REPORT OF
THE WORKING GROUP
ON FERTILIZER INDUSTRY
FOR THE
TWELFTH PLAN
(2012-13 TO 2016-17)

Government of India
Ministry of Chemicals & Fertilizers
Department of Fertilizers

CONTENTS

CHAPTER-I

1.0 INTRODUCTION

1.1 Chemical fertilizers have played an important role in making the country self-reliant in food grain production. The role of Government of India has been significant as the Government has been consistently pursuing policies conducive to increased availability and consumption of fertilizers at affordable prices in the country. It is for this reason that the annual consumption of fertilizers, in nutrient terms (N, P & K), has increased from 0.07 million MT in 1951-52 to more than 28 million MT in 2010-11 and per hectare consumption, has increased from less than 1 Kg in 1951-52 to the level of 135 Kg now.

1.2 Agriculture productivity is dependent upon various factors like soil properties, climate conditions, irrigation facilities, seed quality and variety, cropping pattern, techniques of farming, prevention from pests etc, but more importantly usage of optimum primary, secondary and micro nutrients. Thus, the role of Government becomes more significant in making available all types of nutrient at affordable prices to farmers at appropriate time.

1.3 For the Twelfth Five Year Plan i.e. from 2012-17, a working committee has been set up by Planning Commission under Chairmanship of Secretary (F). The composition and terms of reference of Working Group is mentioned in subsequent paragraphs.

1.4 Composition of Sub-Groups are as follows:

A) Group-I

1. Shri S.C. Gupta, Joint Secretary (F&P) – Chairman.
2. Shri R.G. Rajan, CMD, RCF
3. Shri K.C. Katta, CMD, PDIL
4. Shri B.D. Sinha, MD, KRIBHCO
5. Representative from Ministry of Petroleum & NG.

6. Representative from Ministry of Agriculture
7. Representative from Planning Commission
8. Representative from ONGC
9. Representative from GAIL
10. Shri M.P. Johnson, DDG/DOF.

B) Group-II

1. Shri Satish Chandra, Joint Secretary (A&M) – Chairman.
2. Smt. Neeru Abrol, Director(Finance)/NFL
3. Representative from Ministry of Railways.
4. Representative from Ministry of Shipping.
5. Representative from Ministry of Road & Highways
6. Representative from Planning Commission.
7. Managing Director, IFFCO
8. CMD, Coromandel International Fertilizers Ltd.
9. CMD, GSFC

C) Group-III

1. Shri S.L.Goyal, Joint Secretary (P&P) – Chairman.
2. Shri A.K. Parashar, Economic Adviser/DOF
3. Shri K.C. Katta, CMD, PDIL
4. Representative from Ministry of Agriculture
5. Representative from NCAER
6. Representative from ICAR
7. Representative from Planning Commission
8. Managing Director, Tata Chemicals Limited.

1.5 TERMS OF REFERENCE

The terms of reference of the sub groups constituted under the working committee is placed below:

Group-I

1.5.1 Assessment of requirement of Raw materials/finished fertilizer to meet the demand of all types of fertilizers in the country including steps to increase indigenous production, with an objective to reduce subsidy levels. The Group may include but not limited to the following:-

a) To assess the requirement of various inputs and infrastructural facilities required during the next five years to fill the gap between demand and supply as far as possible and in the perspective of 15 years. This should also throw light on strength and weaknesses of our domestic industry that need strengthening, including technological upgradation.

b) To suggest the manner in which to meet the fertilizer demand, total and region-wise, based on a critical techno-economic analysis of buy-versus-make options or strategic reasons and to suggest optimum level of indigenous capacity addition, after assessing the possible joint ventures by companies in countries having comparatively cheaper feedstock/energy sources; and to examine the need to proactively pursue joint ventures of Indian entities abroad.

c) To assess the feasibility of revival of the closed urea units of FCIL and HFCL, especially in the context of existing infrastructural facility, interest shown by certain fertilizer as well as non-fertilizer PSUs in their revival, scenario of availability of gas in future and particularly with reference to the need for having production in the eastern part of the country to reduce import dependence.

d) To assess the year-wise investment required to be made/being made by the public sector, cooperative and the private sector fertilizer units for augmenting their production capacity or modernization including investments for change-over by the existing Naphtha/Fuel Oil (FO)/ Low sulphur Heavy Stock (LSHS) units into gas based production and its status thereof.

e) To assess the health of the fertilizer industry particularly, PSEs and to suggest measures for improvements and mobilization of the required investments

Group-II

1.5.2 Demand Projection and movement of Fertilizers to end users and the use of new fertilizer practices. The following scope was included in terms of reference of Group –II :

a) To clearly articulate the mid- and long term goals of the sector.
b) To assess the region –wise/state-wise fertilizer demand-supply for the Twelfth Plan and beyond (in the perspective of 15 years);
c) To review the status of the industry up to and during the Eleventh Plan period along with an analysis of growth in demand and demand- production gap, feedstock/raw material availability and infrastructural limitations, level of energy efficiency in production compared to best units at the international level, impact of policy changes made during the period and status of joint ventures abroad with a view to ensuring security of fertilizers and fertilizer inputs for production in the country.
d) To assess the feedstock / inputs limitations in general and measures to sustain the pace of growth in domestic production of fertilizers;
e) To review the present status of various taxes/duties, state-wise, on fertilizers/raw materials and suggest measures for their rationalization, particularly in the wake of proposed implementation of Goods and Services Tax (GST)
f) To assess the need for a fertilizer prices regulatory body in the Wake of opening of the MRPs of fertilizers.
g) The group may also make any other recommendations that may be considered appropriate for increasing efficiency, reducing cost and import, etc

Group-III

1.5.3 Technological and R&D issues relating to Fertilizer Industry and to suggest technological upgradation of the current industry to international standard. The Group may include but not limited to the following:-

a) To assess the current status of research and development in the fertilizer sector and areas of strength and weakness including industry's linkages with institutions for R&D and to identify new thrust areas for R&D

b) To quantify' fund requirement of R&D and means to source them

c) To suggest measures for improving the industry-institutional linkage for R&D.

d) To review and suggest measures on the following issues:-

   i. Efficient and balanced usage of fertilizers;

   ii. Agronomical importance of low analysis fertilizers, specially SSP as well as that of city compost, organic and bio-fertilizers

   iii. Deficiencies of secondary and micro nutrients in the soil (other than NPK);

   iv. Production and use of bio-fertilizers;

   v. Production of slow –release fertilizers;

   vi. Declining response ratio of the soil to the fertilizer application;

   vii. Importance of soil mapping for site specific nutrient management.

e) To assess the need for a regulatory body under FCO for fast track approval of new products for inclusion in the FCO.

Reports of the Sub groups have extensively been used for discussion and finalization of the working Group Report

1.6 **XIIth Plan outlook of Fertilizer Industry**

1.6. The key issues in fertilizer sector are matter related to:

a. Agricultural productivity and balanced fertilization.

b. Indigenous production and overall supply of fertilizers.

c. Fertilizer subsidy.

1.6.1 There is no denying the fact that over the years increased usage of fertilizer has played a significant role in increase of agriculture productivity. Current trends in agricultural output, however, depict that the marginal productivity of soil in relation to the application of fertilizers is declining. The comparatively high usage of straight fertilizers (Urea, DAP & MOP) as against the complex fertilizers (NPKs) which are considered to be agronomically better including low or non usage of secondary and micro nutrients has also probably contributed towards slowdown in growth of productivity. The declining fertilizer use efficiency is also one of the factors for low productivity. The pricing of subsidized fertilizers is also probable responsible for higher usage of straight fertilizers and skewed usage of nutrients. The manufacturers/importers were earlier not willing to fortify the subsidized fertilizers with secondary and micro nutrients, which are only required in nominal quantities as the additional cost for the same was required to be borne by them from their own return on fertilizer production. However, now the manufacturers / importers are allowed to charge 5% above MRP in case of fortified subsidized fertilizer (10% for zincated urea and Boronated SSP) and thus better availability of fortified fertilizers is being ensured by the suppliers. It is therefore more relevant in times to come for the Government to ensure balanced usage of fertilizers comprising of primary, secondary and micro nutrients in optimum quantities by the farmers and to simultaneously monitor the farm productivity levels so that the country is able to generate export surplus after meeting the demand of agriculture produce by the populace.

1.6.2 It is a well known fact that the country is completely lacking in potassic (K) resources and has to entirely depend upon import for meeting the requirement of potash (MOP) for agriculture usage. The country is also deficient in phosphatic (P) resources with around 90% requirement of the country being met through direct import of finished phosphatic fertilizers or phosphatic raw materials/intermediates for indigenous production of phosphatic fertilizers. Urea (N) is the only fertilizer, the requirement of which is largely (around 80%) met through indigenous resources. Even in urea production, RLNG and crude oil

which provides Naphtha & FO/LSHS are imported, the indigenous production can be considered to be partially import dependent. Over the years, the consumption of fertilizer in the country has risen steadily, while the indigenous production of fertilizers has not increased likewise to meet the growing requirement mainly due to raw materials / inputs limitations. There has been hardly any investment in urea sector in last decade except for few revamp and modernization been carried out by few urea units after the Government notified IPP linked New Investment Policy in 2008. Further, the indigenous capacities for phosphatic fertilizers, especially DAP remain underutilized due to raw material constraints and their international pricing levels. India is, thus, becoming more and more import dependent in phosphatic and potassic sector and even the gap of production and consumption in nitrogenous sector is also widening. The increasing international prices of inputs as well as finished fertilizers are making the growing fertilizer subsidies unsustainable. Urea is the only sector where the country can achieve self sufficiency provided the new gas finds are committed for the new urea units and alternative resources like coal, CBM etc. are used for urea production. It is, therefore, pertinent that conducive policy environment be created for encouraging investments in nitrogenous sector by incentivizing alternative feedstock based production and also by committing part of future discoveries of gas to new investments as it takes around four to five years from planning to commissioning of a urea unit, moreover it requires very high capital investment. In Phosphatic and Potassic (P&K) sector, it is necessary to secure long term supplies of not only finished fertilizers but also raw materials / intermediates in this sector, through strategic investments in resource rich countries.

1.6.3 It is important to arrange supplies of the right kind of fertilizer across more than 600 districts in the country at the right time. It is therefore essential that appropriate demand assessment is done for each State/ District/ Block for each fertilizer type for Kharif as well as Rabi season. The production and consumption gap are also assessed and the gaps are required to be bridged through imports.

Thus diligent planning at the commencement of the year and respective season to make available the right quantity of fertilizer at right place is very critical. Required storage, transport, staffing, credit, financial and foreign exchange arrangements are dependent on demand. In case the actual demand of fertilizers is less than that planned or if it increases substantially, the whole plan would go hay way. It may not only have severe financial implications but also production related issues and related political fallouts. The IT based Fertilizer Monitoring System (FMS) is in operation to check the status of fertilizer movement across the country on almost real time basis. Even the status of availability of fertilizer with the dealer, in a District, company-wise etc. can be monitored through FMS now-a-days.

1.6.4 In the last few years, there has been a growing trend of subsidy burden on the Government. Higher subsidy payout is related to increase in consumption, increased production, higher input cost, increasing import prices of fertilizers as well as feedstock and intermediaries and more importantly keeping the retail price of the fertilizers at affordable levels. The increase in subsidy levels has been somewhat due to increase in consumption of fertilizers and mainly due to sharp increase in international prices of fertilizer inputs and finished fertilizers. Furthermore, the farmgate prices of fertilizers are required to be kept at reasonably affordable levels, which further push the subsidy bill. The dilemma, which Government always faces, is to increase the consumption of fertilizers, simultaneously check the subsidy levels and also to see that the price of fertilizers do not become prohibitive. The alternatives or the combinations of alternatives, which the Government possess is that the demand for fertilizers goes down, international prices of fertilizers reduce, the subsidy regime is modified in way to keep the subsidy at fixed levels and at the same time allowing retail price to increase or the subsidies are targeted to end users, especially small and marginal farmers.

CHAPTER II

2.0 EXECUTIVE SUMMARY

2.1 PERFORMANCE OF THE FERTILIZER INDUSTRY DURING THE ELEVENTH FIVE YEAR PLAN

2.1.1 The installed capacity of fertilizer the domestic fertilizer industry was 129.45 lakh metric tonnes (LMT) of nitrogen and 62.13 LMT of P_2O_5 (phosphate) per annum as on 1.11.2010. The capacity of the fertilizer industry remained by and large stagnant during the Eleventh Five Year Plan period.

2.1.2 The report of the Working Group on Fertilizers for the Eleventh Plan had envisaged a demand of 287.55 LMTPA by the terminal year (2011-12). It had also envisaged that RCF-Thal Expansion Project, KRIBHCO-Hazira Expansion Project, Indo-Gulf-Jagdishpur Expansion and revamp of the TCL-Babrala, CFCL-Gadepan, NFCL-Kakinada, RCF-Thal I & II, IFFCO-Phulpur, and IFFCO-Aonla would materialize during the Eleventh Five Year Plan.

2.1.3 However, the actual domestic production of urea in 2010-11 was 218.8 LMT. At present the indigenous capacity of functional units for urea is 222.06 LMT besides 16.52 LMT in the joint venture OMIFCO plant. Therefore, the targets envisaged in the Eleventh Plan period have not been fully achieved. While revamps of the TCL-Babrala, CFCL-Gadepan, NFCL-Kakinada, RCF-Thal I & II, IFFCO-Phulpur, IFCCO-Aonla and BVFCL projects were commissioned in the Eleventh Plan period, none of the expansion project have made any progress due to lack of availability of NG/LNG for new/expansion projects.

2.2 REVIEW OF THE PRICING POLICY

A) Urea Sector

2.2.1 CONTINUANCE OF NPS-III

The New Pricing Policy (NPS) Stage III for urea units ended on 31st March, 2010 has been extended till formulation of new policy.

2.2.2 CONSTITUTION OF A COMMITTEE TO EXAMINE THE PROPOSAL FOR INTRODUCTION OF NBS IN UREA

In view of demand emanating from certain section of industry and Department of Expenditure and Planning Commission suggesting urea to be brought under NBS, the matter was referred to Group of Ministers (GOM) and based on the directive of GOM, a committee was constituted under the Chairmanship of Shri Saumitra Chaudhuri, Member, Planning Commission to examine the proposal for introduction of NBS in urea, including various options thereof, and making suitable recommendations. The Committee has submitted their report in April 2011 recommending a model for implementation of NBS Scheme.

2.2.3 DIRECT TRANSFER OF SUBSIDY TO FARMERS

The Government has constituted a Task Force for Direct Transfer of subsidy under the Chairmanship of Shri Nandan Nilekani. The interim report of the Task Force recommended measures for ultimately shifting to a system of direct transfer of fertilizer subsidy to farmers in phased manner, starting with monitoring movement of fertilizers upto the retail points.

2.2.4 POLICY FOR NEW AND EXPANSION PROJECTS

The Government notified a New Investment Policy for urea sector in September 2008 based on the recommendations of the Committee headed by Prof. Abhijit Sen, Member and Planning Commission. The policy was based on import parity

price with provision of floor and ceiling for determining the producer's price of urea produced from new investments. The policy resulted in increase in capacity by approx 23LMT due to revamp of few existing plants but failed to attract any investments in the expansion, Greenfield or Brownfield projects in the Urea sector due to uncertainty in availability and pricing of gas.. The amendments to the policy are under consideration.

B) Phoshatic & Potassic Sector

2.2.5 The Govt. of India implemented Nutrient Based Subsidy (NBS) Policy w e f 1.4.2010 for decontrolled Phosphatic and Potassic (P&K) fertilizers excluding SSP for which it was affected from 1.5.2010. NBS is applicable for 25 grades of P&K fertilizers namely, Di-Ammonium Phosphate (DAP), DAP Lite, Muriate of Potash (MOP), 18 grades of NPKS complex fertilizers, Mono Ammonium Phosphate (MAP), Triple Super Phosphate (TSP), Ammonium Sulphate (AS) and Single Super Phosphate (SSP). NBS is paid on each nutrient per kilogram of N, P, K & S decided annually. The nutrient based subsidy, so decided by the Government is converted into subsidy per tonne for each subsidized fertilizer.

2.3 TAXES AND DUTIES ON FERTILIZERS/RAW MATERIALS

It is suggested that all local taxes levied by various State Governments may be withdrawn as they affect the viability of the urea producing units or increase the burden of fertilizer subsidy of the Government of India. As far as the rate of sales tax on raw materials, inputs and hydrocarbons (natural gas/LNG, naphtha, and fuel oil/LSHS) is concerned, the Department of Fertilizers has argued that either they be reduced to 4 per cent or less by all the States or alternatively, hydrocarbons (natural gas, naphtha, fuel oil/LSHS) used in the manufacture of fertilizers be declared as 'goods of special importance' under Section 14 of the Central Sales Tax Act, 1956. This would bring in uniformity, or at least, a ceiling in the rate of sales tax on these raw materials and inputs. Keeping in view the unique nature of Fertilizer Industry which is an integral part of the agricultural

production chain, fertilizers and inputs may be exempted from GST. Central Subsidy on fertilizers be continued to be outside the purview of taxation even under GST.

2.3 GLOBAL DEMAND – SUPPLY SITUATION

As per the estimates made by the International Fertilizer Industry Association (IFA), the world demand for urea is expected to grow by 18.4 million tonnes (8.5 million tonnes N), from a total quantum of 153.3 million tonnes (70.5 million tonnes N) in 2011 to 171.7 million tonnes (79.0 million tonnes N) by 2015. As against this, the total supply is expected to increase by 34.9 million tonnes (16.1 million tonnes N), from a total quantum of 155.6 million tonnes (71.6 million tonnes N) in 2011 to 193.4 million tonnes (88.9 million tonnes N) by 2015. Global capacity is projected to be 47.1 million tonnes of P_2O_5 in 2014, representing a net increase of 7.8 million tonnes P_2O_5. Expansion of DAP capacity would account for three-quarters of this increase. Global potash capacity is forecast to increase from 42.7 million tonnes K_2O in 2010 to 54.7 million tonnes in 2014.

2.5 DOMESTIC DEMAND PROJECTION

The projections of fertilizer nutrients based on two different approaches show a range of demand figures of total nutrients between 33.5 and 33.8 million tonnes for the terminal year of 12^{th} Plan. The demand forecasts for 'N', 'P' and 'K' are estimated at 200.35 LMT, 96.00 LMT and 41.74 LMT respectively in the terminal year of the Twelfth Five Year Plan. This corresponds to a demand of 336.77 LMT for urea, 124.13 LMT for DAP, 47.93 LMT for MOP, 114.20 LMT for complex fertilizers and 59.48 LMT for SSP. This demand is based on current consumption patterns which might change in next five years depending upon increase in irrigation/crop pattern and change in percentage growth in agricultural production.

2.6 PLANNING OF CAPACITY AND PRODUCTION FOR THE TWELFTH FIVE YEAR PLAN

2.6.1 In the context of rapidly increasing food-grain production in the country, availability of around 340 LMTPA of urea is to be planned for. It is expected that over and above the present installed capacity of 238.52 LMTPA of urea (222 LMT from domestic units plus 16.52 LMT from OMIFCO), additional capacity is expected to come in the next Plan period as follows:

a) 19.96 LMT capacity addition in the existing units such as KRIBHCO, RCF, NFL & Revival of Duncan Industries Ltd., Kanpur plant.

b) 38.12 LMT from 3 brown field expansion projects and 12.71 LMT from one green field project.

c) 12.71 LMT from revival of one urea units of HFC/FCI.

d) Gap of approx. 30 LMT to be met from JV projects abroad based on low price gas/ LNG and imports. Few JV projects are expected to come up in the countries which have abundant reserves of gas with a buy back arrangement for urea produced by these projects.

2.6.2 INVESTMENT IN THE FERTILIZER SECTOR

The fertilizer sector attracted huge investment during 70's and 90's. However, there has been hardly any investment during the 10^{th} & 11^{th} Plan. The total investment in the fertilizer sector by the end of 2010-11 was Rs.27,247 crore. With the accelerated growth in the Indian economy, other sectors had high rates of return on investment, but the fertilizer sector has failed to attract more investment due to low returns. To increase the capacity of urea by about 12 million tonnes to a total of 33.7 million tonnes by 2016-17, India will need to invest at least Rs.40,000 crore in the sector at current capital costs.

2.6.3 MEASURES FOR ATTRACTING INVESTMENT IN THE SECTOR

a) To insulate the new investments of the industry from the vagaries of rising price of gas, some amendments to the new investment policy have been proposed by the Department, which are being reviewed by Planning Commission as per the directive of GOM. It is pressing necessity to have suitable amendments to the policy and allocation of gas by MOPNG so that the held up investments are initiated and indigenous production of urea is increased to at least meet major portion of the demand.

b) The Fertilizer Industry should be declared an industry of national importance. New investments need to be attracted to the special economic zones where fiscal benefits would go a long way to attract investments. Some of the incentives could be exemptions from various taxes, such as,

   i. Income tax (for a specified period).
   ii. Customs duties on import of capital goods, raw materials, consumables, spares etc.
   iii. Central Excise duties on procurement of capital goods, raw materials, consumable spares etc., from the domestic market.
   iv. Central Sales Tax and Service Tax.

   Other incentives may include:

   i. Viability gap funding for investment in new projects in India and abroad.
   ii. Facilitating long term contracts for gas.
   iii. Securitization of subsidy receivables to ensure regular cash flow.

2.7 RAW MATERIALS AND INTERMEDIARIES FOR FERTILIZER PRODUCTION

2.7.1 The production of urea using natural gas as feedstock is energy efficient and cheaper. The present fertilizer policy is aimed at increasing the use of NG/LNG as a feedstock/fuel. This is not only because NG/LNG is cleaner, cheaper and more

energy efficient, but it would also help in bringing greater uniformity in the industry and thus help to move towards a single urea price and decontrol. However, due to the dwindling supplies of natural gas, even the existing gas based units may face shortage of natural gas. At present, the availability of Gas to Urea Units is around 41 MMSCMD against their requirement of 43.14 MMSCMD.

