur, Bhutan, Sikkim, Andaman and Nicobar Islands.
2. Northern Marketing Zone	Gorakhpur Nangal	States of Punjab, Haryana, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Delhi, Chandigarh and Uttar Pradesh.
3. West South Marketing Zone	Trombay	States of Maharashtra, Gujarat Andhra Pradesh, Mysore, Kerala and Tamil Nadu.
4. Industrial Products Division		All India.

As mentioned in paragraph 1.5, the operations of the Marketing Division for the period ending 31st March 1973 were examined by the Committee on Public Undertakings; their Fiftieth Report (Fifth Lok Sabha—April 1974) refers.

After re-organisation of the Corporation, eacah of the Company is responsible for marketing its products.

10.2 *Sales and distribution*

10.2.1 *Sales plan and performance*

A. *Fertilizers.*—The system by which Government of India allotted fertilizers to different States was introduced in July 1972 and continued during 1973-74 to 1977-78, excepting that Government permitted in 1975-76 diversion of fertilizers from one State to another, if there was difficulty in selling it in the State to which it was allotted. The sales plan of the Corporation

was thus mainly based on the quantities of fertilizers allotted by the Zonal Conference to different States. In addition, the plan also took into account the sale of imported fertilizers under the seeding programme (referred to in paragraph 10.4). In September 1977, the task of disposing stock of Pool complex fertilizers lying with the Food Corporation of India was also entrusted to the Corporation.

The zone-wise sales plan and the actual quantities sold in the years 1975-76 to 1977-78 were as under :—

Year	Eastern Marketing Zone		Northern Marketing Zone		West South Marketing zone		Total	
	Quantity (lakhs of tonnes)	Value (Crores of rupees)	Quantity (lakhs of tonnes)	Value (Crores of rupees)	Quantity (lakhs of tonnes)	Value (Crores of rupees)	Quantity (lakhs of tonnes)	Value (Crores of rupees)
1975-76								
Plan	6.90	89.32	3.96	49.49	3.42	57.33	14.28	196.14
Actual	4.94	62.25	4.31	47.99	2.10	34.91	11.35	145.15
1976-77								
Plan	6.15	84.55	3.95	53.21	2.42	36.81	12.52	174.57
Actual	6.01	83.38	6.40	87.24	2.64	39.36	15.05	209.98
1977-78								
Plan	8.64	122.70	10.98	126.06	4.41	63.52	24.03	312.28
Actual	6.52	88.85	6.77	76.00	2.99	58.46	16.28	223.31

There was considerable shortfall in actual sales with reference to the quantity planned in 1975-76 and 1977-78. However, there was appreciable increase in the quantities sold in 1976-77 and 1977-78 over the data for 1975-76. This was mainly due to better production performance in these years as well as availability of larger quantity of imported fertilizer particularly that of Pool fertilizers.

B. *Industrial products.*—Industrial products and by-products produced by the Corporation such as methanol, ammonia,

ammonium bicarbonate, ammonium nitrate, nitric acid, sulphuric acid, argon gas, technical grade urea and ammonium sulphate, carbon dioxide, methylamine, carbon black and coke-oven by-products were sold through dealers as also directly to customers. In addition, imported methanol was also sold through the Corporation. The following table incorporates the sales performance of industrial products and by-products for the years 1975-76 to 1977-78 :—

(In crores of rupees)

Year	Industrial Products		By-products	
	Plan	Actual	Plan	Actual
1975-76	27.00	25.93	..	0.88
1976-77	24.93	23.49	0.96	1.18
1977-78	23.88	25.17	1.30	1.39

10.2.2 *Distribution*

Fertilizers.—Nitrogenous and phosphatic fertilizers were distributed by the Corporation through (i) co-operative and institutional agencies, (ii) private dealers and (iii) unemployed graduates and disabled ex-servicemen appointed as dealers by the Corporation.

The quantities of fertilizers distributed by the three agencies from 1975-76 to 1977-78 were :—

S. No.	Name of agency	1975-76		1976-77		1977-78	
		Number	Quantity	Number	Quantity	Number	Quantity
					(Quantity in lakh of tonnes)		
1.	Co-operative & institutional agencies	290	3.70	345	6.17	410	6.23
2.	Private dealers	2022	5.53	2808	6.82	3120	7.99
3.	Unemployed graduates and disabled soldiers	1500	2.12	1580	2.06	1525	2.06
	TOTAL	3812	11.35	4733	15.05	5055	16.28

(i) In March 1973, based on firm advice of Government, the Corporation had decided to distribute at least half the quantity allotted to each State under the Essential Commodities Act through co-operatives and other institutional agencies. This ratio was maintained in 1973-74 and 1974-75. In 1975-76, it, however, came down steeply to 33 per cent. Though the percentage share of co-operatives and other institutions increased in 1976-77 and 1977-78, it was still less than 50 per cent. It has been explained (May 1980) by the Ministry that the lower share of the Cooperatives/other institutional agencies was not due to lower allotment but due to their failure to lift the quantities offered to them and such unlifted quantities had, therefore, to be distributed through other channels.

(ii) From the data given below it would appear that a large proportion of the total dealers take and distribute relatively small quantities :—

Quantity taken over each year by individual dealers for distribution	Percentage of dealers to total dealers in				
	1973-74	1974-75	1975-76	1976-77	1977-78
0–100 tonnes	47	55	58	62.2	61.3
101 – 200 tonnes	20	20	13	24.2	28.9
201 – 500 tonnes	19	17	16		
501 – 1000 tonnes	10	5	8	8.0	6.2
1001 – 3000 tonnes	3	2	5	5.1	3.1
3001 and above tonnes	..	..	..	0.5	0.5

The total quantity distributed by each group has not been computed.

10.2.3 *Warehousing.*—The Corporation mainly hired godowns from the Central and State Warehousing Corporations. The number of godowns hired and capacity reserved in each

of the three marketing zones from 1973-74 to 1977-78 were as follows :—

(Capacity in thousands of tonnes)

Year	Eastern Marketing Zone		Northern Marketing Zone		West South Marketing Zone		Total	
	Number	Capacity	Number	Capacity	Number	Capacity	Number	Capacity
1973-74	10	1.8	..	..	..	..	10	1.8
1974-75	13	1.9	—	—	17	11.4	30	13.3
1975-76	73	20.9	21	16.0	56	14.8	150	51.7
1976-77	92	49.4	15	11.8	123	43.0	230	104.2
1977-78	122	56.6	36	8.4	125	44.1	283	109.1

In May 1975, Nangal Unit hired 30 godowns with a storage capacity of 8300 tonnes in Punjab, Haryana and Rajasthan for storing calcium ammonium nitrate and ammonium nitrate phosphate during the off-season which lasts from March to June.

Out of 30 godowns, 8 were surrendered on 31st August 1975 and 17 on 30th September 1975. No space was utilised in another 5 godowns. The total quantity despatched and stored in the godowns was 3987 tonnes which were sold between June and September 1975, except a quantity of 4 tonnes found short. Rupees 1.17 lakhs were incurred on rental of godowns and handling charges of the materials. Apart from the hiring and other charges mentioned above, a loss of Rs. 6.52 lakhs was also incurred because of under-recovery of pool equalisation charges on stocks in the godowns as explained in paragraph 10.7.

The Ministry have stated (November 1978) as follows :—

"The decision to hire godown space was based entirely on a sound appreciation of the difficult marketing situation and of the need to reach fertilizers to the

points of consumption so that there was no difficulty in making fertilizer available to the farmers when demand picked up. With the improvement in off-take of CAN, the need for continuing the warehouse was reviewed and warehouse space was progressively given up from August onwards. Further, the storing of CAN was in godowns owned and operated by State/Central Worehousing Corporations and no private godowns were engaged."

10.2.4 *Credit control*

(a) *Credit policy*—The Corporation's credit policy laid down in January 1969 provided for levy of 12 per cent interest from the date of despatch or date of the invoice with a credit free period of 30 days and a rebate of 3 per cent for payments between the 31st and 120th day.

The credit policy was reviewed by the Board in July 1970 and May 1971. According to the decision taken in May 1971, no unsecured credit was to be given and all sales were to be effected on the basis of demand draft or against specified secured documents such as bank guarantee or letter of credit. Simultaneously, the continuance of a number of rebates (*e.g.* quantity rebate, off-season rebate, cash rebate, wholesalers' rebate, etc.) allowed till then was also reviewed in May 1971 and all the rebates were integrated into a quantity rebate with the exception of rebates on the sale of urea to institutional buyers in Uttar Pradesh and of suphala in Trombay Zone.

Credit policy was again reviewed by the Board in March 1976 and it was *inter alia* decided that interest free unsecured credit upto a period of 30 days might be allowed to institutional buyers at the discretion of the Director (Marketing) with concurrence of Director (Finance).

As regards interest free secured credit for 30 days, it was continued for all products except calcium ammonium nitrate for

which it was withdrawn in July 1972 on the consideration that it was a fast moving product.

In the implementation of the above policy, the following points were noticed :—

(i) Interest totalling Rs. 6.96 lakhs due from 4 institutional buyers in Uttar Pradesh for supplies made between 1968-69 and 1971-72 was not paid by these institutions. Out of this amount, non-recovery of Rs. 1.56 lakhs was brought to the notice of the Board in February 1972 and October 1973 and the balance of Rs. 5.40 lakhs was waived by the Board in March 1976 on the ground that the competitors of the Corporation were not insisting for interest on delayed payments and it would be difficult to realise the amount at this late stage.

(ii) An over due amount of Rs. 134.07 lakhs was paid by the Uttar Pradesh Cane Union Federation in December 1975. Interest amounting to Rs. 6.07 lakhs from the date of despatch was claimed in October 1975 but was not paid by the Federation. The Corporation stated that as subsequently decided by the Chairman and Managing Director, the interest was claimed only for the period beyond the interest free credit period of 30 days. On this basis, the amount payable as interest was Rs. 3.94 lakhs; out of this Rs. 2.5 lakhs was realised in October 1976. The Corporation has further stated (January 1980) that the balance amount could not be recovered from the Federation and the case was being processed for write-off sanction.

(b) *Collection of extra money from the dealers*

While supplying fertilizers to some dealers in 1972-73, the Trombay Unit collected an extra amount of Rs. 12.86 lakhs to clear off outstandings of some other dealers. The amount has

been kept in a 'suspense' account. The matter was referred to the Central Bureau of Investigation for investigation in February 1973.

The Ministry stated (November 1978) as under :—

> "The Central Bureau of Investigation completed the enquiry on the Trombay marketing transaction in early 1976 and it took sometime for Government to complete the action proposed by the Central Bureau of Investigation against the officers involved in these transactions. All the formalities in this regard were completed by April/May 1978 and in the meanwhile instructions have also been issued to dispose of the amount kept under suspense account after taking legal opinion in the matter and also in consultation with the Board of Directors of the Company".

10.2.5 *Marketing cost*

A. *Fertilizers* :

The table below compares the total expenditure incurred on marketing and average marketing cost per tonne sold in the various Zones :—

Zones	Total expenditure on marketing			Quantity sold			Cost per tonne		
	75-76	76-77	77-78	75-76	76-77	77-78	75-76	76-77	77-78
1	2	3	4	5	6	7	8	9	10
	(In lakhs of rupees)			(In lakhs of tonnes)			(In rupees per tonne)		
Eastern	281	322	393	4.94	6.01	6.52	57	54	60
Northern	52*	83	101	4.31	6.40	6.77	12	13	15
West South	103	123	172	2.10	2.64	2.99	49	47	58
TOTAL	445@*	528	666	11.35	15.05	16.28	39	35	41

*Excluding NMZ H.O. expenditure.

@*Including Central Office expenditure.

The average marketing cost indicated above included sales and distribution costs of Rs. 17 per tonne in 1975-76, Rs. 16 per tonne in 1976-77 and Rs. 20 per tonne in 1977-78 ; the rest of the expenditure was on promotion and publicity. The incidence of salaries and wages in the average marketing cost was around Rs. 22 in 1975-76, Rs. 18 in 1976-77 and Rs. 23 in 1977-78.

In January 1975, the Corporation had set up, at the instance of the Government, a Committee to study marketing costs, etc. and to identify areas where economies could be effected and procedures and activities streamlined. The Committee submitted its report in August 1975.

The Corporation has stated (October 1979) that the Committee's report had been considered generally before re-organisation of the Corporation and a detailed organisational set up had been reported to the Board in January 1979. It was decided that the C.M.D. should discuss the proposed Marketing organisation in various States with the Ministry of Food and Agriculture.

B. *Industrial products.*—Marketing costs of industrial products had not been analysed.

The Ministry have stated (November 1978) that the marketing cost of industrial products has been around 1.8 per cent of the total turnover which is considered reasonable.

10.2.6 *Freight*

The sale price of fertilizers includes an element of freight. The total expenditure incurred on freight was Rs. 283.51 lakhs in 1975-76, Rs. 630.50 lakhs in 1976-77 and Rs. 593.06 lakhs in 1977-78. The reasons for increase in freight charges in 1976-77 were not available. The table below gives a Unit-wise comparative position of the equated freight per tonne and

average freight per tonne actually incurred on the fertilizers sold during the year 1977-78 :—

Sl. No.	Name of the Unit	Equated freight	Average freight
		(Rs. per tonne)	(Rs. per tonne)
1.	Sindri	56.91	47.04
2.	Namrup	98.91	97.98
3.	Durgapur	59.68	33.00
4.	Gorakhpur	37.63	40.52
5.	Nangal	35.00 for CAN 38.00 for Urea	36.82
6.	Trombay	77.35	39.80
7.	Barauni	43.61	45.40

10.3 *Fertilizer promotion and agricultural research centre*

Traditionally, the basic responsibility for agricultural research and primary promotion largely rests with Government research and extension agencies both at the Central and State levels, agricultural research institutions, agricultural universities, etc. As a supplemental effort, the Corporation has also set up a centre at Calcutta to undertake promotional programmes in its marketing areas. The principal activities of the centre included :—

(i) Fertilizer demonstrations and trials in farmers' fields.