2.7.2 Apart from the requirements for the existing gas based units, NG/LNG will also be required in the near future for conversion of naphtha and FO/LSHS based units to NG/LNG, de-bottlenecking of existing urea units, setting up of new and expansion units and revival of closed urea units of HFCL and FCIL. Based on the proposals received for de-bottlenecking, expansion projects, revival of closed urea manufacturing units, conversion of non-gas based urea units and new Greenfield units, the total requirement of gas for the fertilizer sector would be more than 100 MMSCMD. However, it has been conservatively estimated that by the end of Twelfth Five Year Plan the requirement would be at least 72.39 MMSCMD. As far as the issue of gas pipeline connectivity to fertilizer plants located in various parts of the country is concerned, it is envisaged that nearly all the urea plants in the country will have connectivity by the year 2012-13.

2.7.3 The availability of APM gas supplied by ONGC and OIL from their nominated blocks is expected to decline in the coming years. At the same time, the availability of gas from domestic, Joint Ventures and private suppliers is likely to witness an appreciable increase. The total availability of natural gas, including RLNG, during the terminal year of XIIth Plan, i.e. 2016-17, is expected to be 373 MMSCMD.

2.7.4 As regards the question of availability of gas for the fertilizer industry, although the sector has been treated as a priority sector along with power in the context of allocation of APM gas, the proportion of gas for the fertilizer sector has been

declining. One of the most important factors to be considered while deciding the priority of allocation of Gas is that fertilizer sector is the only sector which uses both the heat value and chemical components of Gas. All other sectors use only heat value of the Gas. Other sectors may use alternate fields e.g. Coal, Fuel Oil/LSHS etc. whereas fertilizer sector has constraint to use alternate fuels. Therefore, fertilizer sector should always be allocated Gas on priority.

2.7.5 Considering the uncertainty about the pricing and tenure of natural gas supply, DoF has explored the possibility of using coal gas through coal gasification route as an alternative feedstock. It is learnt that over 70% of Ammonia production in China is from coal using coal gas as feedstock and the cost of synthesis gas is approximately 20%-30% less than current level of cost of natural gas.

2.7.6 A consortium consisting of GAIL, Coal India Ltd. (CIL) and Rashtriya Chemicals and Fertilizers Ltd. (RCF) have planned to set-up a coal gasification project cum fertilizer project at Talcher The project involves revival of state owned FCIL Plant at Talcher. A coals block at Talcher Coalfields under the command area of Mahanadi Coalfields Limited (MCL), a subsidiary of CIL, has been identified for this project. Matix Fertilizers and Chemicals Ltd. is setting up a Green field fertilizer complex with a capacity of 3 million ton per annum (MTPA) in Panagarh, West Bengal in a phased manner based on CBM and Natural Gas. In Phase 1, they are setting up a 1.3 MTPA single stream Ammonia Urea plant with integrated facilities.

2.8 HEALTH OF THE FERTILIZER INDUSTRY

2.8.1 The overall health of the urea industry was fairly satisfactory. Almost all the public, private and cooperative sector manufacturing units are making profits. Among Public Sector Undertakings, RCF and NFL are operating satisfactorily on

overall basis. No financial crunch is reported and the companies are undertaking measures for performance and capacity enhancements. Only the plants at Namrup (BVFCL), MFL and FACT units are running under losses. The reasons for sickness are mainly on account of outdated technology, high energy consumption, and lack of trained manpower. The Department is exploring various measures for their financial revival and restructuring.

2.8.2 The first year of the Nutrient Based Subsidy (NBS) regime in P&K sector has seen good profitability for complex fertilizer manufacturers. It has been due to the fact that in the first half of the year, manufacturers were successful in sourcing raw materials at price conducive to the subsidy rates fixed by the Government of India. Furthermore, since the NBS policy gives pricing freedom to the manufacturers, they have increased retail prices in order to pass on input price increases to farmers.

2.9 INFRASTRUCTURAL REQUIREMENTS OF THE FERTILIZER SECTOR

2.9.1 With the increase in demand and corresponding supply of both domestic and imported fertilizers, rail traffic in fertilizers is projected to increase from 45 million tonnes during 2012-13 to 53 million tonnes during 2016-17. The development and maintenance of road transport will have to be substantially increased by way of widening and proper matting of road to withstand increasing load on the national and state highways which should be able to take high capacity trucks.

2.9. 2 Port capacities need to be augmented. The existing facilities at present just about match the needs of the manufacturing units. In particular, special attention is called for at ports like Vishakhapatnam, Kakinada, Paradeep, Kandla, Mundra, etc. There is a pressing need for upgrading and modernizing the shore support for achieving higher discharge rates through mechanical unloading and bagging facilities, raising the number and quality of barges at the anchorage

ports and an increase in warehouse capacities. There is also an imperative need for creating facilities for handling panamax vessels at selected ports.

2.9.3 To ease the pressure on rail and roadways for movement of fertilizers to the consuming areas during the peak agriculture season, alternatives are to be looked into. The inland water transport can provide an alternative mode for transporting fertilizers as it provides necessary wherewithal like night navigation, suitability in transporting higher tonnage, economic and competitive rates to match with the railways etc. Further, incentives need to be provided for new investments in hinterland i.e. in proximity to the consumption centers.

2.10 REVIVAL OF CLOSED UNITS OF FCIL & HFCL

2.10.1 It is recommended by the Empowered Committee of Secretaries that the units which have definite proposals from public sector for revival, may be given to them on nomination basis, by offering 11% of the equity to FCIL/HFCL and land use through a Concessionaire Agreement.

Department of Fertilizers has received intent from the three Public Sector Consortiums for revival of three units of the Fertilizer Corporation of India Limited. ECOS has recommended revival of the following 3 units on nomination basis by the identified PSU Consortiums viz. Sindri unit by consortium of SAIL & NFL; Talcher unit by consortium of GAIL, CIL and RCF and Ramagundam unit by consortium of EIL & NFL.

2.10.2 Gorakhpur Unit & Korba Project of FCIL and Durgapur, Barauni & Haldia Units of HFCL are proposed to be offered to private sector. Private sector is allowed to participate in the revival through a transparent bidding process. They would have to pay an initial biddable 'upfront' fee and also have to bid for the 'revenue share' that they would pay to FCIL or HFCL, as the case may be.

2.10.3 Cabinet Committee on Economic Affairs has approved the Draft Re-habilitation Scheme for revival of eight closed units of FCIL and FCIL with the stipulation that

Board for Industrial and Financial Restructuring (BIFR) proceedings be expedited and thereafter, the matter including the changes, if any, required in bid parameters, be placed before the CCEA for a final decision.

2.11 BALANCED FERTILISATION & NEW PRACTICES

2.11.1 Balanced nutrient supply ensures efficient use of all nutrients. One nutrient may affect the efficiency of other nutrients. For examples, research has shown that response of the yield to applied fertilizer N is limited, if P requirement of the crop is not satisfied. Similar results are found, if K or a secondary or micro-nutrient is deficient. Imbalanced nutrition produces low yields, low fertilizer use efficiency and low farmer profit. It also results in further depletion of the most deficient nutrients in the soil. Once the critical level of a nutrient is reached, yield fall dramatically even through large aggregate amounts of other nutrients may have been applied. Hence, the importance of balanced fertilization in increasing crop yield must be realized. There is a need to establish a National Level Centre of Soil Health Monitoring and Training under DAC, Ministry of Agriculture, Government of India.

2.11.2 There are three ways by which fertilizer use efficiency can be increased: (i) by adoption of better agronomic practices, (ii) use of more efficient fertilizer materials and (iii) integrated nutrient management involving combined use of fertilizers, organic manures, bio-fertilizers, etc. Agronomic practices such as choice of right crops and their varieties, right type of fertilizer, correct dose, appropriate time and method of fertilizer application, weed control and water management that result in increased yield and also increases fertilizer use efficiency. Applying the recommended dosage in installments at the right stage of plant growth would improve fertilizer use efficiency and crop productivity. The application of fertilizer through fertigation leads to saving in fertilizers applied to the extent of 40-60 % without affecting the yield. Use of water soluble fertilizers

through micro-irrigation systems like drip irrigation should be promoted for increasing water and fertilizer use efficiency.

2.11.3 To maintain reasonable health of the Indian soils, each and every field is to be manured with at least 7 to 10.0 tons of organic fertilizers. With this assumption there is a need for about 850 to 1200 million tons of organic fertilizers. Keeping in view of the overall availability of cattle dung, agro-waste, city waste and crop residue etc vis-a-vis their other uses and actual quantity available for manuring purpose, it may not be possible to harvest the potential from these sources. Therefore to meet the challenge, the requirement for organic carbon needs to be met from following resources:

- Organic fertilizers
- Green leaf manuring from fertilizer trees grown on bunds
- Pulses integration in cropping systems
- Biofertilizers and on-farm dung-urine based liquid manures

Ministry of Agriculture brought bio-fertilizers under Section 3 of the Essential Commodity Act, 1955 (10 of 1995), in fertilizer control order 1985 in March 2006. Five biofertilisers viz. Rhizibium, Azatobacter, Azospirillum, Phosphate solubilising Bacteria and Mycorrhizal biofertiliser are specified under FCO, 1985. The Central Fertilizer Committee has included customised fertilizers in the Fertilizer (Control) Order 1985, as a new category of fertilizers that are area/soil/crop specific.

2.12 TECHNOLOGICAL AND RESEARCH & DEVELOPMENT ISSUES

2.12.1 Indian fertilizer industry has kept pace with technological development with upgradation and utilization of better feedstock. It is comparable to the best in the world in terms of efficiency, capacity utilization, energy consumption and utilities like power and water. The industry has been proactive in development and propagation of new and more appropriate grades of fertilizers. It has introduced innovative, coated and fortified fertilizers, crop specific and location

specific customized fertilizers and specialty fertilizers to improve fertilizer use efficiency and improve agricultural productivity to enhance income of the farmers. Almost all the fertilizer producers in the country (ammonia-urea complexes), have implemented energy saving measures, and, are producing urea with minimum possible energy consumption. Sizeable numbers of fertilizer complexes of older vintage have adopted energy saving measures and are operating with lower energy consumption, which are economically viable. In the process, almost all energy saving measures available to-day and are being practiced worldwide, have been implemented in the Indian plants.

Stagnation in Technological Front:

It is agreed worldwide that, technology has reached its peak, especially with regards to process of manufacture. Whatever savings in energy consumption that can be achieved, can be in the following areas:

i) Adopting plants of very high capacities.
ii) Better efficiencies of machines.
iii) Better Catalysts
iv) Higher plant 'on stream' factors

Research & Development Issues

There has not been much of change in R&D activities during last five years. The companies are mainly concerned with trouble shooting, technical audit & inspection exercises and other short-term problems.

2.12.2 The Department of Fertilizers may be strengthened technically as it can play an important role in promoting productivity in the new economic environment through R&D efforts. A fertilizer research institute may also be established on similar lines as of road research institute, coal research institute, steel research institute, cement research institute etc. to carry out various researches related to fertilizer industry. This research institute should always maintain link with the

coordination group for R&D as a suggested above and with various laboratories and other research institutes and academia.

2.12.3 Given the worldwide hardening position on various raw materials, especially Phosphate and Potash, an urgent focus is required to exploit indigenous raw material resources. Potash extraction from Brine has been initiated by a few companies, in association with Marine Research bodies and such effort needs to be further continued. A few of the proposals that can be worked upon are:

- Coal gasification
- Development of process of Potash production from gluconite
- Recovery of potash from sea water
- Exploitation of indigenous rock phosphate

CHAPTER-III

3.0 PERFORMANCE OF FERTILIZER INDUSTRY DURING ELEVENTH FIVE YEAR PLAN PERIOD

3.1 CONSUMPTION OF FERTILIZER NUTRIENTS IN THE COUNTRY

3.1.1 The total nutrient consumption was projected at 259.60 lakh MTs for 2010-11 by the Working Group for the 11th Plan. As a result of continued good weather and comfortable availability of fertilizers, the estimated consumption touched 282.83 lakh MTs in 2010-11 which is higher by about 8.9% over the projected demand. The growth rate in each year remained significantly high during first four years of the 11th Plan **(Table1).**

Table 1: All-India consumption of fertilizer nutrients

2007-08 to 2010-11

Year	Nitrogen (N)	Phosphate (P_2O_5)	Potash (K_2O)	Total	% increase over the previous year	Kg/ hectare (N+P+K)	N:P:K
	----------'000 MTs ----------						
2007-08	14419.1	5514.7	2636.3	22570.1	4.2	115.7	5.5:2.1:1
2008-09	15090.5	6506.2	3312.6	24909.3	10.4	127.7	4.6:2.0:1
2009-10	15580.0	7274.0	3632.4	26486.4	6.3	135.8	4.3:2.0:1
2010-11 (Provisional)	16890.2	8001.4	3391.4	28282.9	6.8	145.0	5.0:2.4:1

3.1.2 Increasing trend in consumption towards balanced application led to improvement in N:P:K use ratio. The ratio had been 6.8:2.6:1 at the end of 9th Plan improved to 5.9:2.4:1 at the end of 10th Plan which further improved to 5.0:2.4:1 during the fourth year of the 11th Plan (2010-11). Per hectare consumption of fertilizer nutrients improved from 92.2 kg at the end of 9th Plan

improved to 112.1 kg. at the end of 10th Plan which further improved to 145 kg. during 2010-11.

3.1.3 During 10th and 11th Plan, there has not been any significant increase in indigenous capacities of finished fertilizers, except improvement in capacity through debottlenecking/revamp in some of the urea plants. Consequently, import of finished fertilizers kept on increasing during the period. Trends in production, consumption and imports of Urea and DAP are presented in **Annexure 3.1, 3.2**. Trends in the consumption of complex fertilizers, SSP and MOP may be seen in **Annexure 3.3.**

3.3 STATEWISE/ZONEWISE CONSUMPTION

3.3.1 The 11th Plan began with a surge in demand for fertilizers which continued throughout the Plan period. During 2007-08, the growth in consumption was 4.2 per cent over the previous year. During the following three years (i.e., 2008-09, 2009-10 and 2010-11), the rate of growth in consumption was 10.4, 6.3 and 6.8 per cent over the previous years. Annual compound growth rate in consumption of fertilizer nutrients was 6.9 per cent during the first four year years of the 11th Plan as against 4.5 per cent in 10th Plan and 3.9 per cent in the 9th Plan period.

3.3.2 At zonal level, all the four zones recorded positive growth in terms of total nutrients (N+P+K) during the first four years of the 11th Plan period. Annual compound growth rate in East, North, South and West zones was 5.7, 4.3, 7.5 and 9.7 per cent, respectively, during first four years of the 11th Plan. **Annexure 3.4** presents zone-wise and state-wise consumption of fertilizer nutrients during 2007-08 to 2010-11. **Annexure 3.5** gives zone-wise and state-wise per hectare use of total fertilizer nutrients.

3.3.3 In most of the states of East zone, there has been consistent growth in consumption of total nutrients during 2007-08 to 2010-11, except negative growth noticed in Bihar and Orissa during 2009-10 and Jharkhand in 2010-11.

The per hectare consumption of total nutrients in the states of East zone widely vary. During 2010-11, it varied from 3 kg. in Arunachal Pradesh to 173.5 kg in Bihar. Among the major states, per hectare consumption was 172 kg. in West Bengal, 74.6 kg. in Jharkhand, 69.4 kg. in Assam and 59.7 kg. in Orissa.

3.3.4 In North zone, most of the states recorded positive growth consistently during 2007-08 to 2010-11, except, negative growth witnessed in Haryana during 2010-11, Himachal Pradesh in 2009-10 and Jammu & Kashmir in 2007-08. The per hectare consumption in most of the states in North zone is high. During 2010-11, it was 237.3 kg. in Punjab, 196.6 kg. in Haryana, 179 kg. in Uttar Pradesh, 133.9 kg. in Uttarakhand and 106.7 kg. in Jammu & Kashmir. Per hectare consumption in Himachal Pradesh was only 59.3 kg. during the period.

3.3.5 Among the states in South zone, positive growth in consumption was noticed in most of the states during the period, except, decline in consumption witnessed in Andhra Pradesh in 2009-10, Kerala in 2007-08 and Tamil Nadu in 2007-08 and 2009-10. The per hectare consumption in Andhra Pradesh, Karnataka and Tamil Nadu is higher than All-India average. During 2010-11, it was 252.8 kg., 170.6 kg., and 211 kg., in Andhra Pradesh, Karnataka and Tamil Nadu, respectively. In Kerala, it was 105.2 kg. in 2010-11.

3.3.6 Interestingly, all the major states of West zone recorded positive growth in consumption during the period. The per hectare consumption is higher than All-India average in Gujarat (167.6 kg.) and Maharashtra (150 kg.). In other states of the zone, per hectare consumption is lower than the All-India average. During 2010-11, it was 90.4 kg in Madhya Pradesh, 107.4 kg in Chhattisgarh and 57.4 kg in Rajasthan.

3.4 RAW MATERIAL LIMITATIONS

3.4.1 In India, bulk of the requirement of feedstock for manufacture of nitrogenous fertilizers is available from domestic sources. During 2010-11, out of the total production of 13.5 million tonnes of ammonia produced in the country, about 83% was based on natural gas, 7% on naphtha and 10% on F.oil/LSHS. In addition, about 1.5 million tonnes of ammonia was imported during 2010-11 to supplement the requirement of ammonia for the production of DAP/ complex fertilizers in the country. During 2010-11, about 2.64 billion SM^3 (8 million SM^3 per day) of LNG was also imported to supplement the increased requirement of gas.

3.4.2 In regard to phosphates, bulk of the requirement of raw materials/ intermediates is met through imports as there is very limited availability of raw materials, viz., rock phosphate and sulphur in the country. Phosphate demand is fulfilled through a mix of following three options:

(i) Domestic production based on indigenous/imported rock phosphates and imported sulphur;

(ii) Domestic production based on imported intermediates, namely, ammonia and phosphoric acid; and

(iii) Imported finished fertilizers

3.4.3 Currently, about 5 million tonnes of rock phosphate and 1.2 million tonnes of sulphur are imported every year. The availability of rock phosphate from domestic sources is about 1.6 million tonnes. Domestic availability of sulphur is about a million tonne. A major portion of these raw materials is used by the fertilizer industry. Likewise, nearly 60-65% requirement of phosphoric acid is met through imports. During 2010-11, about 2 million tonnes of phosphoric acid was imported.

3.4.4 There are no known commercially exploitable reserves of potash in the country and the entire requirement of potash for direct application as well as for production of complex fertilizers is fulfilled through imports.

3.5 PERFORMANCE OF UREA UNITS

The performance of the urea industry in India can be judged from various parameters, such as, capacity utilization, energy efficiency, etc. These are discussed below.

3.5.1 CAPACITY UTILISATION

Most of the urea units in India are highly efficient in terms of capacity utilization. This is reflected in the table given below:

Table 2: Feedstock-wise capacity utilization of urea plants 2007-08 to 2010-11

S.No	Capacity (MT)	Capacity Utilisation %			
		2007-08	2008-09	2009-10	2010-11
Pre-92 gas	4968000	100.20	103.40	106.60	108.42
Post 92 gas	5517600	112.20	111.10	120.60	123.91
Total gas	**10485600**	**106.74**	**107.57**	**113.96**	**116.57**
Pre92 naphtha	2816550	101.30	102.70	105.20	96.61
Post92naphtha	1729200	111.00	106.90	116.30	121.10
Total Naphtha	**4545750**	**105.58**	**104.55**	**110.08**	**105.93**
FO/LSHS	2138400	101.60	99.70	98.40	100.30
Mixed feed	2621987	101.20	104.70	103.30	102.01
Grand total	**19791737**	**105.14**	**105.65**	**109.97**	**110.44**
BVFCL Namrup - II	240000	32.00	26.00	33.00	36.00

- *Post 92 naphtha and mixed feed based urea units have converted to gas*

It may be seen from the above table that the capacity utilization of all the groups together (excluding BVFCL, Namrup II) is above 100 per cent. It has been consistently rising over the years. The capacity utilization improved from 105.14 per cent in 2007-08 to 110.44 in 2010-11.

3.5.2 ENERGY PERFORMANCE

The specific energy consumed to produce one metric tonne of urea is the major indicator of the operating efficiency of the plant as the cost of energy constitutes 60 to 70 per cent of the total cost of production. Over the years, the Fertilizer Industry has been consistently making efforts to improve efficiency by taking suitable measures for reduction in energy consumption. Energy consumption is expected to reduce further when all the fuel oil based plants and the naphtha based plants will switch over to gas as feed stock. The table below indicates the energy consumption norms vis-a-vis actual energy consumption in the years 2007-08 to 2010-11.