(ii) Soil testing services.

(iii) Farmers' training programmes, such as field days and training camps.

(iv) Technical promotional publicity, distribution of leaflets, crop calendars, etc. and publicity through the press, radio broadcasts and film shows.

An analysis of the activities undertaken by the Centre during 1975-76 to 1977-78 indicated that plan projections were not generally fulfilled in these years, as shown by instances given below :—

Item	Projection			Actual		
	1975-76	1976-77	1977-78	1975-76	1976-77	1977-78
	In numbers					
Fertilizer trials	2105	1865	1600	1948	1728	1362
Fertilizer demonstrations	7253	4603	5007	6951	4639	4566
	In lakhs					
Soil samples	3.31	3.18	3.36	2.81	2.37	2.26

The Corporation has stated that shortfall in achievements was due to shortage of field staff, specially field demonstrators, assistant agronomists at grass root level (March 1977). The Ministry have further explained (November 1978) that in 1975-76 some of the field demonstrators were diverted for undertaking sales work thereby reducing the total number of trials and demonstrations carried out by them.

10.4 *Seeding programme*

10.4.1 *Introduction* : The seeding programme is intended to create an adequate market for items to be produced by expansion and from new projects of the Corporation.

The size of the programme is related to the capacity and the dates of commissioning of the various projects. For this purpose, certain principles were adopted in consultation with the World Bank, according to which the seeding programme was to be phased in such a manner that quantities equivalent to 15 per cent of the installed capacity of expansion of new projects were marketed four years ahead of the date of commencement of production. This percentage was to be raised to 20, 25 and 30 in the third, second and first year.

10.4.2 Initially, the entire seeding requirements were expected to be met from imports. Because of various difficulties, imported fertilizers were actually availabale only in limited quantities.

Upto 1971-72, the fertilizers were directly allotted to the Corporation by the Ministry of Agriculture. From 1972-73 onwards, however, the allotments were routed through the State Governments who were to re-allot the material to manufacturers with a seeding programme. The latter were, however, reluctant to re-allot to the Corporation any material except ammonium nitrate phosphate, which was specifically imported by the Ministry for the seeding programme of the Corporation.

As there was scarcity and supplies of fertilizers were controlled under the Essential Commodities Act, the Corporation marketed its own production mainly within the economic zone of each factory. Even then, limited quantities, out of the production of operating Units, were diverted for seeding programme.

Because of these factors, the Corporation was not able to adhere to the seeding programme of its various expansion and new projects.

10.4.3 The Corporation experienced numerous difficulties (*i.e.* receipt of damaged stocks, short supply, non-standardisation of bags, etc.) in receiving the imported material through the Food Corporation. These were brought to the notice of the Ministry of Agriculture from time to time. Government, however, stated that they would not accept claims on account of damages, short weight, etc. The Corporation being a commercial organisation found it difficult to take in turn such an attitude with the dealers who had started making claims on the Corporation. Meanwhile, the marketing of the imported fertilizers also became difficult on account of ;

(a) change from sellers' to buyers' market ; and

(b) restrictions placed in September 1974 by the Ministry of Agriculture on the use of nitrophosphate on certain types of lands.

In view of the above facts, the Corporation intimated the Ministry in July 1975 that it was not in a position to take any more imported material for its seeding programame. In August 1975, the Ministry of Agriculture informed the Corporation that, in view of the Corporation's request and the unjustified refusal of the Corporation to lift imported material in the past, it had been decided not to direct the State Governments to re-allot imported material to the Corporation. The Ministry have stated (November 1978) that "most of these imported fertilizers remained unsold with Government and finally during the years 1976-77 and 1977-78 efforts are being made to dispose off these products after rebagging and substantial reduction in prices".

10.5 *Staff strength*

As on the 31st March 1978, the total strength of the Marketing Division was 2575 in all ranks ; the numbers in the two main groups (i) Sales and distribution including publicity; and (ii) Promotion, on the 31st March 1976, 1977 and 1978 were as follows :—

Date	Sales and distribution including publicity	Promotion	Total
31st March			
1976	1136	1369	2505
1977	982	1379	2361
1978	1097	1478	2575

The sales turnover per man computed on the staff strength of Sales and Distribution (including publicity) was 999 tonnes in 1975-76, 1533 tonnes in 1976-77 and 1484 tonnes in 1977-78.

10.6 *Pricing policy*

10.6.1 Products of the Corporation are classified into the following categories for the purpose of pricing :—

(i) Fertilizers, prices of which are statutorily controlled by Government (*i.e.* ammonium sulphate, calcium ammonium nitrate and urea).

(ii) Other fertilizers on which there is no statutory control (*i.e.* ammonium sulphate nitrate and suphala).

(iii) Industrial products manufactured and marketed in competition with other manufacturers.

(iv) Monopoly and semi-monopoly products.

Controlled fertilizers : The maximum consumer prices of ammonium sulphate, calcium ammonium nitrate and urea are statutorily controlled by Government under the Fertilizer Control Order. The Corporation has, therefore, necessarily to fix the selling prices of these products within the statutory prices, allowing a reasonable margin to the dealer for his services. Thus, the profit margin available to the Corporation on each product would depend on the feed-stock used, process adopted, installed capacity and the actual capacity utilisation, etc.

Non-controled fertilizers : The products which come under this category are ammonium sulphate nitrate from Sindri and suphala from Trombay. Prices of these items are fixed in the light of the following factors :—

(i) Unit price of nitrogen, phosphorous and potash in the straight fertilizers available in the market.

(ii) Prices of similar fertilizers marketed by competitors.

(iii) Cost of production at a reasonable level of production plus a reasonable return on capital employed.

The Government, however, keep a watch on the prices of non-controlled fertilizers. To step up consumption of phosphatic fertilizers, Government had introduced a scheme for subsidizing these fertilizers to the extent of Rs. 1250 per tonne of P_2O_5 from March 1976. This subsidy was to be passed on to the farmers; in terms of the subsidy scheme, the ceiling selling prices of phosphatic fertilizers were also fixed in March 1976.

Competitive Industrial products.—The products which fall under this category are ammonia, nitric acid (weak and concentrated), ammonium bi-carbonate, sodium nitrate and nitrite, sulphuric acid, carbon black, argon gas, ammonium nitrate, carbon dioxide and coke-oven by-products. As these products are manufactured and marketed in competition with other manufactures, prices of these products are generally fixed in consideration of what the market can bear.

Monopoly or semi-monopoly products.—Methanol and methylamines produced in Trombay Unit and heavy water in Nangal Unit are products in this category. The price of heavy water supplied to the Department of Atomic Energy is fixed on 'cost plus' basis which includes interest on working capital at the prevailing borrowing rate and a return of 15 per cent on half the value of gross fixed assets. Prices of methanol and methylamines are fixed, generally, on the basis of landed cost of imported equivalents. The price of methanol is revised with the concurrence of the Administrative Ministry.