Table 3: Energy consumption norms vis-a-vis actual energy consumption 2007-08 to 2010-11

Sl. No	Group-Unit	Existing Norms NPS-III (Plant)	Energy consumption achieved during 2007-08 (Plant)	Energy consumption achieved during 2008-09(Plant)	Energy consumption achieved during 2009-10(Plant)	Energy consumption achieved during 2010-11 (Plant) (Provisional)
		(Gcal)	(Gcal)	(Gcal)	(Gcal)	(Gcal)
1	2	3	4	5	6	7
Group-I : Gas (Pre 1992)						
	BVFCL-Namrup-II	12.610	17.974	22.624	18.228	15.636
1	BVFCL-Namrup-III	12.688	12.102	17.679	14.047	14.326
2	IFFCO-Aonla	5.690	5.682	5.676	5.667	5.676

3	INDOGULF-Jagdishpur	5.534	5.536	5.402	5.424	5.457
4	KRIBHCO-Hazira	5.952	5.892	5.914	5.925	5.946
5	NFL-Vijaipur	5.952	5.808	5.834	5.780	5.888
6	RCF Trombay	9.569	0.000	0.000	7.677	7.480
Group-II : Gas (Post 1992)						
7	NFCL-Kakinada	5.712	5.531	5.536	5.568	5.591
8	CFCL-Kota	5.621	5.615	5.670	5.635	5.549
9	TATA	5.417	5.151	5.295	5.155	5.255
10	OCFL/KSFL	5.712	5.746	5.769	5.678	5.597
11	NFCL-Kakinada Exp	5.712	5.656	5.667	5.570	5.606
12	IFFCO-Aonla exp.	5.522	5.508	5.515	5.536	5.522
13	NFL-Vijaipur Exp.	5.712	5.524	5.526	5.483	5.506
Group-IIIA-I : Naphtha & Coal (Pre 1992)- Sub Group I						
14	SFC-Kota	7.847	7.766	7.707	7.441	7.324
15	IFFCO-Phulpur	7.584	6.803	6.841	6.639	6.670
Group-IIIA-II : Naphtha (Pre 1992)-Sub-Group II						
16	MCFL-Mangalore	7.356	6.744	6.712	6.586	6.516
17	MFL-Madras	8.337	7.774	7.896	7.804	7.492
18	SPIC-Tuticorin	7.382	0.000	0.000	0.000	7.612
19	ZIL-Goa	7.308	6.839	6.894	6.902	6.876
Group-IV : Naphtha (Post 1992)						
20	IFFCO-Phulpur Exp.	5.883	5.791	5.948	5.629	5.669
21	CFCL-II	5.678	5.545	5.560	5.427	5.440
Group-V : FO/LSHS						
22	GNVFC-Bharuch	7.989	7.848	7.969	8.069	8.379
23	NFL-Nangal	9.517	9.505	9.505	9.509	9.507

24	NFL-Bhatinda	10.221	9.608	9.606	9.617	9.682
25	NFL-Panipat	9.654	9.917	10.483	9.789	9.864
Group-VI: Mixed Feedstock						
26	GSFC-Baroda	6.935	6.327	6.532	6.466	6.313
27	IFFCO-Kalol	6.607	5.925	5.919	5767	5.731
28	RCF-Thal	6.938	6.554	6.471	6.293	6.368

Annexure 3.1

Trends in Production, Consumption and Import of Urea				
Year	Production	Consumption	Import	Import % of Consumption
	<---------- (Lakh MTs) ---------->			
2005-06	200.85	222.98	20.57	9.2
2006-07	202.71	243.38	47.19	19.4
2007-08	198.39	259.63	69.28	26.7
2008-09	199.23	266.49	56.67	21.3
2009-10	211.21	266.73	52.10	19.5
2010-11(P)	218.80	282.46	66.09	23.4

Annexure 3.2

Trends in Production, Consumption and Import of DAP				
Year	Production	Consumption	Import	Import % of Consumption
	<---------- (Lakh MTs) ---------->			
2005-06	45.54	67.64	24.38	36.0
2006-07	47.13	73.81	28.75	39.0
2007-08	42.11	74.97	27.24	36.3
2008-09	29.93	92.31	61.92	67.1
2009-10	42.46	104.92	58.89	56.1
2010-11(P)	35.46	111.07	74.11	66.7

Annexure 3.3

Trends in Consumption of NP/NPK Complex Fertilizers, SSP and MOP

(Lakh MTs)

Year	NP/NPK complex Ferts.	SSP	MOP*
2005-06	66.94	27.56	27.31
2006-07	67.99	29.10	25.86
2007-08	67.21	22.88	28.81
2008-09	70.29	26.17	40.77
2009-10	81.56	26.51	46.34
2010-11(P)	98.37	35.96	38.92

* = MOP for direct use. Excludes MOP used for manufacture of NPKs.

Annexure 3.4

ZONE-WISE AND STATE-WISE CONSUMPTION OF FERTILIZER NUTRIENTS

Sl. No.	Zone / State	Nutrient	Consumption ('000 tonnes)				+/% over the previous year				Annual compound growth rate (%)
			2007-08	2008-09	2009-10	2010-11	2007-08	2008-09	2009-10	2010-11 (P)	
I.	**EAST**	**N**	**2,106.29**	**2,160.94**	**2,162.94**	**2,202.42**	**6.97**	**2.59**	**0.09**	**1.83**	**2.84**
		P_2O_5	**803.22**	**918.46**	**973.77**	**1,080.92**	**5.34**	**14.35**	**6.02**	**11.00**	**9.12**
		K_2O	**522.56**	**736.18**	**783.82**	**738.94**	**5.24**	**40.88**	**6.47**	**-5.73**	**10.45**
		Total	**3,432.07**	**3,815.58**	**3,920.53**	**4,022.28**	**6.32**	**11.17**	**2.75**	**2.60**	**5.65**
1	Arunachal Pradesh	N	0.45	0.51	0.51	0.52	-	13.33	-	1.96	3.68
		P_2O_5	0.19	0.21	0.22	0.22	-	10.53	4.76	-	3.73
		K_2O	0.09	0.09	0.09	0.09	-	-	-	-	-
		Total	0.73	0.81	0.82	0.83	-	10.96	1.23	1.22	3.26
2	Assam	N	103.35	115.21	127.25	142.60	0.72	11.48	10.45	12.06	8.58
		P_2O_5	54.61	48.24	48.75	59.40	6.91	-11.66	1.06	21.85	3.84
		K_2O	55.98	57.16	66.27	74.70	11.98	2.11	15.94	12.72	10.56
		Total	213.94	220.61	242.27	276.70	5.04	3.12	9.82	14.21	7.96
3	Bihar	N	929.63	938.46	894.43	907.90	14.86	0.95	-4.69	1.51	2.91
		P_2O_5	191.59	253.01	247.44	288.93	6.99	32.06	-2.20	16.77	12.70
		K_2O	84.42	165.55	167.99	155.52	1.41	96.10	1.47	-7.42	16.91
		Total	1,205.64	1,357.02	1,309.86	1,352.35	12.50	12.56	-3.48	3.24	5.99
4	Jharkhand	N	89.41	88.59	94.03	79.00	-3.03	-0.92	6.14	-15.98	-3.79
		P_2O_5	45.83	45.95	53.84	38.00	9.12	0.26	17.17	-29.42	-2.47
		K_2O	9.76	12.73	19.48	9.00	126.45	30.43	53.02	-53.80	20.21
		Total	145.00	147.27	167.35	126.00	4.69	1.57	13.63	-24.71	-2.34
5	Manipur	N	14.35	9.44	10.67	5.19	1.20	-34.22	13.03	-51.36	-22.22
		P_2O_5	3.36	1.95	1.01	1.04	-6.41	-41.96	-48.21	2.97	-26.64
		K_2O	1.30	1.48	0.36	0.38	-	13.85	-75.68	5.56	-26.47
		Total	19.01	12.87	12.04	6.61	-0.31	-32.30	-6.45	-45.10	-23.27
6	Meghalaya	N	2.54	2.60	2.50	3.03	-13.90	2.36	-3.85	21.20	0.67
		P_2O_5	1.21	0.69	0.83	1.52	-37.63	-42.98	20.29	83.13	-5.92
		K_2O	0.33	0.40	0.35	0.48	37.50	21.21	-12.50	37.14	18.92
		Total	4.08	3.69	3.68	5.03	-20.47	-9.56	-0.27	36.68	-0.49
7	Mizoram	N	1.91	2.11	2.00	2.05	19.38	10.47	-5.21	2.50	6.39
		P_2O_5	1.06	1.19	2.41	2.43	-23.19	12.26	102.52	0.83	15.19
		K_2O	0.90	1.05	1.06	1.12	25.00	16.67	0.95	5.66	11.68
		Total	3.87	4.35	5.47	5.60	4.59	12.40	25.75	2.38	10.92
8	Nagaland	N	0.47	0.47	0.47	0.69	46.88	-	-	46.81	21.18
		P_2O_5	0.25	0.32	0.31	0.45	4.17	28.00	-3.12	45.16	17.02
		K_2O	0.12	0.12	0.16	0.15	50.00	-	33.33	-6.25	17.02
		Total	0.84	0.91	0.94	1.29	31.25	8.33	3.30	37.23	19.15

9	Orissa	N	272.10	297.77	292.29	297.88	6.07	9.43	-1.84	1.91	3.81
		P_2O_5	116.76	147.93	148.59	152.32	25.86	26.70	0.45	2.51	13.20
		K_2O	63.03	89.17	78.46	91.44	17.66	41.47	-12.01	16.54	14.30
		Total	451.89	534.87	519.34	541.64	12.16	18.36	-2.90	4.29	7.68
10	Sikkim	N	-	-	-	-	-	-	-	-	-
		P_2O_5	-	-	-	-	-	-	-	-	-
		K_2O	-	-	-	-	-	-	-	-	-
		Total	-	-	-	-	-	-	-	-	-
11	Tripura	N	7.54	7.54	8.10	11.96	-26.01	-	7.43	47.65	4.09
		P_2O_5	2.60	3.55	3.03	4.91	-32.47	36.54	-14.65	62.05	6.27
		K_2O	2.19	2.78	3.07	3.76	-12.40	26.94	10.43	22.48	10.74
		Total	12.33	13.87	14.20	20.63	-25.45	12.49	2.38	45.28	5.68
12	West Bengal	N	684.54	698.24	730.69	751.60	0.90	2.00	4.65	2.86	2.59
		P_2O_5	385.76	415.42	467.34	531.70	-0.13	7.69	12.50	13.77	8.32
		K_2O	304.44	405.65	446.53	402.30	1.32	33.24	10.08	-9.91	7.57
		Total	1,374.74	1519.31	1,644.56	1,685.60	0.70	10.52	8.24	2.50	5.41
II.	**NORTH**	**N**	**5,211.32**	**5,375.69**	**5,441.98**	**5,783.21**	**2.70**	**3.15**	**1.23**	**6.27**	**3.32**
		P_2O_5	**1,473.93**	**1,661.51**	**1,871.02**	**1,847.09**	**-2.06**	**12.73**	**12.61**	**-1.28**	**5.26**
		K_2O	**267.86**	**368.23**	**492.38**	**429.81**	**10.59**	**37.47**	**33.72**	**-12.71**	**15.42**
		Total	**6,953.11**	**7,405.43**	**7,805.38**	**8,060.11**	**1.93**	**6.51**	**5.40**	**3.26**	**4.26**
1	Haryana	N	939.50	946.28	961.88	949.87	8.91	0.72	1.65	-1.25	2.44
		P_2O_5	257.27	313.52	333.16	278.32	5.39	21.86	6.26	-16.46	3.33
		K_2O	23.59	29.37	60.65	46.64	29.47	24.50	106.50	-23.10	26.49
		Total	1,220.36	1289.17	1,355.69	1,274.83	8.48	5.64	5.16	-5.96	3.18
2	Himachal Pradesh	N	32.34	35.46	31.32	33.18	5.03	9.65	-11.68	5.94	1.89
		P_2O_5	8.91	10.71	10.90	10.47	-12.82	20.20	1.77	-3.94	0.61
		K_2O	8.71	11.20	11.02	11.88	9.28	28.59	-1.61	7.80	10.49
		Total	49.96	57.37	53.24	55.53	2.00	14.83	-7.20	4.30	3.19
3	Jammu & Kashmir	N	56.33	68.78	74.50	72.83	1.51	22.10	8.32	-2.24	7.03
		P_2O_5	17.16	27.87	24.18	37.32	-27.69	62.41	-13.24	54.34	11.99
		K_2O	4.75	8.45	12.99	11.18	-30.25	77.89	53.73	-13.93	13.19
		Total	78.24	105.10	111.67	121.33	-9.05	34.33	6.25	8.65	8.98
4	Punjab	N	1315.47	1331.77	1,358.19	1,404.75	1.27	1.24	1.98	3.43	1.98
		P_2O_5	343.91	379.28	433.60	399.12	-2.74	10.28	14.32	-7.95	3.07
		K_2O	38.38	56.51	73.83	73.43	-0.54	47.24	30.65	-0.54	17.45
		Total	1,697.76	1767.56	1,865.62	1,877.30	0.39	4.11	5.55	0.63	2.64
5	Uttar Pradesh	N	2751.94	2882.24	2,898.83	3,207.54	1.28	4.73	0.58	10.65	4.24
		P_2O_5	821.85	900.35	1,039.17	1,091.13	-3.02	9.55	15.42	5.00	6.52
		K_2O	182.13	250.17	323.50	272.44	12.70	37.36	29.31	-15.78	13.95
		Total	3,755.92	4032.76	4,261.50	4,571.11	0.80	7.37	5.67	7.27	5.24
6	Uttarakhand	N	115.44	110.52	115.40	114.50	6.39	-4.26	4.42	-0.78	1.35
		P_2O_5	24.75	29.78	29.65	30.54	-3.36	20.32	-0.44	3.00	4.50
		K_2O	10.29	12.53	10.26	14.04	14.08	21.77	-18.12	36.84	11.70
		Total	150.48	152.83	155.31	159.08	5.13	1.56	1.62	2.43	2.67
7	Chandigarh	N	-	-	-	-	-	-	-	-	-
		P_2O_5	-	-	-	-	-	-	-	-	-

		K_2O	-	-	-	-	-	-	-	-	-
		Total	-	-	-	-	-	-	-	-	-
8	Delhi	N	0.30	0.64	1.86	0.54	-63.41	113.33	190.63	-70.97	-9.92
		P_2O_5	0.08	-	0.36	0.19	-61.90	-100.00	-	-47.22	-2.47
		K_2O	0.01	-	0.13	0.20	-	-100.00	-	53.85	111.47
		Total	0.39	0.64	2.35	0.93	-62.50	64.10	267.19	-60.43	-2.76
III.	**SOUTH**	**N**	**3,007.68**	**3,359.70**	**3,410.99**	**3,763.22**	**2.96**	**11.70**	**1.53**	**10.33**	**6.54**
		P_2O_5	**1,361.58**	**1,726.89**	**1,832.91**	**2,082.20**	**-6.18**	**26.83**	**6.14**	**13.60**	**9.45**
		K_2O	**1,127.69**	**1,370.79**	**1,369.16**	**1,304.80**	**15.55**	**21.56**	**-0.12**	**-4.70**	**7.53**
		Total	**5,496.95**	**6,457.38**	**6,613.06**	**7,150.23**	**2.78**	**17.47**	**2.41**	**8.12**	**7.53**
1	Andhra Pradesh	N	1,560.37	1,720.84	1,707.12	1,966.63	6.43	10.28	-0.80	15.20	7.62
		P_2O_5	695.02	852.20	875.87	1,031.98	1.33	22.62	2.78	17.82	10.75
		K_2O	412.19	497.84	478.38	498.18	24.13	20.78	-3.91	4.14	10.67
		Total	2,667.58	3,070.88	3,061.37	3,496.79	7.39	15.12	-0.31	14.22	8.92
2	Karnataka	N	790.28	864.10	962.90	1,016.21	4.51	9.34	11.43	5.54	7.67
		P_2O_5	386.78	558.83	629.85	696.17	-11.77	44.48	12.71	10.53	12.26
		K_2O	330.32	408.90	465.73	398.05	13.39	23.79	13.90	-14.53	8.12
		Total	1,507.38	1,831.83	2,058.48	2,110.43	1.45	21.52	12.37	2.52	9.17
3	Kerala	N	93.26	111.74	112.75	117.68	5.19	19.82	0.90	4.37	7.34
		P_2O_5	42.73	55.02	58.18	69.00	-6.31	28.76	5.74	18.60	10.90
		K_2O	72.31	94.15	93.96	96.86	-3.13	30.20	-0.20	3.08	6.73
		Total	208.30	260.91	264.89	283.54	-0.30	25.26	1.53	7.04	7.93
4	Tamil Nadu	N	543.34	646.68	608.54	643.18	-7.12	19.02	-5.90	5.69	2.40
		P_2O_5	228.12	254.99	263.70	279.91	-15.40	11.78	3.42	6.15	0.94
		K_2O	304.19	363.55	324.61	306.10	12.52	19.51	-10.71	-5.70	3.15
		Total	1,075.65	1,265.22	1,196.85	1,229.19	-4.38	17.62	-5.40	2.70	2.24
5	Pondicherry	N	20.04	16.06	19.37	19.14	-20.41	-19.86	20.61	-1.21	-6.63
		P_2O_5	8.57	5.67	5.04	4.81	-24.82	-33.84	-11.11	-4.60	-19.41
		K_2O	8.56	6.21	6.35	5.43	13.23	-27.45	2.25	-14.52	-7.95
		Total	37.17	27.94	30.76	29.37	-15.79	-24.83	10.09	-4.51	-9.68
6	A & N Islands	N	0.39	0.28	0.31	0.39	34.48	-28.21	10.71	25.81	7.69
		P_2O_5	0.36	0.18	0.27	0.33	28.57	-50.00	50.00	22.22	4.19
		K_2O	0.12	0.14	0.13	0.19	200.00	16.67	-7.14	46.15	47.63
		Total	0.87	0.60	0.71	0.91	42.62	-31.03	18.33	28.17	10.52
7	Lakshadweep	N	-	-	-	-	-	-	-	-	-
		P_2O_5	-	-	-	-	-	-	-	-	-
		K_2O	-	-	-	-	-	-	-	-	-
		Total	-	-	-	-	-	-	-	-	-
IV.	**WEST**	**N**	**4,093.83**	**4,194.20**	**4,564.09**	**5,141.32**	**7.50**	**2.45**	**8.82**	**12.65**	**7.79**
		P_2O_5	**1,876.01**	**2,199.38**	**2,596.34**	**2,991.15**	**2.81**	**17.24**	**18.05**	**15.21**	**13.15**
		K_2O	**718.16**	**837.37**	**987.04**	**917.84**	**15.82**	**16.60**	**17.87**	**-7.01**	**10.30**
		Total	**6,688.00**	**7,230.95**	**8,147.47**	**9,050.31**	**6.96**	**8.12**	**12.67**	**11.08**	**9.68**
1	Gujarat	N	1052.63	1,068.82	1,101.60	1,241.20	13.48	1.54	3.07	12.67	7.55
		P_2O_5	424.52	465.17	491.66	518.00	17.55	9.58	5.69	5.36	9.44

		K_2O	146.11	182.99	206.46	179.90	21.67	25.24	12.83	-12.86	10.63
		Total	1,623.26	1,716.98	1,799.72	1,939.10	15.22	5.77	4.82	7.74	8.31
2	Madhya Pradesh	N	795.69	803.41	941.82	998.20	8.99	0.97	17.23	5.99	8.13
		P_2O_5	430.26	530.03	605.63	740.90	4.99	23.19	14.26	22.34	15.96
		K_2O	75.75	89.96	113.72	128.40	16.13	18.76	26.41	12.91	18.45
		Total	1,301.70	1,423.40	1,661.17	1,867.50	8.02	9.35	16.70	12.42	11.57
3	Chhattisgarh	N	272.26	267.61	315.83	343.92	0.01	-1.71	18.02	8.89	6.02
		P_2O_5	116.96	134.26	162.32	185.52	0.83	14.79	20.90	14.29	12.46
		K_2O	52.65	60.95	58.99	81.14	9.66	15.76	-3.22	37.55	14.02
		Total	441.87	462.82	537.14	610.58	1.29	4.74	16.06	13.67	8.77
4	Maharashtra	N	1,263.50	1,340.90	1,478.60	1,682.08	4.47	6.13	10.27	13.76	8.60
		P_2O_5	641.51	747.46	1,016.51	1,142.41	-5.31	16.52	36.00	12.39	13.95
		K_2O	420.84	477.75	570.35	491.02	13.12	13.52	19.38	-13.91	7.18
		Total	2,325.85	2,566.11	3,065.46	3,315.51	2.96	10.33	19.46	8.16	10.07
5	Rajasthan	N	705.33	709.53	721.96	871.13	6.08	0.60	1.75	20.66	6.99
		P_2O_5	260.46	319.02	316.50	401.27	0.86	22.48	-0.79	26.78	11.65
		K_2O	20.91	23.47	34.75	35.40	60.97	12.24	48.06	1.87	28.48
		Total	986.70	1,052.02	1,073.21	1,307.80	5.40	6.62	2.01	21.86	8.72
6	Goa	N	3.47	3.03	3.25	3.63	21.75	-12.68	7.26	11.69	6.23
		P_2O_5	1.84	2.92	3.14	2.35	28.67	58.70	7.53	-25.16	13.22
		K_2O	1.82	2.18	2.71	1.90	8.98	19.78	24.31	-29.89	3.28
		Total	7.13	8.13	9.10	7.88	19.83	14.03	11.93	-13.41	7.28
7	Daman & Diu	N	0.38	0.29	0.31	0.42	-9.52	-23.68	6.90	35.48	
		P_2O_5	0.06	0.08	0.13	0.16	-	33.33	62.50	23.08	27.79
		K_2O	0.03	0.02	0.02	0.03	200.00	-33.33	-	50.00	31.61
		Total	0.47	0.39	0.46	0.61	-4.08	-17.02	17.95	32.61	5.63
8	Dadra & Nagar Haveli	N	0.57	0.61	0.72	0.74	-20.83	7.02	18.03	2.78	0.69
		P_2O_5	0.40	0.44	0.45	0.54	-14.89	10.00	2.27	20.00	3.53
		K_2O	0.05	0.05	0.04	0.05	-16.67	-	-20.00	25.00	-4.46
		Total	1.02	1.10	1.21	1.33	-18.40	7.84	10.00	9.92	1.56
	All India	**N**	**14,419.12**	**15,090.53**	**15,580.00**	**16,890.17**	**4.69**	**4.66**	**3.24**	**8.41**	**5.23**
		P_2O_5	**5,514.74**	**6,506.24**	**7,274.04**	**8,001.36**	**-0.51**	**17.98**	**11.80**	**10.00**	**9.61**
		K_2O	**2,636.27**	**3,312.57**	**3,632.40**	**3,391.39**	**12.91**	**25.65**	**9.66**	**-6.63**	**9.78**
		Total	**22,570.13**	**24,909.34**	**26,486.44**	**28,282.93**	**4.25**	**10.36**	**6.33**	**6.78**	**6.91**

(P) = Provisional.

Note : 1. Fertiliser consumption by Plantation crops in the south zone is included in the total of respective states.

2. Due to rounding off, total for the State/Zone/All-India (Horizontal & Vertical) may not exactly tally.

3. Fertiliser consumption by Plantation crops in the east zone is included in the total of respective states.

Source: 1. Ministry of Agriculture, New Delhi.

2. State Department of Agriculture.

3. Estimated sales data..

Annexure 3.5

State-wise per hectare use of fertilizer nutrients (N+P+K)
2007-08 to 2010-11 (April-March)

(Kg.)

Zone/State	2007-08	2008-09	2009-10	2010-11 (P)
East	**101.6**	**111.9**	**115.0**	**117.9**
Arunachal Pradesh	2.7	2.9	3.0	3.0
Assam	60.2	55.4	60.8	69.4
Bihar	159.0	174.1	168.0	173.5
Jharkhand	54.9	87.2	99.1	74.6
Manipur	84.9	54.4	50.9	28.0
Meghalaya	15.4	10.9	10.9	14.9
Mizoram	42.1	45.8	57.6	59.0
Nagaland	2.1	2.3	2.3	3.2
Orissa	52.1	59.0	57.3	59.7
Sikkim	-	-	-	-
Tripura	41.9	47.0	48.1	69.8
West Bengal	142.7	155.0	167.8	172.0
North	**159.7**	**171.3**	**180.5**	**186.4**
Haryana	190.9	198.8	209.1	196.6
Himachal Pradesh	52.8	61.3	56.9	59.3
Jammu & Kashmir	69.5	92.5	98.2	106.7
Punjab	212.7	223.4	235.8	237.3
Uttar Pradesh	145.6	157.9	166.9	179.0
Uttarakhand	121.3	128.6	130.7	133.9
Delhi	9.1	14.8	54.4	21.5
South	**161.4**	**185.7**	**190.2**	**205.6**
Andhra Pradesh	208.2	222.0	221.4	252.8
Karnataka	121.2	148.1	166.4	170.6
Kerala	71.4	96.8	98.3	105.2
Tamil Nadu	184.1	217.2	205.5	211.0
Pondicherry	1032.5	852.7	938.7	896.4
A & N Islands	62.1	33.7	39.9	51.1
West	**81.2**	**87.1**	**98.2**	**109.1**
Gujarat	133.0	148.4	155.5	167.6
Madhya Pradesh	64.7	68.9	80.4	90.4
Chhattisgarh	77.1	81.4	94.5	107.4
Maharashtra	103.0	116.1	138.7	150.0
Rajasthan	45.8	46.2	47.1	57.4
Goa	41.5	49.0	54.8	47.5
Daman & Diu	156.7	78.0	92.0	122.0
D & N Haveli	36.4	40.6	44.7	49.1
All India	**116.5**	**127.7**	**135.8**	**145.0**

(P) = Provisional.

Note: Consumption of plant nutrients per hectare has been worked out on the basis of the latest available data on gross cropped area.

CHAPTER-IV

4.0 HEALTH ASSESSMENT OF FERTILIZER INDUSTRY

4.1 The Indian fertilizer industry has remained under controlled regime for a long period. The Retention Pricing Scheme (RPS) introduced in 1977 for nitrogenous fertilizers remained in force till 31st March, 2003. Thereafter, New Pricing Scheme (NPS) for urea units was introduced w.e.f. 1st April, 2003. NPS was implemented in three stages, the last stage being NPS-III which was valid till 31st March, 2010. Since formulation of new policy for a period beyond 31st March, 2010 is yet to be formulated, NPS-III policy has been extended till further order. The RPS for Phosphatic and complex fertilizers introduced in 1979 continued till 1992. Thereafter, P & K fertilizers were decontrolled. However, the Government control and the subsidy had to be re-introduced in various forms like ad hoc concession and indicated MRPs to make these fertilizers available to the farmers at prices much below the cost of production and import. This was to encourage increased fertilizer use for higher agricultural production and productivity to ensure India's food security.

4.2 Urea Industry

4.2.1 The health and growth of the industry got a boost under RPS during 70s and 80s. This, however, also resulted in significant increase in the subsidy burden of the Government. With a view to contain rising subsidy bill, the pricing norms under subsidy and pricing schemes were tightened with every successive pricing period. The principal factor behind rise in subsidy bill i.e., incessant increase in feedstock prices in the backdrop of stagnant (or very meager increase in MRP), however, remained unaddressed. The increase in quantity of fertilizer consumption over the years was also an important factor behind rise in subsidy bills. The tightening of norms without addressing causative factors resulted in

under-recoveries to the fertilizer industry which went on aggravating with successive pricing periods after 1992. The impact of measures taken during 7th and 8th pricing period was particularly severe. These measures *inter-alia* included reassessment of capacity, increase in capacity utilization norms, tightening of energy consumption norms and under-recoveries arising out of change in the base for the costed year for updation of fixed costs and recoveries for sale of ammonia.

4.2.2 The trend continued even after introduction of group based pricing and subsidy policy known as NPS for urea units in 2003. The under-recoveries continued mainly due to allowing unit's actual price or the group average whichever is lower. The disallowances of a number of taxes and duties, non-updation of costs, tightening of energy norms and mopping up the efficiency gains by the Government also cut into the margins of the industry.

4.2.3 The Stage-I of NPS policy implemented w.e.f. 1.4.2003 was based on the costed year 1999-2000 resulting in significant under-recovery particularly on account of fixed cost. Similarly, NPS-III policy implemented w.e.f. 1.10. 2006 for urea was based on the costed year 2002-03. There was significant increase in components of fixed cost like salaries and wages, contract labour, selling expenses and repair and maintenance. Certain companies lost on account of reduction in fixed cost due to the concept of allowing lower of the group weighted average and the actual cost of the unit despite limiting this loss to 10% of the fixed cost during Stage-III. Over and above, the capacity utilization norms were increased by 3% from the level of 90% to 93% for naphtha, fuel oil/LSHS based plants. For gas and mixed energy based plants, it was increased from 95% to 98%. Besides, for compensating the industry against additional production of urea beyond re-assessed capacity and sale of surplus urea, the concept of sharing of industry's gain by the Government was introduced resulting in mopping up of gains. The energy norms were revised during the Stage-II of NPS based on performance of

the urea units. During Stage – III of NPS, energy norms were recognized lower of actual in 2002-03 or NPS-II norms.

4.2.4 The above measures made the high energy consuming inefficient urea units, especially those based on naptha unviable and units like FACT-Cochin, MFL-Manali, RCF-Trombay, SPIC-Tuticorin and Duncans Industries suspended their production. RCF-Trombay and SPIC have since resumed production. Even some efficient gas based units like KRIBHCO-Hazira, NFL-Vijaipur found it difficult to sustain their margins under the current dispensation.

4.2.5 For encouraging additional production through revamps, expansions, brownfield and Greenfield urea units, the Government notified New Investment Policy in Sep' 2008, which was based on international parity pricing. Based on Abhijet Sen Committee report, the concept of cut-off quantity based on maximum annual production achieved during 2003-2007 was introduced for revamp units. Most of the gas based urea units have undertaken/ undertaking revamp. Due to the above incentive, these units are producing urea much above cut off level and are able to make reasonably good profits on account of IPP based new investment policy. However, constraints in commitment of gas availability for long term for fresh capacities, prohibited investments in urea sector through expansions, brownfield and Greenfield projects.

4.2.6 The overall health of the urea industry was fairly satisfactory. Almost all the public, private and cooperative sector manufacturing units are making profits.

Among Public Sector Undertakings, RCF and NFL are operating satisfactorily on overall basis. No financial crunch is reported and the companies are undertaking measures for performance and capacity enhancements. Only the plants at Namrup (BVFCL), MFL and FACT units are running under losses. Main reasons identified for sickness in these units are

i) Outdated Technology

ii) High energy consumption

iii) Raw material problems

iv) Financial constraints

v) Lack of trained manpower

a) MFL

Constraints

i) Ammonia plant is not operating at full capacity due to low capacity utilization.

ii) NPK plant is operating at low capacity due to high cost and non-availability of phosphoric acid.

iii) The energy consumption for urea is higher than present day plants.

iv) High feedstock naphtha prices. High depreciation charges compared to group norms.

v) If the ammonia-urea complex has to sustain on stand basis, it will have to bear additional burden due to closure of NPK plant and the ammonia-urea complex cannot bear the additional burden.

Options available for improvement

Change over of feedstock from naphtha to natural gas along with revamp measures in ammonia and urea plants to improve energy efficiency and urea product quality. During the interim period the outlier benefits may be increased to compensate losses.

b) FACT

The reasons for sickness of FACT as reported are:

i) High fixed cost of ammonia plant (900 MTPD)

ii) High cost of feed stock naphtha and furnace oil due to high State taxes

iii) Retention price not commensurate with cost of production

iv) Cochin division urea plant has outdated technology and has become uneconomical

v) Phosphoric acid plant suffers from low production and low efficiency

Options available for improvement

Change over of feedstock from naphtha to natural gas at the earliest. In addition, the following steps may be considered.

i) The outstanding amounts of loans given by Central Government may be converted to equity.

ii) The State Government may be advised to reduce Sales Tax

iii) Phosphoric acid plant should be revamped

iv) Energy saving measures have to be undertaken

v) Infrastructure facilities have to be improved.

c) BVFCL – Namrup

The fertilizer complex of BVFCL has 3 units, namely, Namrup-I, Namrup-II and Namrup-III. Namrup-I has stopped production since mid-2002 due to non-viability of cost of production. Presently, only Namrup-II and Namrup-III units are under production. The production performance of Namrup-II unit, even after implementation of revamp measures, has been unsatisfactory mainly due to the following reasons:

i) Poor performance of rotating machines, i.e. mainly, synthesis gas compressor and Process Air compressor

ii) Very frequent power interruption of external power supply from Assam State Electricity Board.

iii) Irregular and shortage in supply of Natural Gas by Oil India Ltd and ONGC.

However, it can be said in general that, ammonia and urea plants in both Namrup-II and Namrup-III units are of old vintage for which the performance

cannot be at par with the present new generation large capacity plants, which are endowed with the advantage of higher efficiency due to advanced design of rotating machines and equipment. Moreover, frequent interruption in power and natural gas supply always result in larger number of plant shutdown and start-ups, for which, apart from loss in production, the energy consumption on an annualized basis becomes prohibitively high. Government may consider setting up a new state of the art urea unit in Namrup at the earliest to utilise the existing infrastructure and available energy in the region. This shall help in higher production of urea at much economical price due to high energy efficiency of the unit.

4.3 P & K Industry

4.3.1 Phosphatic and Potassic Fertilizers were also part of the retention price cum subsidy scheme from November, 1977 till 24th August, 1992. The price and movement control over these fertilizers was completely withdrawn with effect from 25th August, 1992, based on the recommendations of a Joint Parliamentary Committee. As a result, the farm gate price of these fertilizers increased sharply leading to perceptible decline in its consumption. Keeping in view the need for balanced application of all nutrients (N, P & K), an ad-hoc concession scheme was introduced with effect from October, 1992. The ad-hoc subsidy on sale of these fertilizers was made available by the Central Government through the State Governments, who were also mandated to fix the selling prices within the State. From April, 1994 onwards, disbursement of subsidy to manufacturers / importers was made directly by the Central Government, on receipt of certification of sales from the State Governments. The above arrangement was further modified in April, 1997, with Government of India fixing uniform Maximum Retail Prices (MRPs) of these fertilizers under the concession scheme. The ad-hoc subsidy under the concession scheme was also changed to normative cost of production based subsidy with effect from April, 1999 onwards.

4.3.2 The pricing and concession scheme remained primarily based on cost. The P &K industry had under recoveries during second half of 2008-09 when international prices declined sharply due to the practice of allowing lower of the published price for the previous month and the actual cost of import for the current month. In a falling market, the actual cost of imported material for any month would be higher as the material is generally contracted two months earlier (when the prevailing price was higher) than the published price of previous month (by which time the prices would have come down), though in the rising market the scenario is inverse. There were other issues of under-recoveries in recognizing various components of cost including the fluctuation in exchange rate and international prices.

4.3.3 The introduction of Nutrient Based Subsidy (NBS) Scheme for P & K fertilizers w.e.f. 1.4.2010 has brought a major shift in the policy. Under the nutrient based subsidy regime, the subsidy is fixed for each nutrient viz. N, P, K & S, which is determined by the Government [Inter Ministerial Committee (IMC)] every year. Since the subsidy now remains fixed, the selling price of fertilizers at farm gate level is decontrolled and is determined by the market forces. However, the IMC keeps a vigilant eye on the reasonability of retail prices of fertilizers. The NBS in P&K sector is expected to encourage fertilizer industry to focus more on farmers through development of new innovative fertilizer products customized to their requirements, farm extension services, brand building, product differentiation etc. Further, the basket of subsidized fertilizers could also be gradually broadened to cover new fertilizers containing secondary and micro-nutrients. This will help in achieving twin objectives of balanced fertilization through better fertilizer products and growth of indigenous industry based on buoyant demand of fertilizers in the country. Further, the outgo of subsidy in P&K sector is forecasted and budgeted more rationally on annual basis.

4.4 Complex Fertilizer Industry

4.4.1 The first year of the Nutrient Based Subsidy (NBS) regime has seen good profitability for complex fertilizer manufacturers. It has been due to the fact that in the first half of the year, manufacturers were successful in sourcing raw materials at price conducive to the subsidy rates fixed by the Government of India. Furthermore, since the NBS policy gives pricing freedom to the manufacturers, they have increased retail prices, particularly in the second half, in order to pass on input price increases to farmers. The retail price increases have been absorbed by the farmers without any adverse impact on the demand for complex fertilizers.

4.4.2 The subsidy rates announced for 2011-12 are higher than the rates announced in November 2010 and have been taken into account the increased international prices. Manufacturers will therefore be better placed to negotiate prices with their raw material suppliers. Coupled with the recent price increases, the profitability of complex fertilizer manufacturers is thus expected to remain healthy in 2011-12.

4.5 New Investment in Fertilizer Sector

4.5.1 Government has been consistently pursuing policies conducive to increased availability and consumption of fertilizers at affordable prices in the country. As a result, the annual consumption of fertilizers, in nutrient terms (N, P & K), has increased from 0.07 million MT in 1951-52 to more than 28 million MT in 2010-11, while per hectare consumption, which was less than 1 Kg in 1951-52 has risen to the level of 135 Kg currently. Consecutive five-year plans have provided importance to self-sufficiency and self-reliance in food grains production and painstaking efforts in this direction have resulted in significant increase in agriculture production and productivity. This is evident from the fact that from a very modest level of 52 million MT in 1951-52, food grains production has risen to about 240 million MT in 2010-11. In the success saga of agriculture sector in

terms of meeting total requirement of food grains and also generating exportable surpluses, the significant role played by chemical fertilizers is well acknowledged and established.

4.5.2 India is completely deficient in potassic (K) resources and has to entirely depend upon import for meeting the requirement of potash (MOP) for agriculture usage. The country is also deficient in phosphatic (P) resources with around 90% requirement of the country being met through direct import of finished phosphatic fertilizers or phosphatic raw materials/intermediates for indigenous production of phosphatic fertilizers. Urea (N) is the only fertilizer, the requirement of which is largely (around 80%) met through indigenous production. Even in urea production, since the feedstock like natural gas (especially spot gas) and crude oil which provides Naphtha & FO/LSHS are imported, the indigenous production can be considered to be partially import dependent. The Indian fertilizer industry has not attracted any fresh investment for capacity additions for more than a decade mainly due to Lack of availability of feedstock for new urea units / expansions etc. on long term basis. Moreover, the capacities of DAP are underutilized due to shortage of indigenous as well as imported inputs. The domestic capacity and production of fertilizers have more or less stagnated and due to rising demand for fertilizers on imports are continuously rising. India imported only 3.6 million tonnes of fertilizer materials during 2000-01 which increased to 16.8 million tonnes during 2009-10. During 2010-11, India imported almost 1/3rd i.e. 21 million tonnes of fertilizer material against the total consumption of 58 million tonnes.

4.5.3 As our import dependence increases, the international prices also tend to increase making us more vulnerable to the vagaries of fluctuating international prices. For instance, our import of urea during 2000-01 was meagre 220 thousand tonnes and the average CFR India price of urea was US $117/tonne. The average CFR price of urea import increased to US $327/tonne (excluding

import from Indian JV OMIFCO) during 2010-11 when India imported about 6.6 million tonnes Iincluding from OMIFCO) of urea. Similar is the case with DAP where the average CFR India price increased from US $179/tonne during 2000-01 with an import of a small quantity of 861 thousand tonnes to US $496/tonne during 2010-11 when India imported 7.4 million tonnes.

4.5.4 The import dependence in phosphatic & potassic sector is likely to continue due to limitation of indigenous resources. Nitrogen (Urea) is the only fertilizer where the country can become self-sufficient based on the available and projected hydro carbon resources in the country. The futuristic lookout for urea industry is dependent on new gas finds and also alternate sources of energy like CBM and Coal gasification, which can facilitate new investment in urea sector. This would ensure India's fertilizer and food security, but would also, help in containing incessant rise in international prices of fertilizers and raw materials. There is also urgent need emanating to explore possibility of joint ventures in resource rich countries with backward integration and mining rights for potash and phosphates. Indian companies are also exploring possibilities of setting up additional capacities for finished fertilizers indigenously based on long-term supply arrangements for raw materials/intermediates and investment in potash and phosphates mines abroad.

4.5.5 The Government came out with the policy for attracting fresh investment in urea sector in January, 2004 based on the principle of Long Run Average Cost (LRAC). However, it did not attract any fresh investment as the return on investment based on the policy was not found attractive. Moreover, availability of gas on long term basis had always been a limiting factor. The new investment policy was notified in September, 2008 under which the pricing of urea from new investments in the form of revamps, expansions, brownfield and Greenfield projects was based on import parity price (IPP) with a provision of a floor and ceiling. This policy encouraged investment in revamp of existing units creating a

capacity of producing about 2 million tonnes of additional urea. However, this new policy also could not attract investment in Brown Field (expansion) and Green Field (grass root) projects. The major constraints in attracting investment in new urea projects was non-availability of gas, uncertainty regarding the price of gas, pipeline connectivity for transporting gas and uncertainty regarding returns on investment under prescribed price linked to IPP with floor and ceiling of US $250/tonne and US $425/tonne respectively.

4.5.6 The price of gas has always been a pass through for the industry. Pricing of gas and linking it with the concession rate and price of urea is equally important. The Government has been working with the industry to amend the investment policy notified in Sep' 2008 in such a way that it is a win-win for the industry, the Government as well as for the end user i.e. farmers. The amendments have been proposed in a manner to protect the industry from incurring losses in the event of gas prices rising sharply, while international prices of urea not increasing correspondingly.

4.5.7 The report on policy beyond New Pricing Scheme – Stage-III (NPS-III) has been submitted by Committee of Secretaries headed by Shri Saumitra Chaudhuri, Member, Planning Commission. The amendments to new investment policy of 2008 are also under consideration of the committee.

4.6 SWOT analysis for the domestic fertilizer industry

Overall analysis of strength, weakness, opportunities and threat to the fertilizer sector is as follows:

Strength:

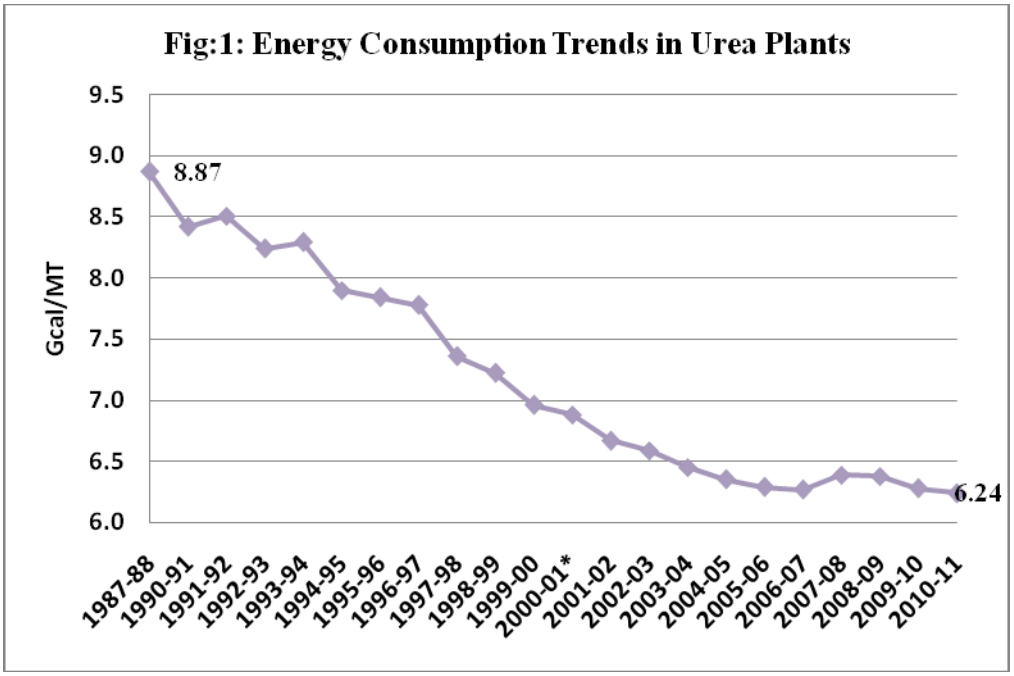
Indian technologies, capabilities and experience: The Indian fertilizer plants have adopted diverse technologies supplied by various renowned licensers. We have kept pace with the technological advancement elsewhere in the world. The single superphosphate plant with associated sulphuric acid plant and granulation plant are indigenously designed, engineered and constructed. There are also Indian capabilities in consultancy, design and manufacturing equipment. Indian manufacturers are fully geared to fabricate critical items for meeting the international codes and standards.

The fertilizer plants in India include old design as well as the most modern ones. These are run by very well trained and experienced operation and maintenance staff. Most of these plants can, therefore, lend staff for construction and commissioning and trouble shooting in other plants both inside India and abroad. Also, many of these plants have highly competent Technical Service teams which continuously monitor running of their plants, keenly watch international technical developments in the fertilizer field and adapt it to their local needs so as to run their plants at the optimum levels.

Several fertilizer companies in India have well equipped research laboratories. These labs are engaged in R&D activities in the area of catalyst, new and modified fertilizer products, including customized and fortified fertilizers, pollution control, water treatment, materials of construction, utilization of inferior quality rock phosphate, process modeling and simulations, etc.

Several hundred highly qualified scientists and engineers are employed in about a dozen R&D centers across the country. India offers a unique opportunity for imparting training and sharing its valuable experience in all facets of fertilizer production.

World class industry: Indian fertilizer industry is bench marked as one of the best in the world in terms of operational efficiency, energy consumption, maintenance of safety and environmental standards. **Figure 1** depicts the considerable improvement in energy consumption between 1987-88 and 2010-11.



According to an energy consumption survey undertaken by International Fertilizer Industry Association (IFA), Paris in 2002-03, it has been found that Indian gas based plants are comparable to the world average in terms of energy consumption (**Fig.2**).