10.6.2 Government had constituted (January 1976) a Pricing Committee (known as the Marathe Committee) to go into the costs and prices of fertilizers. After the first part of the report covering nitrogenous fertilizers was submitted by the Committee in May 1977, the Government of India issued notification on 1st November 1977 under Fertilizer (Control) Order 1957 introducing a system for a fair-ex-factory retention price per tonne of urea for each plant based on a capacity utilisation of 80 per cent and a combination of norms and actuals in regard to the consumption of raw materias, utilities and

other inputs, maintenance and other costs and making provision for a post tax return of 12 per cent on net worth. The system was required to be administered by a Fertilizer Industry Co-ordination Committee which was to operate a fertilizer Price Fund Account. In case the retention price was lower or higher than the ex-factory maximum price, the difference was required to be credited/debited to the account "Fertilizer Price Fund Account" by the unit. During 1st November 1977 to 31st March 1979, the retention prices and ex-factory price fixed for the six operating units of the Corporation were as under :—

Unit	Urea		C.A.N.		A.S.	
	Retention price	Ex-factory price	Retention price	Ex-factory price	Retention price	Ex-factory price
					(Rupees per tonne)	
Namrup	1231	1158	..	..	..	..
Gorakhpur	1499		..	..	..	..
Trombay	1565		..	..	..	..
Durgapur	1571		..	..	..	..
Nangal	1693		849	686	..	..
Sindri	2187				819	625

10.6.3 In December 1974, the Ministry of Agriculture advised the Corporation to treat Railway Out-agencies in the North Eastern Region as Rail-heads for the purposes of delivery on the basis of F.O.R. destination. This was accepted by the Corporation in June 1975 and sale of fertilizer on this basis commenced from July 1975. In accordance with a decision taken by the Board, the Corporation approached the Ministry of Petroleum and Chemicals in March 1976 for reimbursement of the additional freight of Rs. 9.50 lakhs incurred annually by the Corporation in implementing the scheme. The matter was

discussed in the coordination meeting with the Ministry of Agriculture on 24th December 1977 and it was felt that this problem would not arise in future on account of Marathe Committee's recommendations. Accordingly, the Corporation was advised not to pursue the matter.

10.6.4 For ex-godown delivery, the Corporation recovered from dealers in the Eastern Marketing Zone, additional charges at the rates mentioned below from 1972-73 onwards :—

(*i*) Ammonium sulphate	Rs. 10 per tonne
(*ii*) Urea	Rs. 15 per tonne
(*iii*) Suphala	Rs. 20 per tonne
(*iv*) Ammonium nitrate phosphate, for all areas	Rs. 20 per tonne.

As the storage charges (excluding interest on blocked capital) worked out to Rs. 28 per tonne, the Chief (Marketing Research) proposed in March 1975 to increase the godown charges to Rs. 30 per tonne for urea, suphala and ammonium nitrate phosphate and Rs. 25 per tonne for ammonium sulphate, ammonium sulphate nitrate and calcium ammonium nitrate. However, considering the stocks which had piled up, it was decided (May 1975) to maintain the existing rate of godown charges. It was further decided to levy such charges in the case of ammonium sulphate nitrate and calcium ammonium nitrate, too, at rates applicable to ammonium sulphate. The approval of the Board to these rates was obtained in March 1976.

The rationale for fixing warehousing charges at different rates for urea and suphala (sale price of which are more or less the same) was not recorded. In this connection, the Ministry have stated (May 1980) as under :—

> "Warehousing charges were fixed earlier when the price of suphala was more than that of urea. Later the price of urea was increased but the Management did not consider it prudent to change the warehousing charges in order to avoid any unsettlement in the market. It is also further clarified that the

storage requirement for suphala is also for much longer period than for urea."

10.7 *Fertilizer pool equalisation charges*

Government revised retail sale prices and manufacturers' prices (inclusive of dealers' margin, equated freight and excise duty) of urea, ammonium sulphate and calcium ammonium nitrate from June 1974 to cover the increase in the cost of production of fertilizers as also under-realisation on the sale of imported fertilizers. The manufacturers were to deposit the difference between the statutory retail price and the manufacturers' price with Government as fertilizer pool equalisation charges, as given below :—

(Rupees per tonne)

Sl. No.	Product	Sale price on 31st May 1974	Revised sale price from 1st June '74	Manufacturers' price	Fertilizer pool equalisation charges
1.	Urea	1050	2000	1390	610
2.	Ammonium sulphate .	590	925	730	195
3.	Calcium ammonium nitrate	615	1095	800	295

The fertilizer pool equalisation charges were subsequently decreased with corresponding decreases in the retail sale prices as follows :—

(Rupees per tonne)

Effective date	Revised rate for		
	Urea	Ammonium sulphate	Calcium ammonium nitrate
July 1975	335	135	155
September 1975	265	100	115
March 1976	165	100	115
October 1977	65	100	115

According to instructions issued by the Ministry of Agriculture, the pool equalisation charges were to be collected on all sales or outgoings from the factory and deposited in the Government account once a month or before the last working day of the month, failing which penal interest was payable.

It was noticed in audit that the Gorakhpur Unit could not deposit in time the pool equalisation charges for the months March to June 1975 because of financial stringency, and penal interest at 16½ per cent totalling Rs. 2.73 lakhs was paid in September 1975. According to the Ministry, even if the payment had been made in time, it would have been only out of cash credit, which would have entailed a payment of interest at the rate of 14 per cent.

While the pool equalisation charges were payable at the rates ruling on the date of despatch from the factory, these were recoverable from dealers at the rates prevalent on the date of sale. The Corporation had to bear the extra burden of pool charges amounting to Rs. 9.55 lakhs (Rs. 3.03 lakhs for Gorakhpur and Rs. 6.52 lakhs for Nangala Unit) on stocks transferred by Gorakhpur and Nangal Units to the godowns but sold after pool equalisation charges and prices were reduced in July 1975 and March 1976. The Ministry have stated (November 1978) that the Corporation took up the matter with Government and sought for compensation but Government did not agree.

11. *MANPOWER ANALYSIS*

11.1 *Staff strength*

The staff strength of the Corporation for the 3 years ending 31st March 1978 for Units, Divisions and Offices grouped as supervisors (Class I and II Officers) and others and the ratio of supervisors to others are mentioned in Appendix VI.

From the Appendix, the following facts would be noticed:—

(i) Amongst the Operating Units, Sindri had the maximum staff 8,044 and Barauni with 1459 the least.

(ii) The ratio of supervisors to other staff was highest in Sindri Unit and least in the case of Durgapur Unit.

11.1.1 According to the Indian Fertilizer Statistics, 1974-75 compiled by the Ministry of Chemicals and Fertilizers, manpower employed in the fertilizer industry totalled 76,664 (65,292 in the public sector including 28,585 employed in the Corporation, 10,118 in the private sector and 1,254 in the co-operative sector) as on the 31st March 1975. Thus the Corporation employed approximately 37 per cent of the total number employed in the fertilizer industry against which the Corporation's share in overall installed capacity of fertilizers was 26.1 per cent.

The Ministry have stated (December 1978) that the marginal higher rate of employment in the Corporation was largely attributable to the staff strength of the earlier plants and the processes adopted in those plants; the other reasons for higher employment were organisational set up, feed-stock, process technology, fertilizer promotion, etc.

11.2 An analysis of the staff strength of the Operating Units, as on the 31st March 1978 by different departments as compiled by the Corporation, is given in Appendix VII. It will be seen from the Appendix that, while the proportion of production staff to maintenance staff ranged between 1 : 0.9 and 1 : 1.3, the number of persons engaged on administration, personnel, accounts and other ancilliary functions considered as a proportion of production and maintenance staff varied considerably.

The Ministry have stated (December 1978) that these ratios are not comparable from unit to unit for want of uniformity in the composition of each department in various units of the Corporation; efforts were being made to evolve a pattern which was to be finalised in consultation with the Units and Divisions but consequent upon the re-structuring of different Units/ Divisions the position has undergone some changes necessitating a fresh review by the respective corporations.

11.3 Lack of manpower planning at Sindri and Nangal Units of the Corporation was commented upon by the Committee on Public Undertakings in its 6th Report (3rd Lok Sabha, April 1965).

The Norms Committee set up by the Corporation in May 1968 also recommended that the Project Organisation should be developed according to a plan drawn up in advance, both in regard to the permanent set-up of the new Unit and the phasing of the project staff in the three or three and a half years of the construction period. The Corporation has so far (March 1977) finalised the permanent set-up of six Operating Units and four projects under construction (Barauni, Ramagundam, Talcher and Haldia). The permanent set-up in respect of other Divisions and including the Central Office is yet to be decided (March 1977). The permanent set-up decided in respect of Operating Units (excepting Durgapur) also needs to be reviewed because of the expansion schemes undertaken at these Units.

In deciding the permanent set-up of the Units and Divisions, no work study or job evaluation was undertaken except in respect of the Barauni and Trombay Units. It has been stated (March 1977) that permanent set-up was decided after assessment of requirement by the General Managers with the assistance of departmental heads, Industrial Engineering, Finance and Personnel Departments as well as on the basis of on-the-spot study and discussions.

11.4 *Productivity*

Certain productivity indices *e.g.* number of employees per 100 tonnes of nutrients and sales turnover per employee have been given in paragraphs 5.5, 5.4 and 10.5.

11.5 *Staff costs*

Expenditure on salaries and allowances (including bonus and other benefits) of the Corporation increased from Rs. 31.54 crores in 1975-76 to Rs. 43.22 crores in 1977-78; expenditure per employee was Rs. 10,294 in 1975-76, Rs. 10,843 in 1976-77 and Rs. 13,383 in 1977-78.

11.5.1 Overall incidence of staff welfare expenses per employee in respect of operating units was Rs. 1357 in 1975-76, Rs. 1477 in 1976-77 and Rs. 1805 in 1977-78. An analysis of staff welfare expenses indicated that it varied widely amongst the operating units, for example, the position for the year 1977-78 was as follows :—

Sl No.	Operating unit	No. of employees	Expenditure on Welfare	Welfare cost per employee
			(Rs. in lakhs)	(Rs.)
1.	Sindri	8,044	114.48	1423
2.	Nangal	3,394	62.38	1838
3.	Trombay	2,411	64.39	2671
4.	Namrup	2,217	64.74	2920
5.	Gorakhpur	2,268	35.53	1567
6.	Durgapur	1,500	11.36	757
7.	Barauni	1,459	31.43	2154

The Ministry have stated (December 1978) that Welfare Policy of the Corporation was more or less uniform and that the variation in staff welfare expenses from unit to unit was due to the fact that these facilities had generally established in the older units but were in the process of developing in the newer units.

11.5.2 Salaries and allowances included overtime payments which rose from Rs. 1.91 crores in 1976-77 to Rs. 2.48 crores in 1977-78. An Unit/Division/Office-wise position during 1977-78 is indicated below :—

	Wage bill (Rs. in lakhs)	Over-time (Rs. in lakhs)	Percentage of overtim to wage bill
1. Nangal	192.00	8.76	4.6
2. Gorakhpur	198.00	15.14	7.6
3. Namrup	165.10	42.86	26
4. Sindri	450.47	70.00	15.5
5. Trombay	320.16	23.00	6.1
6. Barauni	159.40	27.50	17.3
7. Durgapur	80.00	15.00	18.7
8. Planning and Development	144.25	34.04	23.6
9. Eastern Marketing Zone	5.74	2.94*	51
10. Western Markting Zone	33.81	1.25	3.7
11. Central Office	85.43	7.78	9.1

*Includes arrears of overtime.

The Ministry have stated (December 1978) that the incidence of expenditure on overtime is directly linked with the hourly rates for each employee which in turn is dependent upon the pay element. Therefore, mere increase in overtime expenditure may not strictly reflect the increase in the quantum of overtime.

12. *INTERNAL AUDIT*

12.1 *Introduction*

Internal Audit Department was re-organised in August 1968 with the creation of a Central Internal Audit team in the Central office, in addition to unit-based internal audit. While the unit-based internal audit functions under the control of the Finance Manager and General Manaager, the central teams operate under the control of the Chief Internal Auditor who is responsible to the Director (Finance).

It may be mentioned that a firm of Chartered Accountants engaged by the Corporation to recommend the scope of internal audit functions had made *inter alia* the following recommendations :—

(a) That Internal Audit Department should be independent of the Executive and be under the Chief Internal Auditor.

(b) That the Chief Internal Auditor should report to the Managing Director at periodical intervals.

(c) That Internal Auditors should report to the Chief Internal Auditor.

The Board had accepted the above recommendations subject to the following :—

(i) internal audit organisation be set up at the Central office and the question of the regional teams be considered later on; and

(ii) reports of internal audit to be submitted to the Chief Executive through Director (Finance).

Though the Unit based Internal Audit teams function, under the administrative control of the respective Finance Manager/ General Manager, in pursuance of the instructions issued in June 1976, each Unit based Internal Audit Cell is required to forward to the Chief Auditor of the Corporation half-yearly internal audit programme of the Unit and also a report on the completion of the half yearly audit. Besides, the important irregularities observed by the local Internal Audit Cell are reported to the Director (Finance) with an extract thereof to the Chief Internal Audit.

As on 31st March 1978, the strength of the Internal Audit Department was 88 both in respect of Central Office and the Units.

The Ministry have stated (December 1978) as under .