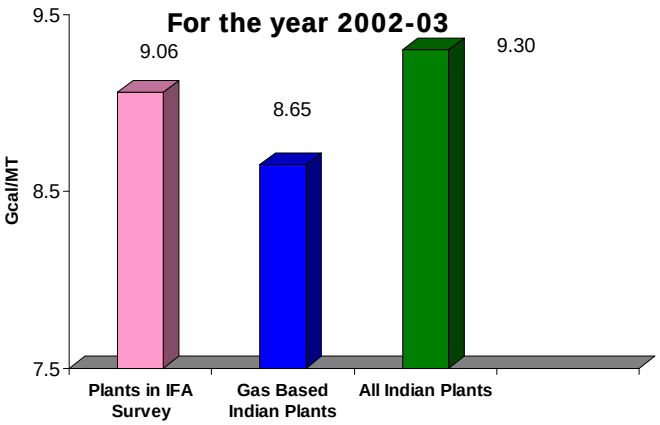


Fig. 2: BENCHMARKING WITH WORLD PLANTS (Energy consumption of Ammonia)

Most ammonia plants (>90%) in the IFA survey are based on NG as feedstock. Almost 40% of Indian capacity is based on less efficient naphtha and fuel oil. Still average energy consumption of Indian plants is comparable to the world average. Indian gas based plants are more efficient than the world plants.

International Fertilizer Industry Association, Paris has instituted an award called *IFA Green Leaf Award* since 2009. It is an award for excellence in safety, health and environment in the fertilizer plants. The award is judged by an international panel of judges. Indian companies have successively got this award in 2009 (runner up) as well as 2010 (rank 1st).

Large distribution network: Over the years, it has been the Endeavour of the Government and the Fertilizer Industry to make fertilizers available across the country, including the remote and inaccessible areas. Currently, there are about 275 thousand sale points across the country catering to the need for fertilizer across the country. Out of the total number of sale points, 77 per cent are in the private channel and 23 per cent in the cooperative & other institutional agencies.

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Extension workforce: Fertilizer Industry has a good number of extension workforce to take care of the promotion and extension activities of the Industry. Despite very limited available resources, the Industry undertakes various promotional and extension work. These include, Fertilizer Demonstrations, Critical input package demonstrations, Field programmes, Agriculture extension programmes, Research & development, Farmers service centers, Information technology, Trainings, etc.

Weakness

Lack of consistent and conducive policies: The policies formulated from 1990s emphasized on containing fertilizer subsidy rather than reducing dependence on imports. Lack of conducive policies led to stagnation in domestic capacity and increasing dependence on imports in the past one decade.

High imports : Currently about 38 per cent of the total fertilizer consumption is fulfilled through imports. The imports of total finished fertilizers have gone up to 21.7 million tonnes (Mt) in 2010-11 from 3.6 Mt only in 2000-01. Out of 21.7 Mt, the import of urea was 6.6 Mt, DAP 7.4 Mt, MOP 6.4 Mt and the balanced quantity of 1.3 Mt comprised of NP/NPKs, Ammonium sulphate, TSP and SOP.

Inadequate availability of raw materials/ intermediates: Bulk of the requirement of feedstock for manufacture of nitrogenous fertilizers is available from domestic sources. During 2010-11, about 13.5 million tonnes ammonia was produced in the country. About 1.7 million tonnes of ammonia was imported to supplement the requirement of ammonia for the production of DAP/ complex fertilizers. In addition, about 2.64 billion SM3 (8 million SM3 per day) of LNG was also imported to supplement the increased requirement of gas.

In regard to phosphates, bulk of the requirement of raw materials/ intermediates is met through imports. Currently, about 6.4 million tonnes of rock phosphate and 1.8million tonnes of sulphur are imported. The availability of rock phosphate from domestic sources is about 1.6 million tonnes. Domestic availability of sulphur is about a million ton. During 2010-11, about 2.1 million tonnes of phosphoric acid were imported.

Entire requirement of potash is met through imports.

International prices of fertilizers and raw materials are volatile. These are not governed by the cost of production and margin, but influenced by demand and supply. The availability of imported materials is in the hands of a few suppliers. Sourcing them is a big challenge to the Indian Fertilizer Industry.

Limited product diversification: FCO contains a long list of fertilizers of more than 80 products. However a few products are marketed on which subsidies are allowed. These include Urea, DAP, DAP Lite, SSP, MOP and 18 grades of complex fertilizers. Out of these, bulk of the share is comprised of Urea, DAP and MOP. Urea accounts for 78% share of N consumption and the share of DAP in total P is about 62%. Increasing use of high analysis fertilizers has resulted in multi-nutrient deficiencies in the soil.

Dependence on subsidy: The government of India ensures supply of fertilizer to the farmers at reasonable rates. The retail prices of fertilizers are significantly lower than the cost of production/ imports. The difference between the cost of production/ imports and the retail price is paid as subsidy to the farmers. The amount of subsidy increased from Rs.13.8 thousand crores in 2000-01 to Rs. 99.5 thousand crores in 2008-09 and Rs. 65.8 thousand crores in 2010-11. The rising amount of subsidy is due to increasing cost of production/ imports against the lower MRP.

Low profitability: The profitability of the fertilizer sector is significantly lower than other core sectors. Even the profitability of the best performing companies in the fertilizer sector is far lower than other core sectors of the economy. Table given below gives an example of the profitability and return on net worth in some of the best performing fertilizer companies vis-à-vis power, steel, cement, petroleum and coal sectors of the country.

Comparative profitability of the fertilizer sector vis-à-vis other core sectors of India (Rs. crore) – 2009-10				
Company	Business Sector	Net worth[1] (Rs. crore)	Net profit (Rs. crore)	Return on net worth (%)
GAIL (India) Ltd.	Natural Gas	17810	3140	17.6
ONGC	Oil / Natural Gas/ Petroleum products	86441	16768	19.4
SAIL	Steel	1677	466	27.8
NTPC	Power	62437	8728	14.0
Ambuja Cement	Cement	6471	1217	18.8
Coal India Ltd.	Coal	25795	9622	37.3
Rashtriya Chemicals & Fertilizers Ltd.	Fertilizer	1837	235	12.8
Indian Farmers Fertilizers Cooperative Ltd.	Fertilizer	4271	401	9.4
Gujarat State Fertilizers and Chemicals Ltd.	Fertilizer	2144	254	11.8

1 = Share capital + Reserves and surplus

High interest cost: Rate of interest is high in India both for borrowing in short term to meet working capital requirement as well as term loan for long term compared to developed countries. High interest cost enhances the cost of production.

Infrastructure facilities: Adequate infrastructure facilities are not available in India when a plant is set up in a specific location.

Opportunities

Large market and Investment opportunities: India is the second largest consumer of fertilizer in the world next to China. There is a large market for suppliers to sell the finished fertilizers as well as raw materials. It is also a financially credible market. There are lots of opportunities to invest in Indian fertilizer sector

Threat

Import threat: As mentioned earlier, lack of addition in domestic capacities of finished fertilizers have created increasing dependence of the country on imports which is a major challenge to deal with.

CHAPTER-V

5.0 REVIEW OF FERTILIZER POLICIES

5.1 Urea is at present the only fertilizer which is under statutory price, movement and distribution control under the Essential Commodities Act, 1955. While the potassic and phosphatic fertilizers were decontrolled w.e.f 25.8.1992, the low analysis nitrogenous fertilizers viz. calcium ammonium nitrate, ammonium chloride and ammonium sulphate were decontrolled and brought under control several times in the past. These fertilizers were last decontrolled w.e.f 10.6.1994.

5.2 Until 31.3.2003, the subsidy to urea manufacturers was being regulated in terms of the provisions of the Retention Price Scheme (RPS). Under RPS, the difference between retention price (cost of production as assessed by the Government plus 12% post tax return on networth) and the MRP was paid as subsidy to the urea units. Retention price used to be determined unit wise, which differed from unit to unit depending upon the technology, feedstock used, the level of capacity utilization, energy consumption, distance from the source of feedstock/ raw materials, etc. Though the RPS did achieve its objective of increasing investment in the fertilizer industry and thereby creating new capacities and enhanced fertilizer production along with increasing use of chemical fertilizers, the scheme had been criticized for being cost plus in nature and not providing strong incentives for encouraging efficiency.

5.3 Given the importance of fertilizer pricing and subsidization in the overall policy environment impinging on the growth and development of the fertilizer industry as well as well of agriculture, the need for streamlining the subsidy disbursement to urea units had been felt for a long time. A High Powered Fertilizer Pricing

Policy Review Committee (HPC) was constituted, under the chairmanship of Prof. C.H. Hanumantha Rao, to review the existing system of subsidization of urea, suggest an alternative broad-based, scientific and transparent methodology, and recommend measures for greater cohesiveness in the policies applicable to different segments of the industry. The HPC, in its report submitted to the Government on 3rd April 1998, inter-alia, recommended that unit-wise RPS for urea may be discontinued. It recommended that instead of unit-wise RPS, a uniform Normative Referral Price be fixed for existing gas based urea units and also for DAP and a Feedstock Differential Cost Reimbursement (FDCR) be given for a period of five years for non-gas based urea units.

5.4 Expenditure Reforms Commission (ERC) headed by Shri K.P. Geethakrishnan had also examined the issue of rationalizing fertilizer subsidies. The ERC submitted its report on 20th September 2000, in which it recommended, inter-alia, dismantling of existing RPS and in its place introduction of a Concession Scheme for urea units based on feedstock used and the vintage of plants.

5.5 The recommendations of ERC were examined in consultation with the concerned Ministries/Departments. The views of the fertilizer industry and the State Governments/Union territories, and economists/research institutes were also obtained on the ERC report. After due examination of all these views, a New Pricing Scheme (NPS) for urea units for replacing the RPS was formulated and notified on 30.1.2003. The new scheme has taken effect from 1.4.2003. It aims at inducing the urea units to achieve internationally competitive levels of efficiency, besides bringing in greater transparency and simplification in subsidy administration.

5.6 New Pricing Scheme (NPS) is being implemented in stages. Stage-I was of one year duration, from 1.4.2003 to 31.3.2004. Stage-II was from 1.4.2004 to 31.9.2006.

5.7 Under NPS, the existing urea units have been divided into six groups based on vintage and feedstock for determining the group based concession. These groups are: Pre-1992 gas based units, post-1992 gas based units, pre-1992 naphtha based units, post-1992 naphtha based units, fuel oil/low sulphur heavy stock (FO/LSHS) based units and mixed energy based units. The mixed energy based group shall include such gas based units that use alternative feedstock/fuel to the extent of more than 25% as admissible on 1.4.2002.

5.8 The objectives of Stage – I & II of NPS were as follows:

(i) Encourage efficiency parameters of international standards based on the usage of the most efficient feedstock, State of the Art Technology;
(ii) Ensure viable rate of return to the units;
(iii) Partial decontrol of distribution and movement of Urea leading to total decontrol;
(iv) Creation of additional Urea capacity based on cheaper feed stock i.e. gas through a policy of de-bottlenecking / revamp / modernization and brown field expansions of existing Urea Units;
(v) Conversion of non-gas based Urea Units to gas through incentives.

5.9 Under NPS, pre-set energy norms for urea units during Stage-II of NPS were notified with a view to fix norms for specific energy consumption and encourage efficiency and discourage in-efficiency. Similarly, reduction in rates of concession during Stage-II of NPS for urea units on account of reduction in capital related charges were also notified vide the Department's letter dated 6.8.2003. Phased decontrol of urea distribution/movement was also undertaken under the NPS.

5.10 A Working Group was constituted under the chairmanship of Dr. Y.K. Alagh for reviewing the effectiveness of Stage-I and II of NPS and for formulating a policy for urea units beyond Stage-II. Based on the recommendations of the Working Group, the pricing policy for urea units for Stage-III of NPS was notified w.e.f. 1.10.2006 to 31.3.2010 vide notification dated 8.3.2007. The Working Group evaluated the possibility of total decontrol of the urea pricing and found that this would affect the interest of the farmers in a significant negative manner. Hence, the Working Group ruled out decontrol of urea pricing in the near future. The Working Group observed that reforms under the NPS have led to cost reduction and energy savings from the levels achieved earlier. Working Group suggested that the policy based on feedstock and vintage may be continued in Stage-III of NPS and more time is needed to see that objectives of NPS are realized in a meaningful and lasting manner. Beyond that time, it is expected that the stage would be set for a single producer price and decontrol of urea which is the ultimate objective of the long term urea policy. The Department favoured the option recommended by the Working Group for continuation of NPS, which aims to carry forward the trends of efficiency, transparency and uniformity introduced during Stage I & II of NPS without any sudden changes of a basic nature.

5.11 **Key objectives of NPS-Stage – III are as follows:**

(i) Promote further investment in the urea sector including technological up-gradation

(ii) Conversion of non-gas based units to gas through a credible plan of action

(iii) Incentivize additional urea production

(iv) Encourage investment in Joint Venture Projects abroad

(v) Urea distribution to be increasingly guided by market mechanism

(vi) Ensuring availability of urea in the remotest corners of the country.

5.12 **Salient features of the Stage-III of NPS are as under:**

(a) The classification based on six groups to continue viz. Pre-1992 Naphtha based, Pre-1992 gas based, Post-1992 naphtha based, Post-1992 gas based, Fuel Oil/ LSHS based and Mixed Feed based

(b) Group averaging done after updation of all costs upto 31.3.2003

(c) Capacity utilization levels of 93% for pre-92 Naphtha and FO/LSHS based plants and 98% for pre-92 gas, post-92 gas, post-92 Naphtha (*amendment-95%)* and mixed energy based plants is considered for calculating the base concession rates of urea units as on 31.3.2003

(d) Transportation cost of gas computed and paid separately

(e) The updated notional concession rates of all urea units as on 1.4.2003 is the basis to calculate the concession rate payable to each urea unit during Stage-III of NPS commencing from 1.10.2006.

(f) On the base concession rate so determined for each unit, only escalation and de-escalation on components of variable cost on actual basis subject to pre-set energy norms given in Stage – III.

(g) The respective pre-set energy consumption norm of each urea unit during Stage-II of NPS or the actual energy consumption achieved during the year 2002-03, whichever is lower, is recognized as the norm for Stage-III of NPS.

(h) **Resumption of urea production by units under shutdown:** Resumption of production by urea units viz. RCF-Trombay-V, FACT-Cochin and Duncans Industries Limited (DIL)-Kanpur is allowed based on natural gas/LNG/CBM/Coal gas

(i) **Conversion of non-gas based units to NG/LNG:** The Stage-III policy of NPS lays down a definite plan for conversion of all non-gas based units to Natural Gas (NG) / Liquefied Natural Gas (LNG). At present, there are 8 urea units (MFL, SPIC, ZIL, MCFL, GNFC, NFL-Nangal, NFL-Bhatinda, NFL- Panipat) in the country which are based on naphtha or FO/LSHS as feed stock. All these 8 units are required to switchover to natural gas/LNG within a period of next three years. Beyond this

time limit, the high cost urea produced by these non-gas based units will not be entitled to subsidy at the existing levels and it will be restricted to the lower of the prevalent import parity price (IPP) or their own rate. The units which are unable to tie up gas will have to explore alternative feedstocks like Coal Bed Methane (CBM) and coal gas.

In order to incentivize conversion of non gas based units to gas, the policy provides for a regime where there will be no mopping up of energy efficiency for a fixed period of five years for Naphtha based as well as FO/LSHS based units. The Policy recognizes the comparative higher cost of conversion of FO/LSHS based units to gas and provides for one time capital investment assistance to these units for conversion to gas during the next three years. A specific policy to this effect has been announced separately by Department of Fertiliser (DOF) in consultation with Department of Expenditure (DOE), Ministry of Finance.

(j) **Incentives for additional urea production:** Considering the likely growth in consumption of Urea in the years to come, Stage-III of NPS encourages the existing Urea units to produce beyond 100% of their installed capacities by introducing a system of incentives for additional Urea production subject to merit order procurement. The policy of requiring prior Government permission for additional urea production has been dispensed with All production between 100% and 110% of the existing reassessed capacity will be incentivized on the existing net gain sharing formula between the Government and the Unit in the ratio of 65:35 respectively with provision that the total amount paid to the units after including the component of variable cost will be capped at the unit's own concession rate. The Units increasing production beyond 110% may be compensated at their concession rate, subject to the overall cap of IPP. To the extent Government does not require any quantities of additional production the Urea companies are free to dispose of the remaining quantities by way of export or sale to complex manufacturers without any prior permission of Government.

(k) **Distribution and Movement of Fertilizers** - The Government continues to retain the authority to direct movement of urea stock up to 50% of production

depending upon the exigencies of the situation. States are required to allocate the entire quantity of planned urea arrivals i.e., both regulated and de-regulated urea in a District-wise, month-wise and supplier wise format. Each unit has to maintain a district level stock point in the districts where it is required to supply urea. These district level stock points are the primary Godowns. Subsidy to individual units is reimbursed based on conformity to planned movement up to district level for both controlled and de-controlled urea. The monitoring of the movement and distribution of urea throughout the country is done by an on-line computer-based 'Fertilizer Monitoring System (FMS)'. Subsidy is paid only when the urea reaches the district. The Department operates a buffer stock through the State Institutional Agencies /Fertilizer Companies in States up to a limit of 5% of their seasonal requirement. The Department also works through the agricultural department of the states to realize the objective of adequate and timely availability of urea at the Block level.

(l) **Freight reimbursement**- Primary Freight is reimbursed on the basis of actual leads for rail movement and reimbursement of railway freight is as per the actual expenditure. For the road component of the primary freight, road leads are as per actual distance to the primary godown and per tonne Km. rates are escalated by the composite road transport index *{weighted average of the Wholesale Price Indices (WPIs) of HSD oil, Motor Tyres, Truck Chassis and All Commodities}.* One time enhancement of 33% has been granted on the road component of primary freight to offset the impact of Supreme Court directed maximum truckload limit of 9 MT on road vehicles. Tariff Commission was requested to fix average leads and per tonne km base rates for road transportation in the case of secondary movement. Based on the report of Tariff Commission, the rates have been notified recently.

(m) The existing system of import of urea through designated State Trading Enterprises (STEs) i.e. Minerals & Metals Trading Corporation (MMTC), State Trading Corporation (STC) and Indian Potash Limited (IPL) continues.

(n) **JVs abroad** are encouraged under the policy

5.13 Policy beyond NPS-III in Urea Sector

There are many concerns about the existing fertilizer industry, which need appropriate addressing, some of them are mentioned below:

(i) Many urea units are of old vintage and the successive policies have lead to a situation of hardly any surplus funds, particularly PSUs which need substantial funds for upgradation and maintenance. It is felt that there should be a minimum level of fixed cost below which the operation is unviable.

(ii) NPS-III was based on costed year 2002-03 and there was no recognition of increase in the elements of conversion cost and investment made beyond the said year leading to under recoveries by the units. Industry has been representing regarding under recoveries on account of increase in salaries & wages, repairs & maintenance, selling expenses and contract labour.

(iii) The Government has not been able to provide connectivity/availability of gas to various units in peninsular region resulting into continuous use of naphtha. As per the indications given by MPONG, these units are likely to have connectivity by 2012-13. Till then, these units have no option but to continue using Naphtha as feedstock, though it is costlier than gas leading to production of costly urea as compared to the international price. FO/LSHS based units have embarked upon conversion of feedstock to gas as a consequence of Government's conversion policy. The conversion is likely to take about three years' time and, therefore, these units have to continue to use FO/LSHS as feedstock.

(iv) Some units have become financially sick / closed down in past due to various reasons. To augment indigenous production capacities in relatively short period, revival/restart of shutdown plants is essential.

(v) The Department and the industry, both are concerned about the long term domestic availability of gas on sustained basis at reasonable prices, especially in view of the fact that all non-gas based urea units have to convert to gas based, including FO/LSHS based units under conversion and the naphtha based units,

which will initiate conversion, once the gas connectivity is assured. Furthermore, new investments in urea sector are dependent upon availability of gas.

(vi) A section of the Fertilizer Industry has also been demanding to implement Nutrient Based Subsidy (NBS) in urea sector. NBS in urea will result in fixing of subsidy per nutrient and freeing MRP.

(vii) In view of concerns of urea industry, amendments to NPS-III as 'modified NPS-III Policy' were proposed by Department of Fertilizers. However, in view of demand emanating from certain section of industry and Department of Expenditure and Planning Commission suggesting urea to be brought under NBS, the matter was referred to Group of Ministers (GOM) and based on the directive of GOM, a committee was constituted under the chairmanship of Shri Saumitra Chaudhuri, Member Planning Commission to examine the proposal for introduction of NBS in urea, including various options thereof, and making suitable recommendations.

(viii) The Department of Fertilizer, however, had certain concerns over implementation of NBS in urea Sector, which include the following:

- Urea industry is very heterogeneous in terms of vintage, feedstock, energy consumption, capacities, technologies and location of the urea units.
- All the non-gas based urea units are likely to get converted to gas in next 3 years. NBS should be thought of when all the non-gas urea units are converted to gas so that there is uniformity in urea sector at least on feedstock front.
- Decontrolling the entire urea is extremely sensitive and farmers are not likely to accept a regime which completely frees the selling price of urea.
- A separate formulation specifically for these depreciated old plants is needed to be worked out to avoid windfall gain to some units.
- There could be legal issues, tax related issues, issues related to Centre and State while pooling the gas prices notionally as every company has multiple GSPA with suppliers

- Many permutations and combinations were attempted by DoF on NBS, which were resulting in varied gain/loss scenario for the urea units. etc.

(ix) The Committee submitted their report on NBS in April 2011. The key recommendations are at **Annexure-1**. The report of Committee along with views of Minister of Chemicals & Fertilizers were placed before GOM and GOM has decided that Department of Fertilizers should place the recommendations of the committee along with the views of Minister of Chemicals & Fertilizers before CCEA.

5.14 **Policy for New and Expansion Projects of Urea**

5.14.1 A pricing policy was announced in January 2004 for setting up new urea projects and expansion of existing urea projects for augmenting the domestic production capacity of urea to meet the growing demand for enhancing the agricultural production in the country. As per this policy, the new/expansion projects were to be based only on natural gas/LNG as feedstock, which is the most cost effective and least polluting feedstock in the fertilizer sector today.

5.14.2 The consumption of nutrients (N,P,K) have been increasing sharply over the years leading to increasing import dependence towards meeting the requirement of fertilizers in the country. On the other hand, there has been no significant investment in fertilizer sector in the last several years leading to stagnant indigenous capacities. An urgent need was being felt to encourage investments in fertilizer sector to promote indigenous production of all major nutrients. It was also observed that increase in fertilizer consumption is not leading to commensurate increase in agriculture productivity due to imbalanced application of nutrients and lack of application of secondary and micro nutrients. It was felt to simultaneously promote balanced fertilization in order to increase agriculture productivity i.e. the increase in indigenous fertilizer production need to be complemented with increased balanced fertilization.

5.14.3 A Committee under the chairmanship of Prof. Abhijit Sen, Member, Planning Commission was constituted to look into various options for New Investment Policy in fertilizer sector which will induce balanced fertilization. Various international benchmarks in this regard were to be examined. The policy for new investments in urea sector and long-term offtake of urea from joint ventures abroad was notified on 4.9.2008.

5.14.4 Salient Features of New Investment Policy

(a) The policy is based on Import Parity Price (IPP) benchmarked with suitable floor and ceiling prices of USD 250/MT and USD 425/MT respectively

(b) **Revamp project**: Any improvement in capacity of existing plants through investment upto Rs. 1000 crore in the existing train of ammonia-urea production is treated as revamp of existing unit. The urea produced from existing units beyond their reassessed capacity under NPS or the maximum achieved capacity by a unit for 330 days in last four years (2003-07), whichever is higher (cut off quantity), is recognised as the production under revamp of the existing unit. However, the urea produced under revamp quantity will only be eligible for the above dispensation once the total production of the unit crosses 105% of the cut off quantity or 110% of the reassessed capacity, whichever is higher. The additional urea from the revamp of existing units is recognized at 85% of IPP with the floor and ceiling price.

(c) **Expansion projects**: Setting up of a new ammonia-urea plant (a separate new ammonia-urea train) in the premises of the existing fertilizer plants, utilizing some of the common utilities with investment exceeding Rs.3000 crore is treated as expansion unit. The urea from the expansion of existing units is recognized at 90% of IPP, with the floor and ceiling price

(d) **Revival/Brownfield projects**: The urea from the revived units of Hindustan Fertilizer Corporation Limited (HFCL) and Fertilizer Corporation of India Limited (FCIL) to be recognized at 95% of IPP with prescribed floor & ceiling price, if the revival of closed units takes placed in public sector.

(e) **Greenfield projects**: The policy stated that:

(i) The Department can identify the location (deficit States) for setting up of Greenfield projects, or in coastal areas, encourage the urea units to add DAP/Complex fertilizers to their product lines.

(ii) The Greenfield projects can be offered for bidding with a minimum floor price which {of USD 250 per MT} *(can be decided at the time of bidding based on domestic gas prices and the IPP and an appropriate ceiling price {of USD 425 / MT}*. A commitment to offtake a minimum of 50% of production of the unit in case of IPP falling below the floor price will be provided by the Government.

(iii) The bidder has to indicate the price as a percentage discount below the prevailing IPP for urea which shall be calculated as notified in the policy. The feedstock linkage and price has to be entirely on the account of the bidder.

(f) **Gas transportation charges**: Additional gas transportation cost to be paid to units undertaking expansion and revival on the basis of actuals (upto 5.2 Gcal per MT of urea) as decided by the Regulator (Gas) subject to a maximum ceiling of USD 25 per MT of urea.

(g) **Allocation of Gas**: Only non-APM gas to be considered for the new investment in urea sector

(h) **Coal gasification based Urea Projects**: The Coal gasification based urea projects to be treated on par with a revival or a Greenfield project as the case may be.

(i) **Joint Ventures abroad**: The JV projects abroad in gas rich countries are proposed to be encouraged through firm offtake contracts.

- Principle for deciding upon the maximum price will be the price achieved under Greenfield projects or 95% of IPP as proposed for revival projects (in absence of any Greenfield projects) with a cap of USD 405 CIF India per MT and a floor of USD 225 CIF India per MT (inclusive of handling and bagging costs).

(j) **Time period for proposed investment policy**: Those revamp projects which start production of additional capacities within four years of notification of the new policy would qualify for the dispensation. Production from expansion and revival (brownfield) units that come about within five years of notification of the new policy would qualify for dispensation provided in the policy.

5.14.5 Availability of gas at a pre-determined price for the long term is a must for any investment in the urea sector as the gas price constitutes around 60% to 70% of the total cost of production of urea. Average delivered cost of natural gas varied between USD 5.5/mmbtu to USD 9/mmbtu whereas a gas price of USD 4.88/mmbtu from KG-D6 basin was used as a benchmark to fix the floor price based in New Investment Policy. Availability of domestic natural gas on a long term basis, which was one of the key assumptions of Abhijit Sen Committee report based on which the New Investment Policy was notified, did not fructify. Moreover, the price of KG-D-6 gas is valid for only 5 years, after which it would have to be revised based on the principles indicated in the production sharing contract.

5.14.6 The following companies have shown interest to set up expansion and Greenfield projects:

S. No.	Name of the Unit	Proposed capacity (LMTPA)
	Expansion Units	
1.	KRIBHCO- Hazira, Gujrat	11.55
2.	Indo Gulf- Jagdishpur, U.P.	11.55
3.	RCF, Thal, Maharastra	11.55
4.	IFFCO, Kalol, Gujarat	13.86
5.	CFCL, Gadepan III, Rajasthan	11.55
6.	TCL, Babrala, U.P.	12.71
7.	NFCL, Kakinada	12.71
	Total	**85.48**
	Greenfield Units	
8.	Matix Ferts. & Chems., Panagarh, West Bengal (CBM based)	**13.00**

5.14.7 In addition to expansion and Greenfield units, revivals of following closed urea units through PSUs are expected in near future:

	Revival of closed urea units through PSUs	Capacity
1.	Revival of FCIL, Talcher – RCF, GAIL & CIL (Coal gas based)	11.55
2.	Revival of FCIL, Ramagundam (EIL & NFL)	11.55
3.	Revival of FCIL, Sindri (SAIL and NFL)	11.55
	Total	**34.65**

Further, the rest five closed urea units of FCIL & HFCL are proposed to be revived through bidding process.

5.14.8 Some of the urea units have already undertaken revamp and following units are creating additional capacity by way of de-bottlenecking/revamp/modernization of their existing urea units:

S. No.	Name of the Unit	Proposed capacity (LMTPA)
1.	RCF-Thal I & II	4.50
2.	NFL, Vijaipur I	1.350
3.	NFL, Vijaipur II	2.240
4.	Kribhco, Hazira	4.655
	Total	**12.745**

5.14.9 In absence of commitment from MoPNG on firm allocation of long term gas at a particular price level, the investment proposed by the companies is not getting fructified and after notification of New Investment Policy in Sep' 2008, only few revamp projects have been executed. The investment required in gas based expansion and Greenfield urea units is estimated to vary from around Rs 3,700 crore to Rs 4,700 crore. In view of huge capital expenditure requirement for the new urea units, and uncertainty on account of gas availability and pricing, it is imperative to amend the New Investment Policy in such a way that even if the units have to use a mix of RLNG and domestic gas, they should be able to sustain the production and incur reasonable profits.

5.14.10 A proposal to suitably amend the investment policy of 2008 is under the consideration of Government and it is expected that it shall encourage investments in Urea sector and the demand production gap will be sufficiently bridged in coming years.

5.15 Nutrient Based Subsidy Policy in Phosphatic & Potassic Sector

5.15.1 The intent of the Government in fertilizer sector was announced by the Finance Minister in his Budget Speech 2009, which is as below:

"In the context of the nation's food security, the declining response of agricultural productivity to increased fertilizer usage in the country is a matter of concern. To ensure balanced application of fertilizers, the Government intends to move towards a nutrient based subsidy regime instead of the current product pricing regime. It will lead to availability of innovative fertilizer products in the market at reasonable prices. This unshackling of the fertilizer manufacturing sector is expected to attract fresh investments in this sector. In due course it is also intended to move to a system of direct transfer of subsidy to the farmers."

5.15.2 An IMG with Secretary (Fertilizers) as Chairman and Secretaries of Department of Expenditure, Agriculture & Planning Commission as members, was constituted in November 2008 to look into all aspects of fertilizer subsidy regime. The IMG looked at various alternatives and drew upon the international experiences in this sector to review the subsidy regime. It was found that though, internationally, agriculture production and in some cases agriculture inputs are subsidized, no other country follows an open-ended fertilizer subsidy regime as being implemented currently in India.

5.15.3 In view of the issues relating to agriculture productivity, balanced fertilization and growth of indigenous fertilizer industry, and examining all options for rationalization of existing fertilizer subsidy regime, the IMG recommended implementing a NBS regime, wherein the farmgate prices of fertilizers are decontrolled and subsidy is fixed for each fertilizer based on nutrient content therein. The salient features of NBS in P&K sector include:

a) Nutrient Based Subsidy (NBS) Policy was implemented from 1.4.2010 for decontrolled Phosphatic and Potassic (P&K) fertilizers excluding SSP for which it was effected from 1.5.2010
b) NBS is applicable for 25 grades of P&K fertilizers namely, Di-Ammonium Phosphate (DAP), DAP Lite, Muriate of Potash (MOP), 18 grades of NPKS complex

fertilizers, Mono Ammonium Phosphate (MAP), Triple Super Phosphate (TSP), Ammonium Sulphate (AS) and Single Super Phosphate (SSP).

c) NBS is paid on each nutrient per kilogram of N, P, K & S decided annually. The nutrient based subsidy, so decided by the Government is converted into subsidy per tonne for each subsidized fertilizer.

d) Any variant of the fertilizers with secondary and micro nutrients are also eligible for subsidy. The secondary and micro nutrients get a separate per tonne subsidy.

e) An Inter Ministerial Committee (IMC) has been constituted under the Chairmanship of Secretary (Fertilizers) to recommend per nutrient subsidy for N, P, K & S before the start of financial year and inclusion of new fertilizers under the NBS.

f) The imports of all the subsidized fertilizers (P&K) including complex fertilizers are now under Open General License (OGL).

g) A separate additional subsidy will be provided to indigenous manufacturers producing complex fertilizers using Naphtha based captive Ammonia for a maximum period of two years during which the units will have to convert to gas or use imported Ammonia.

h) The MRP of urea has been increased by 10% from the current Rs. 4830/MT to Rs. 5310/MT with effect from 1st April, 2010.

i) As per guidelines dated 21.4.2011 applicable w.e.f. 1.1.2011, freight subsidy under NBS on the decontrolled subsidized fertilizers (except SSP) for rail movement is paid as per actual claim. Secondary freight for the P&K fertilizers (except SSP) is paid in line with the “Uniform Freight” applicable for urea. Freight for direct road movement is subject to lower of actual claim and equivalent rail freight.

j) The distribution and movement of fertilizers along with import of finished fertilizers, fertilizer inputs and production by indigenous units is monitored through the on-line web based “Fertilizer Monitoring System (FMS)”.

k) It is mandatory for companies to print their Retail Price without subsidy, Subsidy applicable and Net Retail Price on the fertilizer bags

l) Subsidy allowed by Department of Fertilizers under Nutrient Based Subsidy Policy during 2011-12 is at **Annexure-2**.

5.15.4 The international prices of fertilizers have been continuously on rise. Despite decontrol of P&K sector, the rising prices have kept pressure on the Government to keep the retail prices on check. It is observed that post implementation of NBS in P&K sector, in the first year the subsidy payout reduced but the increase in international prices resulted in increase in subsidy payout as well as increase in retail price. There were certain constraints in contracting of P&K fertilizers, which resulted in pressures in supply side. The nutrient consumption in 1995-96, 2009-10 and 2010-11 is shown below:

Nutrients Consumption	**N**	**P**	**K**	**Total**	**N : P K (Desired:4:2:1)**
1995-96	9.82	2.90	1.16	13.88	8.47:2.50:1
2009-10	15.58	7.27	3.63	26.48	4.29:2.00:1
2010-11	16.89	8.00	3.39	28.28	4.98:2.36:1

Annexure-1

Key Recommendations of Committee under Chairmanship of Shri Saumitra Chaudhuri, Member, Planning Commission for NBS in Urea Sector

a) The concepts of "cut-off quantity and energy norm, as presently used, are being carried forward.

b) The recommendations here pertain to the subsidy regime upto the "cut-off" point. Beyond the "cut-off" point, production will be covered by the amendments to the New Investment Policy which is yet to be decided upon. In the interim, the present arrangement for subsidy beyond the "cut-off" point, which is linked to import parity price under New Investment Policy of 2008, will continue.

c) The fertilizer companies will be free to change the retail selling price of their product within reasonable limits. All incidences of taxes, including recently introduced 1 per cent Excise Duty and State VAT, if any, will be passed on to the consumer after adjusting for any input tax credits that may exist.

d) Restrictions regarding the add-ons for neem-coated, zincated and other kinds of modified/fortified urea will be suspended. Units will, however, make sure that there is adequate supply of plain urea, if the farmer wants plain urea.

e) Of the 21 gas-based units, there will be a notional gas price pooling for 17 units. This will be operated by the FICC/Department of Fertilizers presently. This pooling of gas will be on the basis of existing energy norms on actual gas mix and upto gas usage for "cut-off quantity".

f) Four small units (RCF Trombay, GSFC and two units of BVFCL) will be kept out of this gas price pooling arrangements.

g) The 21 gas based units have been classified depending on various established parameters as follows:

   i. Pre-1992 gas-based – 4 units

ii. Post-1992 gas-based – 6 units (excluding NFCL-II, which is of post 1992-naphtha plants vintage)

iii. Pre-1992 – 2 units that have switched over from naphtha to gas

iv. Post-1992 units that have switched over from naphtha to gas including NFCL-II – 3 units and "mixed feedstock" units – 2 Nos – total of 5 units

v. Units that have been kept outside of the gas price pooling scheme – 4 units

h) The flat subsidy of Rs. 4,000 per tonne would be available to all gas-based units. Some units will only receive the basic subsidy, a second group will receive additional subsidy of Rs. 675 per tonne and a third group additional subsidy of Rs. 1,800 per tonne while fourth group shall receive Rs. 1,600 per tonne. This additional subsidy will be phased out to two differential rates over the period of next three years i.e. to Rs 4,000/MT for Group A&B and Rs 5,000/MT for the rest of the Groups. Thereafter, a view may be taken on the timeframe to phase out this additional subsidy.

			2011/12	2012/13	2013/14	2014/15
I	Basic Subsidy Rate applicable to all units		4,000	4,000	4,000	4,000
II	Additional Subsidy Rates	A.	Nil	Nil	Nil	Nil
		B.	675	450	225	Nil
		C.	1800	1500	1200	1000
		D.	1600	1400	1200	1000
		E.	1600	1400	1200	1000

i) The subsidy regime for Naphtha and FO/LSHS units will continue to be along the present lines except for 2 changes. First, along with the other units they will be free to set the retail selling prices within reasonable levels. Second, of the increase in net selling price, at least Rs.80 per tonne will go to reduction in subsidy. Fuel price increase will be passed through as being presently done. This arrangement will continue upto March 2013.

j) The gas price pooling will be based on actual gas price paid and will, therefore, have to be periodically updated. Increase or decrease in gas prices will be passed on to the consumer through the selling price.

Annexure-2

Subsidy allowed by Department of Fertilizers under Nutrient Based Subsidy Policy during 2011-12

S.No	Grades of Fertilizers Under NBS	NBS - Rs/MT (2011-12)
1	DAP : 18-46-0-0	19763
2	DAP lite (16-44-0-0)	18573
3	MAP : 11-52-0-0	19803
4	MOP : 0-0-60-0	16054
5	TSP : 0-46-0-0	14875
6	SSP : 0-16-0-11	5359
7	AS: 20.3-0-0-23	5979
8	10–26–26	18080
9	12–32–16	17887
10	14–28–14	16602
11	14–35–14	18866
12	15–15–15	12937
13	16-16-16	13800
14	15-15-15-09	13088
15	16-20-0-13	11030
16	17–17–17	14662
17	19–19–19	16387
18	20–20–0	11898
19	20-20-0-13	12116
20	23–23–0	13683
21	28–28–0	16657
22	24-24-0-0	16657
23	13-33-0-6	14302
24	11-44-0	17216
25	14-46-0	18677
	Nutrient	NBS - Rs/kg
	N	27.153
	P	32.338
	K	26.756
	S	1.677

CHAPTER-VI

6.0 TAX/ DUTY STRUCTURE ON FERTILIZERS AND INPUTS

6.1 Introduction

6.1.1 Taxation issues relating to Inputs for manufacturing of fertilizers and on sale of fertilizers are vital for the Fertilizers Industry as tax has traditionally constituted of a pass-through item. Basic price of inputs such as Natural Gas/Liquified Natural Gas/Naphtha/Fuel oil/coal etc have been considered in the erstwhile Retention Price Scheme (RPS) as well as under the New Price Scheme (NPS) together with Taxes. In the erstwhile Retention price Scheme applicable up to 2001-02 the taxes and duties were recognized irrespective of the fact whether they were levied by Union Government or State government with the exception of specific Purchase tax, turnover tax and additional sales tax.

6.1.2 Similarly different States have levied sales tax and other taxes on sale of fertilizers thus farmers are getting fertilizers at varied prices across the States. Moreover, considering the demand –supply gap and potential of Indian Industry to set up Plants abroad the study of tax structure on key inputs by key nations is essential. Rationalization of taxes in the wake of proposed implementation of Goods and Service tax (GST) shall be the key point for the 12^{th} Five Year Plan 2012-17.

6.1.3 **Types of Taxes/Duties**

The following are various types of taxes and duties levied by union government and state government on various raw materials used in the manufacture of Urea.

a) Sales tax
b) Additional sales tax
c) Value Added Tax(VAT)
d) Excise duty
e) Entry tax
f) Octroi

g) Purchase Tax
h) Turnover tax
i) Cess/duty on captive power plants(CPP)
j) Service tax
k) Education cess

6.2 Treatment under the pricing policy of urea

The RPS recognized most taxes on input raw material, irrespective of the fact whether they were imposed by union government or by state governments. It did not recognize specific taxes in the form of purchase tax. Turnover tax and additional sales tax. These taxes were also not passed on to the consumers. On representation by the Industry during fifth pricing period, Government took up the issue with state governments asking them to exempt the fertilizer units from such levies. State Governments did not respond positively to the suggestion. This issue was also referred to the joint parliamentary committee (JPC) constituted in the year 1992. The JPC desired that Government should review the entire tax structure and its impact with a view to avoid duplication of tax on fertilizers and reducing the tax incidence on farmers. The issue was reviewed and not considered for recognition of purchase tax, turnover tax and additional sales tax from sixth pricing period in view of the fact that recognition of such levies imposed by state governments will tantamount to devolution of federal resources to the states and more and more states would be encouraged to levy such taxes. Non-recognition of such taxes in the urea pricing mechanism led to under recovery for the urea manufacturers for the cost, which was beyond their control.

6.3 Treatment under the New Pricing Scheme (NPS) of Urea

In the New pricing Scheme (NPS) the State level taxes was restricted to the level of 1.04.2002. Under the NPS, group concession rate was calculated excluding the incidence of sales tax on inputs and the sales tax on inputs was paid separately limiting the same to the level of 1.04.2002. Any increase in tax or new tax was

not to be recognized under NPS. However, any decrease in the rate of recognized tax was adjusted proportionally in the concession price. After implementation of VAT, the taxes, which subsumed in VAT were recognized for working out the concession rate. However, some of the States have levied additional VAT on inputs and the same is not recognized under concession price.

6.4 Present Structure of taxes and duties on Inputs

6.4.1 Union Government and State government has levied different types of taxes and duties on inputs utilized for Fertilizers such as Excise Duty, Central Sales tax, VAT, Electricity duty on power generation, Entry tax, Service tax, Education Cess etc. A Statement showing the various taxes and duties levied by Union/ State Government has been placed at Annexure 4.1.

6.4.2 Different States have adopted different rates of taxes and different types of taxes impacting the units situated in that State. As can be seen from the Annexure 4.1, the Entry tax on inputs in Punjab varies from 4% to 8.8%, whereas it is 2% in Haryana, 1% in Madhya Pardesh and 5% in Uttar Pardesh. Similarly VAT on inputs in Haryana is 4.20% and in Madhya Pardesh the same is to the tune of 12.50%.

6.4.3 Taxes and duties paid by the Fertilizers manufacturers cannot be passed on to the consumers by the Fertilizers Manufacturers as the MRP of the Fertilizers is fixed by Government and thus these taxes should form part of Concession rate for reimbursement. Fertilizer manufacturers get reimbursement of these taxes and duties through fixation of concession rate and in case some of the taxes and duties are not recognized or restricted to some level the same is direct loss to the manufacturing unit. Non-reimbursement of Turnover tax, purchase tax and other taxes levied by some of the State Governments was not recognized under RPS and NPS and has resulted into losses to the units.

6.5 Present Structure of taxes etc. on Fertilizers

6.5.1 Union Government has levied 1% ad valorem Excise duty w.e.f. 1.03.2011 in the Union Budget for 2011-12 on Fertilizers which were previously exempted. Various State governments have levied different rates of taxes (VAT) on fertilizers and the current status of State wise taxes on fertilizers is placed below:

Fertilizer –UREA

STATE	VAT	Additional Taxes
PUNJAB	Nil	Nil
HARYANA	Nil	Nil
RAJASTHAN	5.00%	Nil
DELHI	12.50%	Nil
HP	Nil	Nil
J&K	5.00%	Nil
MP	5.00%	1.00%
CHATTISGARH	5.00%	Nil
MAHARASHTRA	5.00%	Nil
AP	5.00%	Nil
ORISSA	4.00%	Nil
UP	4.00%	1.00%
UTTARAKHAND	4.00%	0.50%
BIHAR	5.00%	Nil
JHARKHAND	5.00%	Nil
GUJARAT	5.00%	Nil

6.6 Impact of Value Added Tax (VAT)

Implementation of VAT has Herald a new era in Indian tax administration to bring uniformity in tax rates across the country. It is a revenue generation model capturing value addition at each stage of production / distribution. VAT is a multi point sales tax with set off for tax paid on purchase of input raw materials. It is collected in installments at each transaction in the production-distribution system. The taxes paid on input raw materials are deducted from the taxes payable on final output. For payment of tax on final output, manufacturers deduct the tax already paid on inputs from the tax becoming payable on the final output. Since the value of final output is more than the value of input raw

material in normal circumstances, manufacturers pay only the difference to the state government. Contrary to the above general pattern, the maximum retail price of urea is being determined by government irrespective of the value of input raw materials used in the manufacture of urea. Therefore, when the final output i.e. urea is moved out from the premises of the manufacturers, the units gets a refund of excess sales tax paid on inputs from the concerned state governments.