(i) The question of augmenting the staff strength of Internal Audit Cells of different Units and Divisions was under active consideration of the Management for some time and a High Power Committee was constituted to examine the requirement of staff on the basis of proposals received from Units and Divisions. The Committee made certain recommendations which could not be processed for submission to the Board on account of re-organisation of the Corporation. So far as the Fertilizer Corporation of India, after re-structuring, was concerned the matter would be reviewed for submission to the appropriate authority shortly.

(ii) After the re-organisation of the Corporation steps to induct suitable technical persons in the Central Internal Audit are under way to assist the Chief Auditor in conducting Management and Operational audit.

12.2 *Scope and functions*

The functions of central internal audit were approved by the Chairman and Managing Director in June 1968 and covered a continuous review of operations and records in accounting, finance and all other areas of activity by specially assigned staff, to ;

(i) achieve the highest possible production ;

(ii) reduce costs by minimising waste, maximum utilisation of plant, manpower, materials, etc. ;

(iii) simplify procedures and make controls more effective ; and

(iv) exercise moral check.

While the duties and responsibilities of the unit-based internal audit have been laid down in Chapter IX of the Accounts Manual, those in respect of Central Internal Audit have not been manualised. The Ministry have stated (December 1978) that since the specific points of interest to be looked into either in general or for a particular Unit/Division under the orders of the Chief Auditor or higher authorities, are included in the audit programme, the need for manualising instructions on the functioning of Central Internal Audit was not felt.

12.3 *System of reporting*

Based on the Quarterly Audit programme approved by the Director (Finance), audit of various Units, Divisions and Offices is undertaken by Central internal audit and the report on the results of audit is approved by the Chief Auditor, Central Office. Afterwards, copies of the reports are sent to the head of the concerned Unit, Division, the Chairman and Managing Director, the Director (Finance) and the concerned functional Director.

The Unit-based internal audit team submits its report to the Finance Manager and General Manager of the Unit. To bring about co-ordination between internal audit at the Units and the central office, instructions have been issued in June 1976 to associate the unit-based internal audit staff with the central team visiting a particular Unit and also for submission to the Chief Internal Audit of the audit programmes and extracts of important irregularities raised by the unit-based internal audit staff.

12.4 *Review of activities*

It was observed that the coverage of internal audit of various units and offices by the Central Audit, during the five years ending March 1978 was not adequate. Similarly, unit-based internal audit had not covered a number of operational activities ; audit was not completed as per the approved programmes, and important fields like checking of civil work contracts, measurement books, material issued to contractors, recovery of hire charges for use of heavy mobile equipment, material management, inventory control etc., were not scrutinised in internal audit.

The Statutory Auditors in their reports to the shareholders on the accounts for the years 1975-76 to 1977-78 have also mentioned that the extent and depth of internal audit (Central as well as Unit-based) did not appear to be commensurate with its size and nature of its business.

12.5 *Physical verification of stores*

Physical verification of stores earlier entrusted to internal audit at Unit level was transferred in March 1971 to the Materials/Management Department. The effect of this is that stores are being checked and verified by the agency responsible for holding the stores.

The Ministry have stated (December 1978) that the functions of physical verification were transferred to the Materials

Management on the recommendations of the Management Consultants. Further, apart from reconciliation of stores accounts records maintained by Accounts Department with Stores Department records, test check with book balances of the items physically available in the Stores are also done by the Statutory Auditors and Internal Auditors during the course of their audit, if felt necessary.

(P. P. GANGADHARAN)

Chairman, Audit Board and Ex-officio Additional Deputy Comptroller and Auditor General (Commercial)

New Delhi
The 21-2-1981

Countersigned

(GIAN PRAKASH)

Comptroller and Auditor General of India

New Delhi
The 21-2-1981

APPENDIX - I

(Referred to in Paragraph 1.1)

Statement showing the questions referred to the Study Team by the Ministry of Petroleum & Chemicals and recommendations of the Team.

QUESTIONS

1. Should there be one, two, or possibly several public sector corporations? What should be the optimum size of a Corporation?

2. Should the system be aimed at developing the corporations along the lines of European Government Corporations such as ONIA and Dutch State Mines (which are quite successful and appear to have a high degree of autonomy), of TVA, of private industry, or through some combination of these? What should be the top managerial set up for the recommended form of organisation?

3. Are any changes necessary in the powers enjoyed by the public sector corporations?

4. What changes, if any, are necessary in the organisational features of the present corporations for dealing with future plant?

5. What should be the relationship of the designing and engineering groups with production units?

6. Should the two present design and engineering groups be combined into one?

7. Is the separate engineering by FCI and FACT of various units at one project a feasible arrangement?

8. Do the existing operation control systems require any change for maximising production in present and future plants?

9. What further steps can be taken to develop design, engineering, fabrication and construction competence in India and make it competitive with or replace foreign sources?

10. What procedures or arrangements should be followed for expediting construction and avoiding delays?

11. On the basis of the general future organisation recommended by the team, what is the best arrangement for product marketing?

Recommendations

1. There should be a single public sector fertilizer corporation.

2. The corporation should be directed by a Board of six or seven members, made up of full-time Functional Directors and two Government Representatives.

3. The corporation Headquarters should be made up of the heads of Functioning divisions who service and control unit and Regional activities under a policy of wide Decentralization.

4. Complete administrative separation should be maintained between Research, Design and Engineeringg groups on the one hand and Production units on the other.

5. P & D and FEDO should be continued as entities under a technical director, who will be responsible for research, design and Engineering Functions.

6. Separate Engineering of sub-plants at some Projects by P & D and FEDO is feasible.

7. A post of Director of new Projects should be established to be responsible for construction of all new projects and major expansions.

8. Indigenous design, engineering and construction should be further developed by engaging Indian Organisatnios outside the corporation to Design and Build Structures and works not directly involved in Chemical processes.

9. Separate groups should be established in the Technical Division to inspect and expedite the manufacture, fabrication, and transport of equipment made in India or abroad.

10. A single Marketing Division should be established to market the products of all the Manufacturing units of the corporation and such fertilizers as may be produced by plants in other public sector corporations as incidental to their major functions.

11. The Marketing Division should be organised by regions and areas to cover the country and these should function under the direction of the C ntral Headquarters.