6.7 Tax Structure on inputs in Different countries

- The importance of indirect taxes has increased over the years. Singapore retaining one of the lowest VAT/GST rates. Aruba charging the lowest rates of just three per cent.
- Highest rates @25 per cent being charged by
  - Sweden
  - Denmark
  - Norway
- The average VAT rate in the
  - EU is higher at 19.5 per cent
  - OECD countries is 17.7 per cent
  - South American countries at 14.2 per cent
  - Asia Pacific countries at 10.8 per cent
- There is no VAT or GST in Hong Kong
- Bahrain is a tax-free country, a land where there is no corporate or personal income tax

6.8 Concerns of Industry on Taxes and Duties

Fertilizer industry is the only industry where the retail price and the movement is determined by the Government as well as the subsidies As Government controls the MRP the fertilizer units cannot increase the MRP to recover the

impact of VAT. Fertilizer being a highly seasonal industry there is often mismatch with respect to input tax and output tax. This poses problem with respect to set off and significant portion of the input tax has to be carried forward to future period for set off. There is no value addition because the selling price is always less than the cost of products

Other than Urea, the inputs are mostly imported for other fertilizers such as

- DAP
- SSP
- MoP
- The extent of input tax that can be availed by the Fertilizer Industry is limited especially so in the case of Phosphatic Fertilizer industry where most of the raw materials are imported and as such no VAT credit is possible.

6.9 Recovery of incidence of non-reimbursable input taxation levied by State Governments from time to time n the subsidy regime.

Urea manufacturing units have been allowed to recover the incidence of non-reimbursable state levies under subsidy regime, from entire sale of subsidized urea in the concerned State in the form of additional cost over and above the MRP to compensate the Urea manufacturing units within the State w.e.f. 01.04.2011. The annual impact of additional tax on various inputs levied by the State Govt. on the cost of production of Urea within the State is assessed by Fertilizer Industry Coordination Committee (FICC). Additional cost due to non-recognize input taxation (ACTN) is arrived by dividing total annual impact of additional taxes on cost of production of Urea within the State by the estimated consumption of Urea. The Fertilizer manufacturing companies selling urea within the State recovers ACTN over and above the MRP from the farmers in the State and deposit it in an input taxation account with FICC. From this account, the producers within the State are reimbursed additional taxes levied by the State Govt. by FICC.

6.10 Rationalization of taxes duties with reference to proposed

6.10.1 Goods and services Tax (GST)

Government is in the process of implementing Goods and services Tax (GST) from next financial year. The GST will be a dual levy one by the Centre Government (Central GST) and the other by the State Governments (State GST) independently to promote cooperative federalism. Both components: Centre Goods and Services TAX (CGST) and State Goods and Services TAX (SGST) will be levied on a common and identical base. The Central GST and State GST would be applicable to all transactions of goods and Services made for a consideration except the exempted goods and services, goods which are outside the purview of GST and the transactions which are below the prescribed threshold limits. Incidence of tax only domestic consumption on the invoice credit method eliminating cascading effect at various stages of production and distribution. Both CGST and SGST will be levied on Imports of goods and services into the country. Input tax credit (ITC) will be allowed on goods and services and capital goods. CGST and SGST shall be credited to the accounts of the Centre and the States separately. Natural gas should also be covered under GST. It has been proposed that natural gas should be kept outside GST and draft amendment to the constitution is prepared accordingly. This will defeat the very purpose of GST as no input credit on NG will be applicable resulting in higher cost of urea.

6.10.2 GST –Global Scenario:

More than 140 countries have already introduced GST/National VAT. France was the first country to introduce GST system in 1954. Most countries have a single GST rate. Typically it is a single rate system but two/three rate systems are also prevalent depending upon the requirement of the implementing nation. Standard GST rate in most countries ranges between 15-20%. All sectors are taxed with very few exceptions/ exemptions. Full tax credits on inputs – 100% set off.

Canada and Brazil alone have a dual VAT.

6.10.3 Major findings and recommendations:

The reforms process initiated by the Government for simplification and rationalization of a plethora of existing indirect taxes both by the Central Government and the State Governments by subsuming them under a single Tax i.e., Goods and Services Tax (GST) is a step forward towards reducing the total tax burden and also result in simplification of the system.

(i) The Central Government is providing subsidy on Fertilizers to keep the farmers' prices affordable and to encourage its consumption. Fertilizers were hitherto exempt from Central Excise Duty. In the Union Budget 2011-12, the Government has levied 1% excise duty on Fertilizers without input tax credit and 5% of excise duty with the provision of input tax credit to facilitate their being brought within the ambit of GST once it is implemented. Major inputs for Fertilizer production continue to remain exempt from excise duty. The State Governments are levying a host of taxes and duties on Fertilizers and inputs, which increases the overall cost of fertilizers. Some of these state taxes are taken into consideration while determining the cost of production by the Central Government. To this extent, it may be said that it results in revenue generation by the State Government which is reimbursed by the Central Government.

(ii) Imported fertilizers attract concessional rate of customs duty at 5%. In addition, Government has also levied Countervailing Duty (CVD) of 1% on imported Fertilizers in the Union Budget 2011-12.

(iii) Imported inputs for Fertilizers qualify for concessional rates of Customs Duty between 2% to 5%. For rock phosphate and sulphur, the customs duty is 2% and for other major inputs like ammonia, phosphoric acid, it is 5%.

(iv) The policy of the Government is to give Fertilizers to the farmers much below their cost of production/imports. This is for well being of Indian farmers and to increase their income through higher production/productivity. This policy also ensures the food security of the country. Levy of taxes and duties on fertilizers and inputs increases the cost of production/imports and increases the subsidy burden of the Government.

(v) The taxes and duties on Fertilizer products are levied on the farmers' prices, known as Maximum Retail Price (MRPs), which are either fixed by the Government or which are in line with the Government expectations. MRPs are in any case significantly lower than the cost of production/imports. There are norm-based reimbursements by the Government by way of subsidy/concession. The inputs are, however, taxed at the full cost. Thus, the incidence of tax on inputs is far in excess of the incidence of tax on finished fertilizers. Under the proposed GST regime, the input tax credit will far exceed the tax payable on fertilizers. The invoice value i.e., MRP is only around 25-40% of the total cost of fertilizers. This means that the input credits will be far more than what can ever be availed on the outputs. This would block large amounts of input tax credit of the fertilizer companies with the Government on a recurring basis even if there is a provision of periodical cash refund. Currently, there are no provisions for refund of unadjusted credits in the features available in the public domain excepting for refunds on exports. Thus, peculiar situation of the Fertilizer Sector requires to be given due consideration under the proposed GST Scheme.

(vi) In the case of fertilizers the products are generally stock transferred to the States of Sale as per market requirements and requirements of the

various governments. So the GST shall be paid in the State of Manufacture but the credit adjustment has to be made from the destination state.

(vii) A number of crucial inputs for the fertilizer industry like natural gas, electricity generation and petroleum products are not to be included under GST. This means that no input tax credit would be available against the taxes paid on these industrial inputs. Natural gas, naphtha, fuel oil, LSHS, electricity, etc., are essentially industrial goods and denying the input tax credit on these products will defeat the very purpose of removing cascading effect of these taxes which would be significant.

(viii) The proposed GST Model suggest GST basis for the Taxable sector and Exempt Sector. Exempt Sector comprises of Food Sector, Health Sector and Educational Services. GST Model provides exemption for unprocessed food articles, food grains - rice, wheat, etc. The fertilizer is the main input for agricultural products. The several national and international studies have proved that 40-50% of agricultural productivity is contributed by fertilizers. Inputs for manufacturing fertilizers like Natural gas etc are exempt from GST as per the Constitutional Amendment Bill 2011. If fertilizers are covered under GST the farmer will not be able to get input tax credit, as food grain is exempt from GST.

(ix) Keeping in view the unique nature of Fertilizer Industry which is an integral part of the agricultural production chain, fertilizers and inputs should be exempted from GST. It is more so because the crucial input like natural gas and also major outputs like food grains are outside the purview of proposed GST. By the same logic as in the case of food grains, fertilizers be exempted from GST.

(x) Import of fertilizers and crucial inputs be exempted from import duty to reduce the overall cost of fertilizers and consequently the subsidy burden of the Government. It will relieve the industry from blockage of large funds by first paying the import duty and then claiming its reimbursement by way of subsidy.

(xi) The GST, if applicable, be levied on the invoice value of fertilizers excluding subsidy.

(xii) Central Subsidy on fertilizers be continued to be outside the purview of taxation even under GST. This is a well settled position of law that Subsidies cannot attract Sales Tax. By the same logic since they are neither goods nor are they services, they cannot attract GST.

(xiii) Appropriate mechanism for Stock transfers be developed for immediate credit in the case of Inter-State movement of goods.

(xiv) In the Union Budget for the year 2011-12, Fertilizer Industry has been given infrastructure status. Under the existing provisions of section 35AD of the Income-tax Act, investment-linked tax incentive is provided by way of allowing hundred per cent deduction in respect of any expenditure of capital nature (other than on land, goodwill and financial instrument) incurred wholly and exclusively, for the purposes of the "specified business". With effect from FY 2011-12, production of fertilizer in India has been included in the definition of specified business. The deduction is available upon commencement of new business. In order to give fillip to the investment in Fertilizer Sector, import of plant and machinery for Fertilizer Projects may be considered for exemption from Custom Duty.

CHAPTER-VII

7.0 GLOBAL DEMAND AND SUPPLY SCENARIO

7.1 Global fertilizer demand is projected to grow at an average annual rate of 2.4% between 2010 and 2015. World fertilizer consumption is projected to be close to 190 million tonnes nutrients in 2015. Nitrogen demand growth will be the strongest initially but the lowest in longer term. Phosphate demand growth will be higher in the medium term as nutrient imbalances are addressed in key market areas. Potash demand growth will be slow to recover but eventually growth will be stronger than the other nutrients.

Table-1: World Fertilizer Projected Demand

(Million tonnes)

Nutrients	**2010**	**2011**	**2015**
Nitrogen N	102.6	105.2	112.4
Phosphorous P_2O_5	39.9	41.4	44.9
Potash K_2O	27.2	27.2	32.6
Total	**169.7**	**175.3**	**189.9**

Source IFA

7.2 **Nitrogen (Urea)**

The following Table-2 presents the world supply demand balance for urea during 2011 to 2015. Between 2010 and 2015, 58 new plants are planned to come on stream, of 41 will be located outside China. World urea capacity will increase by 45 million tonnes, 222.08 million tonnes in 2014. Outside China, the main addition will mostly occur in South Asia.

Table-2: World Urea Supply/Demand Balance

(Million tonnes)

	2011	2012	2013	2014
Supply				
Capacity	188.3	198.5	206.9	222.1
Total Supply	162.9	169.9	179.2	193.4
Demand				
Fertilizer Demand	139.5	143.6	148.8	152.6
Non Fertilizer Demand	18.8	19.9	20.9	21.9
Total	158.3	163.5	169.7	174.5
Potential Balance	4.5	6.4	9.4	18.9

Source: IFA-June 2010

7.3 Phosphatic Fertilizers

7.3.1 Di-Ammonium Phosphate (DAP)

Over the next five years, 40 new MAP, DAP and TSP units are planned to come on stream. New facilities are planned in Africa (Algeria, Morocco and Tunisia). West Asia (Saudi Arabia), Asia (Bangladesh, China, Indonesia and Vietnam), Latin America (Brazil and Venezuela) and EECA (Kazakhstan). Global capacity is projected to be 44.4 million tonnes of P_2O_5 in 2015, representing a net increase of 7.8 million tonnes P_2O_5. Expansion of DAP capacity would account for three-quarters of this increase.

7.3.2 Phosphoric Acid

Global phosphoric acid capacity is forecast to increase by 9.2 million tonnes to 57.6 million tonnes P_2O_5 between 2010 and 2015. Expansions in China account for one-third of this increase. Close to 34 new acid units are planned for completion between 2010 and 2015, of which 15 would be located in China, 6 in Morocco and 3 in Saudi Arabia. On a global basis, the net addition to

merchant grade acid capacity is estimated at 1 million tonnes P_2O_5, of which 0.86 million tonnes will come from two large stand-alone units in Tunisia and Jordan.

Between 2011 and 2015, the global phosphoric acid supply/demand balance shows a very small potential surplus in 2011 of less than 3% of available supply. This imbalance will increase very moderately to 2.4-3.5 million tonnes per annum between 2012 and 2014. It will expand to 3.5 million tonnes P_2O_5 in 2014 with the commissioning in 2014/2015 of large-capacity projects planned in Morocco.

Table-3: World Phosphoric Acid Supply/Demand Balance

(million metric tonnes P_2O_5)

	2011	**2012**	**2013**	**2014**
Supply				
Capacity	51.0	52.5	53.8	55.5
Total Supply	41.5	43.3	45.3	47.1
Demand				
Fertilizer Demand	32.8	34.2	35.5	36.6
Non-Fertilizer Use	5.6	5.6	6.0	6.2
Distribution losses	0.7	0.8	0.8	0.8
Total Demand	39.1	40.6	42.2	43.6
Potential Balance	**2.4**	**2.7**	**3.1**	**3.5**

Source: IFA-June 2010

7.4 Sulphur

Between 2010 and 2015, world production of elemental sulphur is projected to grow at an average annual rate of 6.7%, to 67.2 million tonne in 2015. Close to 60% of the 16.8 million tonnes increase will be generated in the natural gas processing sector. Between 2011 and 2014, the potential surplus will represent only 3.8 to 7.4%% of global supply.

Table-4 : World Elemental Sulphur Supply / Demand Balance

(million metric tonnes S)

	2011	2012	2013	2014
Sulphur Demand				
• Sulphur for Sulphuric Acid	46.2	49.5	52.4	54.9
• Non- Sulphuric Acid uses	6.8	6.9	7.1	7.2
Total Demand	**53.0**	**56.4**	**59.5**	**62.1**
Sulphur Supply				
• Oil recovered	24.7	26.0	27.6	28.6
• Gas recovered	25.9	28.0	29.7	33.2
• Others, including Frasch	4.4	4.8	5.0	5.2
Total Supply	55.1	58.7	62.3	67.1
Potential Balance	**2.1**	**2.3**	**2.8**	**5.0**

Source: IFA-June 2010

7.5 Potash Outlook

World potash sales showed a marked recovery in 2010, due to stronger than expected worldwide demand for fertilizers and anticipated purchases in late 2010 prior to seasonal demand in 2011. Around 30 potash-related projects are currently being undertaken by existing producers, with completion planned between 2011 and 2015. Global potash capacity is forecast to increase from 43.8 million tonnes K_2O in 2011 to 54.7 million tonnes in 2014. The bulk of new potash capacity will be in the form of MOP. North America will be the world's largest supplier in 2015, with a 39% share of the potential world supply, followed by EECA (29%), East Asia (10%), West Asia (8%) and Latin America (5%).

The global potash supply/demand balance shows a reduced potential surplus in 2011, moving to large potential surpluses after 2012. A potential imbalance of close to 15 million tonnes K_2O may emerge in 2015, assuming all planned projects are completed on schedule.

Table-5: World Potash Supply / Demand Balance

(million metric tonnes K_2O)

	2011	2012	2013	2014
Supply				
Capacity	43.8	47.9	52.2	54.7
Total Supply	39.2	41.4	42.9	45.9
Demand				
Fertilizer Demand	28.5	29.8	30.9	31.9
Non-Fertilizer Demand	2.6	2.7	2.8	2.9
Distribution losses	0.9	1.0	1.0	1.0
Total Demand	32.1	33.5	34.7	35.8
Potential Balance	7.1	7.9	8.2	10.0

Source: IFA-June 2010

CHAPTER-VIII

8.0 ASSESSMENT OF ALL-INDIA, ZONE-WISE AND STATE-WISE DEMAND FOR FERTILISERS DURING THE 12th PLAN AND UPTO 2024-25

8.1 Demand Projections by FAI

There are various approaches of demand forecasts, viz., need based, crop area, time series, causal, etc. Different methodologies have been devised by experts from time to time keeping in view these approaches. The selection of a method depends upon the purpose to be served by the forecast. Estimation of future demand for fertilizer may be either potential demand or effective demand. Potential demand is the most desired level of application of fertilizer under the circumstances in which a particular crop is cultivated. Effective demand is the demand likely to take place.

8.2 FAI has projected demand for fertilisers by the following two methodologies: (i) Multiple regression and (ii) Population nutrition. These two methodologies have been adopted to work out the effective demand for the 12th Five Year Plan and upto 2024-25.

i) Model 1: Multiple regression

8.3 Keeping in view the recent trend in the consumption of fertilisers and additional area to be brought under irrigation, additional area under HYV, normal level of rainfall in the coming years, prices of fertiliser nutrients, the estimates of demand for fertiliser nutrients have been worked out in FAI for the 12th Plan period, based on the multiple regression model. Among a large number of factors, the following variables were finally considered in the model based on their statistical significance and stability of the functional relationship to estimate demand for the period 2012-13 to 2016-17.

(1) Irrigated area (as % of gross cropped area)

(2) Area under HYV (as % of gross cropped area)

(3) Fertiliser nutrient prices

(4) Rainfall (as % of long term average value)

(5) Lagged dependent variable (Fertiliser consumption in the previous year)

The methodology and the findings of the study are shown in **Annexure I**

8.4 Taking into account the predicted values of independent variables, assuming normal rainfall for the forecast period and actual values of lagged consumption up to 2010-11 and predicted values of it thereon, the forecasts of total nutrients ($N+P_2O_5+K_2O$) has been made. This has been broken into N, P_2O_5 and K_2O separately by applying suitable NPK use ratio. The demand forecast of fertiliser nutrients for the period 2012-13 to 2016-17 and beyond, i.e., up to 2024-25 has been worked out. Based on the model, the total nutrient consumption is estimated at 33.81 million tonnes in 2016-17 as against 29.68 million tonnes in 2012-13.

Model I:

Table 1 : All India Demand Projection of Fertiliser Nutrients During the 12th Plan (2012-13 to 2016-17)

('000 tonnes)

Year	N	P_2O_5	K_2O	Total
2012-13	17585	8426	3664	29675
2013-14	18230	8735	3798	30763
2014-15	18834	9025	3924	31783
2015-16	19430	9310	4048	32788
2016-17	20035	9600	4174	33809

ii) Model II: Population nutrition

8.5 The population nutrition method is adopted to project the demand for the future by using the projections of population and the per capita need for foodgrains. According to the Census 2011, the total population in India is estimated at 1.21 billion in 2010. The population projections for the future years upto 2025 have been obtained from the FAO Statistics. The projected population figure for the 1st year of 12th Plan (i.e., 2012) works out to 1.247 billion. It is expected to rise at 1.309 billion during the terminal year of 12th Plan (2016) and 1.431 billion by 2025.

8.6 Currently, about 37 per cent of the total population is under BPL category. It is assumed that population under BPL category will reduce by 0.2 per cent per annum during the future years with the gradual improvement in the income levels. The per capita net availability of foodgrains under BPL category is assumed here is 500 grams per day or 183 kg per annum. The per capita net availability of foodgrains in the APL category is assumed here is 450 grams per day or 164 kg per annum. Accordingly, the net availability of foodgrains under BPL category is estimated as 81 million tonnes per annum and under APL categories 143 million tonnes per annum in 2016-17. The total net requirement of foodgrains by BPL and APL category together works out to 223 million tonnes in 2016-17. Assuming, the net availability as 87.5% of the gross availability, the gross requirement of foodgrains works out to 255 million tonnes in 2016-17.

8.7 By applying a response ratio of 1:6, the additional requirement of fertilizers for food grains over the level of 2010-11 would be 18.5 million tonnes by 2016-17. Currently, about 60% of the total fertilizer consumption applied is on foodgrains and the balance 40% on various other crops. There is likelihood of shift in fertilizer use on foodgrain crops to horticultural crops in future. The 12th Plan approach paper envisages a growth rate of 1.5 to 2 per cent for the production

of cereals and 5 per cent for horticultural crops. Therefore, the share of fertilizer use may slowly reduce from foodgrain crop to horticultural crops and other commercial crops (groundnut, sugarcane, cotton, etc). The share of fertilizer use on foodgrains to total use is assumed to decline by 0.2 per cent per annum from the present level of 60 per cent. So, the additional requirement of fertilizers (nutrients) would be around 5.24 million tonnes during 2016-17 over the current level. Therefore, the total requirement of fertilizer nutrients (N+P+K) will be 33.52 million tonnes (28.28 + 5.24) by the end of 2016-17. By applying the current NPK use ratio of 4.8:2.3:1, the requirement of N, P and K is expected to be 19.86, 9.52 and 4.14 million tonnes, respectively during 2016-17.

8.8 The response ratio of 1:6 for fertilizer to foodgrain has to be maintained through balanced fertilization and efficient use of fertilizer. NPK use ratio may improve from the current level of 4.8:2.3:1 to 4.6:2.3:1 by the end of 2024-25. All-India demand for fertilizer nutrients during 2011-12 to 2016-17 is given in the **Table 2**.