APPENDIX—II

(Referred to in paragraph 5.5.3)

Quantity='000 tonnes Value=Rs. million

Product-wise Imports of Fertilizers

Product	1969-70		1970-71		1971-72		1972-73		1973-74		1974-75		1975-76		1976-77		1977-78	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A.S.	790	262.8	83	27.5	186	31.19	128	27.5	75	39.0	235	0261.52	96.0	143.7	—	—	3.8	2.8
Urea	938	620.7	780	458.9	550	249.35	1008	507.9	1034	737.1	1244	2711.67	1545.0	3668.4	1596.9	1772.7	1498.9	1845.0
A.C.	—	—	—	—	—	—	—	—	—	—	30	48.78	30.0	47.6	—	—	—	—
A.N.P.	7	3.3	17	9.7	—	—	56	31.9	240	202.0	183	323.88	—	—	34.6	40.2	—	—
A.S.N.	—	—	25	10.3	32	11.37	—	—	2	1.8	14	17.19	10.0	17.6	—	—	—	—
C.A.N.	83	35.5	280	108.8	317	113.69	318	121.9	183	105.6	360	559.00	176.0	274.0	4.5	4.9	14.3	12.4
Di-A.P.	125	66.2	12	7.1	353	200.03	348	273.8	340	359.8	436	982.14	536.0	1477.6	30.1	43.4	356.3	532.7
S.O.P.	4	2.1	24	18.9	—	—	6	3.2	5	3.0	10	11.56	—	—	10.5	12.3	14.6	16.7
Muriate of Potash (Pool)	27	7.0	135	52.0	362	110.40	504	160.2	607	275.0	649	467.41	390.0	327.4	441.0	305.8	986.0	654.8
(STC/MMTC)	125	45.4	22	8.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NPK Mixture	184	124.7	121	65.9	289	183.64	119	76.6	55	44.2	285	593.42	618.0	1271.5	13.4	22.8	—	—
M. APK	—	—	—	—	—	—	12	9.6	—	—	—	—	—	—	—	—	—	—
T.S.P.	—	—	—	—	—	—	—	—	—	—	5	14.77	—	—	—	—	—	—
TOTAL	2283	1167.7	1499	767.8	2089	899.67	2499	1212.6	2541	1767.5	3451	5991.34	3401.0	7227.8	2131.0	2202.1	2873.9	3064.4

Abri.=A.S.=Ammonium Sulphate; A.C.=Ammonium Chloride; ANP=Amm. Nitro-phosphate; ASN=Amm. Sulphate-Nitrate; C.A.N.=Cal. Amm. Nitrate; Di A.P.=Di-Ammonium Phosphate; S.O.P.=Sulphate of Potash; T.S.P.=Triple-Super-Phosphate.

APPENDIX III

(Referred to in para 5.5.4)

(Rated capacity and Actual production—in lakhs of tonnes)

Statement showing unit-wise capacity utilisation of main products

	Rated capacity	1970-71		1971-72		1972-73		1973-74		1974-75		1975-76		1976-77		1977-78	
		Actual production	%of utilisation	Actual production	%of utilisation	Actual production	%of utilisation	Actual production	%of utilisation	Actual production	%of utilisation	Actual production	%of utilisation	Actual production	% of utilisation	Actual production	%of utilisation
Sindri																	
Ammonium Sulphate	3.55	2.75	78	2.31	65	1.72	50	1.94	55	1.98	56	1.77	50	1.03	29	0.43	12
Double Salt (ASN)	1.22	0.42	34	0.31	25	0.57	47	0.48	40	0.27	22	0.21	17	0.02	2	—	—
Urea	0.23	0.15	65	0.14	61	0.11	48	0.12	52	0.09	40	0.07	30	0.004	2	—	—
Nangal																	
Calcium Amm. Nit.	3.18	2.15	68	2.23	71	2.14	67	2.46	77	1.61	51	3.05	96	3.20	101	2.21	69
Heavy water (tonnes)	14	8.87	63	12	86	10	71	11	80	8	60	14£	100	14	100	9	64
Trombay																	
Urea	0.99	0.74	75	0.61	62	0.56	57	0.57	58	0.63	64	0.80	81	1.04	105	1.06	107
NPK 15:15:15	2.10	@			@	2.46	117	2.13	101	2.11	100	1.81	90	1.82	87	2.14	102
20:20:0	1.80					—		—		—		0.22	12	0.88	49	0.28	16
Ammonia	1.06	0.83	80	0.88	83	0.95	90	0.87	82	0.79	75	0.81	76	1.03	97	1.03	97
Namrup																	
Amm. Sulpt	1.00	0.60	60	0.56	56	0.60	60	0.64	64	0.70	70	0.95	95	0.92	92	0.91	91
Urea	0.55	0.31	56	0.40	73	0.48	87	0.50	91	0.55	100	0.55	100	0.58	105	0.56	102
Gorakhpur																	
Urea	+1.74	1.47	84	1.65	95	1.51	87	1.40	80	1.58	91	1.29	74	2.07	73	1.93	68
Durgapur																	
Urea	3.30	—	—	—	—	—	—	—	—	0.25*	15	0.80	24	1.01	31	1.12	34
Ammonia	1.98									0.18*	18	0.46	23				

*As commercial production started from 1-10-1974, capacity utilisations were with reference to 50% of the rated capacity.

£Excluding production from tritiated heavy water.

@NPK of different composition was produced for which rated capacity was not separately fixed. Hence capacity utilisation could not be assessed. Further during 72-73, 73-74, 74-75 the 20:20:0 grade was not produced. It is presumed that the capacity of 20:20:0 was utilised in producing 15:15:15.

+Increased to 2.85 lakh tonnes after implementation of expansion programme in January 1976.

APPENDIX IV

(Referred to in paragraph 5.5.5.1)

Statement showing investment per tonne of finished product and nutrient

Sl. No.	Name of the Unit	Date of and or anticipated date of commencement of production.	Original Capacity in tonnes		Project cost		Investment per tonne			
			Product	Nutrient	As per initial approval/ actual expenditure	As per revised estimates/actual expenditure	Product		Nutrient	
							As per initial approval/ actual expenditure	As per revised estimates/ actual expenditure	As per initial approval/ actual expenditure	As per latest revised estimates/ actual expenditure
			(in lakh tonnes)		(Rs. in crores)					
			OPERATING UNITS							
1.	Sindri I&II	October, 1951	A.S. 3.55	0.75	—	25.77	—	726	—	3436
			Urea 0.23	0.11	11.02	11.52	760	794	2563	2679
			Double Salt 1.22	0.32	—	—	—	—	—	—
2.	Nangal	February, 1961	CAN 3.18	0.80	24.71	28.80	777	905	3089	3600
3.	Trombay I	November, 1965	Urea 0.99 Suphala (16:13:0) 2.70	1.24	40.78	59.27	1105	1606	3289	4780
4.	Namrup	January, 1969	Urea 0.55	0.24	10.05	13.41	1828	2438	4187	5586
			A.S. 1.00	0.21	7.98	10.86	798	1086	3800	5171
5.	Gorakhpur	February, 1968	Urea 1.74	0.80	27.11	34.65	1558	1992	3388	4331
6.	Durgapur	October, 1973 (Commercial Production started in October, 1974)	Urea 3.30	1.52(5)	38.09	102.15 (inclusive 13.54 crores for Capative Power Plant).	1154	3095	2506	6720
7.	Namrup Expn.	October, 1976	Urea 3.30	1.52	29.47	72.91	893	2209	1938	4797
8.	Nangal Expn.	November, 1978	Urea 3.30	1.52	75.60	129.83	2291	3934	4974	8541
9.	Gorakhpur Expn.	January, 1976	Urea 1.11	0.51	11.83	18.39	1066	1657	2320	3606
10.	Barauni	November, 1976	Urea 3.30	1.52	35.14	92.32	1065	2798	2312	6074
11.	Trombay Exp.	January, 1979	N.P. (20:8:20:8) 3.61	0.75 .75 P205	44.02	76.27	1219	2113	2935	5085
			PROJECTS UNDER CONSTRUCTION							
1.	Korba	Not taken up	Urea 4.95	2.28	118.25	201.70	2389	4075	5186	8846
2.	Sindri Modernisation	October, 1979	Urea 3.30	1.52	88.92	178.88	2695	5421	5858	11768
3.	Trombay Exp. V	April, 1981	Urea 2.58	1.19	111.40	169.97	4318	6588	9361	14283
4.	Haldia	April, 1981	Urea 1.65	0.76	88.03	228.51	1324	3661	3436	7591
			Nitro Phosphate 5.00	2.25						
5.	Sindri Rationalisation	October, 1979	T.S.P. 3.26	1.50 P205	22.96	60.77	704	1864	1531	4051
6.	Talcher	November, 1980	Urea 4.95	2.28	70.49	208.63	1424	4105	4214	9150
7.	Ramagundam	August, 1980	Urea 4.95	2.28	71.18	204.73	1436	4101	4136	8979

APPENDIX V

(Referred to in paragraph 5.5.5.2)

Statement showing the ratio of turnover to investment of the operating Units

Units	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Sindri	27 : 100	28 : 100	36 : 100	33 : 100	20 : 100	15 : 100
Nangal	39 : 100	49 : 100	46 : 100	70 : 100	69 : 100	101 : 100
Trombay	72 : 100	84 : 100	90 : 100	63 : 100	85 : 100	87 : 100
Namrup	28 : 100	31 : 100	42 : 100	58 : 100	30 : 100	35 : 100
Gorakhpur	43 : 100	48 : 100	73 : 100	52 : 100	72 : 100	71 - 100
Durgapur	—	—	—	17 : 100	21 : 100	31 : 100
Barauni	—	—	—	—	5 : 100	17 : 100

APPENDIX VI

(Refer Paragraph 11.1)

Statement showing the overall staff strength of the Corporation for 1975-76, 1976-77 and 1977-78

Sl. No.	Name of the Unit/ Divn./Office	As on 31-3-1976				As on 31-3-1977				As on 31-3-1978			
		Super-visors	Others	Total	Ratio of Sup. to others	Super-visors	Others	Total	Ratio of sup. to others	Super-visors	Others	Total	Ratio of sup. to others
1		2	3	4	5	6	7	8	9	10	11	12	13
UNITS													
1.	Sindri	589	7391	7980	1:12.5	734	7297	8031	1 : 9.9	801	7243	8044	1 : 9.0
2.	Nangal & Ngl. Expansion	437	3034	3471	1 : 7	452	3002	3454	1 : 6.6	486	2908	3394	1 : 6.0
3.	Trombay	534	1801	2335	1 : 3.3	570	1798	2368	1 : 3.2	582	1829	2411	1 : 3.1
4.	Namrup	347	1908	2255	1 : 5.5	341	1887	2228	1 : 5.6	353	1864	2217	1 : 5.3
5.	Gorakhpur	283	2005	2288	1 : 7	312	1952	2264	1 : 6.3	317	1951	2268	1 : 6.2
6.	Durgapur	279	1188	1467	1 : 4.2	431	1053	1484	1 : 2.4	443	1057	1500	1 : 2.3
7.	Barauni	275	1058	1333	1 : 3.8	285	1148	1433	1 : 4.0	301	1158	1459	1 : 3.8
	Sub Total	2744	18385	21129		3125	18137	21262		3283	18010	21293	

PROJECTS UNDER CONSTRUCTION												
1. Ramagundam	173	744	917	1 : 4.3	199	825	1024	1 : 4.1	227	935	1162	1 : 4.1
2. Talcher	173	569	742	1 : 3.2	190	779	969	1 : 4.1	221	856	1077	1 : 3.9
3. Haldia	130	386	516	1 : 2.9	206	439	645	1 : 2.1	291	750	1041	1 : 2.6
4 Korba	25	80	105	1 : 3.2	25	102	127	1 : 4.1	20	100	120	1 : 5.0
Sub Total	501	1779	2280		620	2145	2765		759	2641	3400	
OFFICES												
1. Jodhpur	29	460	489	1 : 15.8	27	423	450	1 : 15.7	32	393	425	1 : 12.3
2. B.P.L.O.	30	89	119	1 : 3	40	79	119	1 : 2.0	41	79	120	1 : 1.9
3. C.P.L.O.	13	106	119	1 : 8.1	19	115	134	1 : 6.1	19	119	138	1 : 6.2
4. F.P.&A.R.C.	266	755	1021	1 : 2.8	277	778	1055	1 : 2.8	312	804	1116	1 : 2.6
5. Marketing Dn.	538	783	1321	1 : 1.4	540	913	1453	1 : 1.7	572	1027	1599	1 : 1.8
6. P&D Division	1233	2296	3529	1 : 1.8	1199	2295	3494	1 : 1.9	1539	2032	3571	1 : 1.3
7. Central Office	159	469	628	1 : 2.9	166	471	637	1 : 2.8	169	463	632	1 : 2.7
Sub-Total	2268	4958	7226		2268	5074	7342		2684	4917	7601	
Grand Total	5513	25122	30635		6013	25356	31369		6726	25568	32294	

APPENDIX VII

(Referred to in paragraphs 11.2)

Statement showing the staffing pattern of operating units as on 31-3-1978

	Sindri	Nangal	*Trombay	*Namrup	*Gorakhpur	*Durgapur	*Barauni
1	2	3	4	5	6	7	8
Administration	390	195	83	170	149	99	122
Personnel	536	213	75	142	148	114	92
Materials Management	948	120	293	153	169	193	205
Maintenance	2227	1319	795	828	850	446	456
Production	2394	1006	903	680	652	404	366
Accounts	225	156	98	94	129	101	94
(*i*) Ratio of production to Maintenance staff	1 : 0.9	1 : 1.3	1 : 0.9	1 : 1.2	1 : 1.3	1 : 1.1	1 : 1.3
(*ii*) Ratio of Accounts to Production-cum-maintenance staff. . . .	1 : 20.5	1 : 14.9	1 : 17.3	1 : 16.0	1 : 11.6	1 : 8.4	1 : 8.7
(*iii*) Ratio of personnel to production-cum-maintenance staff. . . .	1 : 8.6	1 : 10.9	1 : 22.6	1 : 10.6	1 : 10.6	1 : 7.5	1 : 8.9
(*iv*) Ratio of Administration to production-cum-maintenance.	1 : 11.8	1 : 11.9	1 : 20.4	1 : 8.9	1 : 10.1	1 : 8.6	1 : 6.7
(*v*) Ratio of materials management to production-cum-maintenance staff.	1 : 4.9	1 : 19.4	1 : 5.8	1 : 9.9	1 : 8.9	1 : 4.4	1 : 4.0

*As on 31-12-1977

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