Model II

Table 2 : All India Demand Projections of Fertiliser Nutrients During the 12th Plan (2012-13 to 2016-17)

('000 tonnes)

Year	N	P_2O_5	K_2O	Total
2012-13	17897	8576	3729	30202
2013-14	18395	8814	3832	31042
2014-15	18889	9051	3935	31875
2015-16	19378	9285	4037	32700
2016-17	19861	9517	4138	33516

8.9 The summary of results derived from two methodologies used for projections of demand for fertilizers nutrients (NPK) for the 12th Five Year Plan is shown in **Table 3.**

Table 3: Summary of Demand Projections of Fertilizer Nutrients (N+P+K) Based on Two Methodologies during the 12th Five Year Plan

Methodology	2012-13	2013-14	2014-15	2015-16	2016-17	Average per annum growth during 12th Plan	
	---------- million te ----------					Quantity (million te)	Compound growth (%)
I. Multiple Regression	29.68	30.76	31.78	32.79	33.81	0.83	3.3
II Population nutrition	30.20	31.04	31.88	32.70	33.52	0.66	2.6

8.10 The projections of fertilizer nutrients based on two methodologies show a close range of demand figures of total nutrients between 33.52 and 33.81 million tonnes for the terminal year of 12th Plan. However, the results generated from Model II based on population nutrition method (Ref. Table 2) have been finally adopted as the figures for the base year and the terminal year conform to the likely trend. The details of NPK break up are shown above in **Table 2. Table 4** gives All-India demand projections for fertilizer nutrients during 2017-18 to 2024-25.

Table 4: All-India Demand Projections of Fertiliser Nutrients

2017-18 to 2024-25				
				('000 tonnes)
Year	N	P	K	Total
2017-18	20165	9868	4290	34323
2018-19	20632	10096	4390	35118
2019-20	21092	10322	4488	35902
2020-21	21545	10543	4584	36672
2021-22	21989	10761	4679	37428
2022-23	22225	11113	4832	38170
2023-24	22648	11324	4923	38895
2024-25	23060	11530	5013	39603

The year-wise details of All-India demand projections of fertilizer nutrients for 2012-13 to 2024-25 along with the methodology are presented in **Annexure II**.

8.11 **All India Demand Forecast of Fertilizer Products**

i) The current share of urea to total N is 78 per cent. Same share has been used for future projections However, in case of DAP, its share to total P may progressively reduce from the current level of 63 per cent to 60 per cent by the end of the 12th Plan. On the contrary, the share of NP/NPKs to total P is likely to increase from 29 per cent to 30 per cent during the period. The share of SSP to total P may also increase from 7 to 10 per cent during the period. The share of MOP to total K for direct application was 76 per cent in 2009-10 which reduced 67 percent in 2010-11. During the 12th Plan, the share is likely to be within the range 67 to 70 per cent. By applying the above

ratios, All-India demand projection for fertilizer products for the 12th Plan period are presented in **Table 5**.

Table 5 : All-India Demand Projections of Fertilizer Products – 2012-13 to 2016-17

							('000 tonnes)
Year	Urea	DAP	SSP	NP/NPKs	MOP*	Others	Total
2012-13	30347	11559	4288	10291	4195	950	61630
2013-14	31192	11784	4682	10577	4343	975	63553
2014-15	32029	12002	5091	10861	4492	975	65451
2015-16	32858	12212	5513	11142	4643	1000	67368
2016-17	33677	12413	5948	11420	4793	1000	69251
* = MOP for direct application.							

ii) All-India demand projections for fertilizer products during 2017-18 to 2024-25 is given in Table 6.

Table 6: All-India Demand Projections of Fertilizer Products - 2017-18 to 2024-25

							('000 tonnes)
Year	Urea	DAP	SSP	NP/NPKs	MOP*	Others	Total
2017-18	33754	12764	6476	11841	4934	1025	70793
2018-19	34536	12950	6626	12318	5048	1025	72503
2019-20	35307	13014	7096	12799	5086	1050	74352
2020-21	36064	13179	7248	13284	5195	1050	76021
2021-22	36808	13392	7566	13558	5224	1075	77624
2022-23	36720	13710	7814	14224	5395	1075	78938
2023-24	37418	13909	8139	14495	5416	1100	80476
2024-25	38099	14036	8467	14874	5514	1100	82090
* = MOP for direct application.							

8.13 Zone-wise and State-wise Demand Projections of Fertilizer Nutrients

The zone-wise demand projections have been worked out based on the average consumption of individual nutrients in each zone to the respective nutrient total at the All-India level. **Table 7** shows zone-wise demand projections during the 12th Plan.

Table 7: Zone-wise demand projection of fertilizer nutrients				
2012-13 to 2016-17				
				('000 tonnes)
East				
Year	N	P	K	Total
2012-13	2537	1171	787	4495
2013-14	2607	1204	809	4620
2014-15	2677	1236	831	4744
2015-16	2747	1268	852	4867
2016-17	2815	1300	874	4988
North				
Year	N	P	K	Total
2012-13	6526	2317	443	9286
2013-14	6707	2381	455	9544
2014-15	6887	2445	468	9800
2015-16	7066	2508	480	10054
2016-17	7242	2571	492	10305
South				
Year	N	P	K	Total
2012-13	3877	2220	1545	7643
2013-14	3985	2282	1588	7856
2014-15	4092	2343	1631	8067
2015-16	4198	2404	1673	8275
2016-17	4303	2464	1715	8482
West				
Year	N	P	K	Total
2012-13	4957	2868	953	8778
2013-14	5095	2947	980	9022
2014-15	5232	3026	1006	9264
2015-16	5367	3105	1032	9504
2016-17	5501	3182	1058	9741

The zone-wise demand projections have been further broken into state-wise demand projections based on the average consumption of individual nutrients in each state to the respective nutrient total of the respective zone. The details of zone-wise and state-wise demand projections during 2012-13 to 2016-17 are given in **Annexure III (a). Annexure III (b)** gives the projections for the period 2017-18 to 2024-25.

8.14 Specialty fertilizers

Government of India (GOI) has introduced nutrient based subsidy (NBS) on P & K fertilizers w.e.f 1st April 2010. It may lead to sweeping changes in the fertilizer use pattern in the medium to long-term period towards balanced fertilization. A number of new/ innovative products are already being produced, imported and marketed in the country. These include neem coated urea, customized fertilizers, fortified fertilizers, water soluble fertilizers, bentonite sulphur, etc. **Table 8** given below shows the estimated sale and use of these products from 2006-07 to 2010-11 as per the data mostly received from fertilizer industry. A sizeable increase in the use of these products is expected in future years.

Table 8: Estimated Sale of Specialty Fertilizers

('000 tonnes)

Product	2006-07	2007-08	2008-09	2009-10	2010-11
Neem coated urea *	603.51			917.79	1183.96
Water soluble fertilisers	14.69	28.71	29.31	36.83	47.27
Customised fertilisers	-	-	19.69	24.75	49.81
Bentonite sulphur	0.10	4.71	26.27	104.42	98.50

*= Based on the reports received from 5 companies.

Annexure I

Multiple Regression Model - Methodology

Among a large number of factors, the following variables were finally considered in the model based on their statistical significance and stability of the functional relationship to estimate demand for the period 2012-13 to 2016-17.

(1) Irrigated area, (2) Area under HYV, (3) Fertiliser nutrient prices, (4) Rainfall (as % of long term average value), (5) Lagged dependent variable (Fertiliser consumption in the previous year)

The data were transformed into logarithmic form in order to reduce the variations and bring uniformity in the expression of units of different variables. The following functional form of equations was used: -

Equation:

$\text{Log } Y_t = C + b_1 \text{Log} X_{1t} + b_2 \text{Log} X_{2t} + b_k \text{Log} X_{kt} + U_t$

The equation generated for consumption of total nutrients ($N+P_2O_5+ K_2O$) as given below:

$\text{Log } Y_t = C + b_1 \text{Log} I_t + b_2 \text{Log} H_t + b_3 \text{Log} P_{Nt} + b_4 \text{Log } P_{Pt} + b_5 \text{Log } P_{Kt} + b_6 \text{Log } R_t + b_7 \text{Log } Y_{t-1}$

Where :

Y_t = Consumption of total nutrients ($N+P_2O_5+ K_2O$)

t= denotes years

I = Percentage of gross irrigated area to gross cropped area

H = Percentage of area under HYV to gross cropped area

R = Rainfall (as percentage of Long Term average value)

P_N = Price of N through Urea

P_P = Average Price of P_2O_5 through DAP and SSP

P_K = Price of K through MOP

Annexure-II

ALL-INDIA DEMAND PROJECTIONS OF FERTILISER NUTRIENTS - 2012-13 TO 2024-25

I. Population nutrition method

Sl.no.	Item	Unit	2010-11 (Actual)	2011-12 (Est.)	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
1	Population	Million No.	1210	1231	1247	1263	1279	1294	1309	1324	1339	1353	1367	1381	1394	1407	1419
	- Under BPL		448	447	446	445	444	443	442	441	440	439	438	437	436	435	434
	- APL		762	784	801	818	835	851	868	884	899	915	930	944	958	972	986
2	Net availability of foodgrains	Per capita	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173
	- Under BPL (500 gm/day)	(Kg. per annum)	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183
	- APL (450 gm/day)		164	164	164	164	164	164	164	164	164	164	164	164	164	164	164
3	Net requirement of foodgrains	Million tonnes	207	210	213	216	218	221	223	226	228	230	233	235	237	239	241
	- Under BPL		82	82	81	81	81	81	81	80	80	80	80	80	80	79	79
	- APL		125	129	132	134	137	140	143	145	148	150	153	155	157	160	162
	(Item 1 x Item 2)																
4	**Gross requirement of foodgrains (Item 3 / 87.5%*)**	**Million tonnes**	**236.5**	**240.4**	**243.4**	**246.3**	**249.3**	**252.2**	**255.0**	**257.8**	**260.5**	**263.2**	**265.8**	**268**	**271**	**273**	**275**
5	Additional requirement of foodgrains on the level of base year	Million tonnes		3.9	6.9	9.9	12.8	15.7	18.5	21.3	24.0	26.7	29.3	31.8	34.3	36.7	39.0
6	Response ratio of fertiliser nutrients (N+P+K) to foodgrains			1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6	1:6
7	Additional demand for fertilisers for foodgrains (N+P+K) (Item 5 x response ratio)	Million tonnes		0.65	1.15	1.65	2.14	2.62	3.09	3.55	4.01	4.45	4.88	5.31	5.72	6.11	6.50
	Additional demand for fertilisers for all crops (N+P+K)	Million tonnes		1.08	1.92	2.76	3.59	4.42	5.24	6.04	6.84	7.62	8.39	9.15	9.89	10.62	11.32
8	**Total demand for fertilisers for all crops (Total consumption of N+P+K during the base year + Additional consumption in the respective years)**	**Million tonnes**	**28.28**	**29.36**	**30.20**	**31.04**	**31.87**	**32.70**	**33.52**	**34.32**	**35.12**	**35.90**	**36.67**	**37.428**	**38.170**	**38.895**	**39.603**
9	Nutrientwise demand																
	N	Million tonnes	16.660	17.398	17.897	18.395	18.889	19.378	19.861	20.165	20.632	21.092	21.545	21.989	22.225	22.648	23.060
	P	Million tonnes	8.120	8.336	8.576	8.814	9.051	9.285	9.517	9.868	10.096	10.322	10.543	10.761	11.113	11.324	11.530
	K	Million tonnes	3.500	3.624	3.729	3.832	3.935	4.037	4.138	4.290	4.390	4.488	4.584	4.679	4.832	4.923	5.013

* = The balance 12.5% is projected to be provided for seeds, feed requirements and wastes.

Assumptions:1. BPL category = Reduction in BPl category population by about 0.2 per cent per annum from the present level of 37 per cent..

2. Net availability of foodgrains - 500 grams per day for BPL and 450 grams per day for APL categories.

3.Response ratio of fertiliser nutrients (N+P+K) to foodgrains - 1:6.

4.Share of fertiliser use to foodgrains may decline by about 0.2 per cent per annum from the current level of 60 per cent.

Annexure-III(a)

Zone-wise and State-wise Demand Projections of Fertiliser Nutrients - 2012-13 to 2016-17

('000 tonnes)

State	2012-13				2013-14				2014-15				2015-16				2016-17			
	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total
East	**2,537**	**1,171**	**787**	**4,495**	**2,607**	**1,204**	**809**	**4,620**	**2,677**	**1,236**	**831**	**4,744**	**2,747**	**1,268**	**852**	**4,867**	**2,815**	**1,300**	**874**	**4,988**
Assam	133	77	72	281	137	79	74	289	141	81	76	297	144	83	78	305	148	85	80	312
Bihar	1,048	266	146	1,460	1,077	273	150	1,501	1,106	280	154	1,541	1,135	288	158	1,581	1,163	295	162	1,620
Jharkhand	113	67	13	193	116	69	14	199	119	71	14	204	123	73	14	210	126	75	15	215
Orissa	341	167	91	598	350	172	93	615	360	176	96	631	369	181	98	648	378	185	101	664
West Bengal	867	582	459	1,908	891	598	472	1,961	915	614	485	2,014	938	630	497	2,066	962	646	510	2,117
Arunachal Pradesh	1	0.3	0.1	1	1	0.3	0.1	1	1	0.3	0.1	1	1	0.3	0.1	1	1	0.3	0.1	1
Manipur	17	3	1	21	17	3	1	22	18	4	1	23	18	4	2	23	19	4	2	24
Meghalaya	4	2	0.4	6	4	2	0.4	6	4	2	0.4	6	4	2	0.4	6	4	2	0.4	7
Mizoram	2	2	1	5	2	2	1	5	2	2	1	5	2	2	1	5	2	2	1	5
Nagaland	1	0.4	0.1	1	1	0.4	0.1	1	1	0.4	0.1	1	1	0.4	0.2	1	1	0.4	0.2	1
Sikkim	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.4	0.2	0.03	1
Tripura	11	5	3	19	12	5	3	20	12	5	3	20	12	5	4	21	13	5	4	21
North	**6,526**	**2,317**	**443**	**9,286**	**6,707**	**2,381**	**455**	**9,544**	**6,887**	**2,445**	**468**	**9,800**	**7,066**	**2,508**	**480**	**10,054**	**7,242**	**2,571**	**492**	**10,305**
Haryana	1,149	406	41	1,596	1,181	417	42	1,640	1,213	429	43	1,684	1,244	440	44	1,728	1,275	451	45	1,771
Himachal Pradesh	41	15	12	68	42	15	13	70	43	15	13	72	44	16	13	73	46	16	14	75
Jammu&Kashmir	79	35	9	123	81	36	10	126	83	37	10	130	85	38	10	133	88	39	10	136
Punjab	1,668	544	71	2,282	1,714	559	73	2,346	1,760	574	75	2,409	1,805	588	77	2,471	1,851	603	79	2,533
Uttar Pradesh	3,454	1,279	296	5,030	3,551	1,315	304	5,170	3,646	1,350	312	5,308	3,740	1,385	320	5,446	3,833	1,420	328	5,582
Uttarakhand	134	38	13	185	138	39	14	191	141	40	14	196	145	41	14	201	149	42	15	206
Chandigarh	0.01	-	-	0.01	0.01	-	-	0.01	0.01	-	-	0.01	0.01	-	-	0.01	0.01	-	-	0.01
Delhi	1	0.2	0.03	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1
South	**3,877**	**2,220**	**1,545**	**7,643**	**3,985**	**2,282**	**1,588**	**7,856**	**4,092**	**2,343**	**1,631**	**8,067**	**4,198**	**2,404**	**1,673**	**8,275**	**4,303**	**2,464**	**1,715**	**8,482**
Andhra Pradesh	1,962	1,073	535	3,571	2,017	1,103	550	3,670	2,071	1,133	565	3,769	2,125	1,162	580	3,866	2,178	1,191	594	3,963
Karnataka	1,028	696	479	2,203	1,056	715	492	2,264	1,085	734	505	2,325	1,113	753	518	2,385	1,141	772	531	2,444
Kerala	124	71	110	305	127	73	113	313	131	75	116	322	134	77	119	330	138	79	122	338
Tamil Nadu	736	367	411	1,514	756	377	422	1,556	777	387	433	1,597	797	397	444	1,639	817	407	456	1,680
Pondicherry	27	13	11	51	28	13	11	52	29	13	11	53	29	14	12	55	30	14	12	56
A & N Islands	0.4	0.3	0.1	1	0.4	0.4	0.1	1	0.4	0.4	0.1	1	0.4	0.4	0.1	1	0.5	0.4	0.1	1
West	**4,957**	**2,868**	**953**	**8,778**	**5,095**	**2,947**	**980**	**9,022**	**5,232**	**3,026**	**1,006**	**9,264**	**5,367**	**3,105**	**1,032**	**9,504**	**5,501**	**3,182**	**1,058**	**9,741**
Gujarat	1,242	598	197	2,037	1,277	615	203	2,094	1,311	631	208	2,150	1,345	647	213	2,206	1,378	664	219	2,261
Madhya Pradesh	939	665	103	1,707	965	683	106	1,754	991	702	108	1,801	1,017	720	111	1,848	1,042	738	114	1,894
Chhattishgarh	341	181	70	592	351	186	72	609	360	191	74	625	370	196	76	641	379	201	77	657
Maharashtra	1,561	1,011	553	3,125	1,605	1,039	568	3,212	1,648	1,067	584	3,298	1,690	1,094	599	3,384	1,733	1,122	614	3,468
Rajasthan	868	409	28	1,305	892	420	29	1,341	916	432	29	1,377	940	443	30	1,413	963	454	31	1,448
Goa	4	3	3	9	4	3	3	10	4	3	3	10	4	3	3	10	4	3	3	10
Daman & Diu	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4
Dadra & Nagar Haveli	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2
All-India	**17,897**	**8,576**	**3,729**	**30,202**	**18,395**	**8,814**	**3,832**	**31,041**	**18,889**	**9,051**	**3,935**	**31,875**	**19,378**	**9,285**	**4,037**	**32,700**	**19,861**	**9,517**	**4,138**	**33,516**

Annexure-III(b)

Zone-wise and State-wise Demand Projections of Fertiliser Nutrients - 2017-18 to 2024-25

('000 tonnes)

State	2017-18				2018-19				2019-20				2020-21				2021-22				2022-23				2023-24				2024-25			
	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total	N	P	K	Total
East	**2,858**	**1,347**	**906**	**5,111**	**2,924**	**1,379**	**927**	**5,230**	**2,990**	**1,409**	**947**	**5,347**	**3,054**	**1,440**	**968**	**5,461**	**3,117**	**1,469**	**988**	**5,574**	**3,150**	**1,517**	**1,020**	**5,688**	**3,210**	**1,546**	**1,039**	**5,796**	**3,269**	**1,574**	**1,058**	**5,901**
Assam	150	88	82	321	154	90	84	328	157	92	86	335	160	94	88	343	164	96	90	350	165	99	93	358	169	101	95	364	172	103	96	371
Bihar	1,181	306	168	1,655	1,208	313	172	1,693	1,235	320	176	1,731	1,262	327	180	1,768	1,288	333	183	1,805	1,302	344	189	1,835	1,327	351	193	1,870	1,351	357	196	1,904
Jharkhand	127	77	15	220	130	79	15	225	133	81	16	230	136	83	16	235	139	84	17	240	141	87	17	245	143	89	17	249	146	90	18	254
Orissa	384	192	104	680	393	197	107	696	401	201	109	712	410	205	111	727	419	210	114	742	423	216	118	757	431	221	120	771	439	225	122	785
West Bengal	977	670	528	2,174	999	685	541	2,225	1,021	700	553	2,275	1,043	715	565	2,323	1,065	730	576	2,371	1,076	754	595	2,425	1,097	768	606	2,471	1,117	782	617	2,517
Arunachal Pradesh	1	0.3	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1	1	0.4	0.2	1
Manipur	19	4	2	24	19	4	2	25	20	4	2	25	20	4	2	26	21	4	2	27	21	4	2	27	21	4	2	27	22	5	2	28
Meghalaya	4	2	0.5	7	4	2	0.5	7	4	2	0.5	7	4	3	0.5	7	4	3	0.5	7	4	3	0.5	8	4	3	0.5	8	5	3	0.5	8
Mizoram	2	2	1	6	2	2	1	6	2	2	1	6	2	2	1	6	2	2	1	6	2	2	1	6	3	2	1	6	3	2	1	6
Nagaland	1	0.4	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1	1	0.5	0.2	1
Sikkim	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.4	0.2	0.03	1	0.5	0.2	0.03	1	0.5	0.3	0.04	1	0.5	0.3	0.04	1	0.5	0.3	0.04	1
Tripura	13	5	4	22	13	5	4	22	13	6	4	23	14	6	4	23	14	6	4	24	14	6	4	24	14	6	4	25	15	6	4	25
North	**7,353**	**2,666**	**510**	**10,528**	**7,523**	**2,728**	**522**	**10,772**	**7,691**	**2,789**	**533**	**11,012**	**7,856**	**2,848**	**545**	**11,249**	**8,018**	**2,907**	**556**	**11,481**	**8,104**	**3,002**	**574**	**11,680**	**8,258**	**3,059**	**585**	**11,902**	**8,408**	**3,115**	**596**	**12,119**
Haryana	1,294	467	47	1,809	1,324	478	48	1,851	1,354	489	49	1,892	1,383	499	50	1,933	1,412	510	51	1,973	1,427	526	53	2,006	1,454	536	54	2,044	1,480	546	55	2,081
Himachal Pradesh	46	17	14	77	47	17	14	79	48	18	15	81	49	18	15	82	50	18	15	84	51	19	16	86	52	19	16	87	53	20	16	89
Jammu&Kashmir	89	40	11	140	91	41	11	143	93	42	11	146	95	43	11	149	97	44	12	152	98	45	12	155	100	46	12	158	102	47	12	161
Punjab	1,879	625	82	2,586	1,922	640	84	2,646	1,965	654	86	2,705	2,007	668	88	2,763	2,049	682	90	2,820	2,071	704	92	2,868	2,110	718	94	2,922	2,149	731	96	2,975
Uttar Pradesh	3,892	1,472	340	5,705	3,982	1,506	348	5,837	4,071	1,540	356	5,967	4,158	1,573	364	6,095	4,244	1,605	371	6,221	4,290	1,658	383	6,331	4,371	1,689	391	6,452	4,451	1,720	398	6,569
Uttarakhand	151	44	15	210	154	45	16	215	158	46	16	220	161	47	16	225	165	48	17	229	166	50	17	233	169	51	18	238	173	51	18	242
Chandigarh	0.01	-	-	0.01	0.01	-	-	0.01	0.02	-	-	0.02	0.02	-	-	0.02	0.02	-	-	0.02	0.02	-	-	0.02	0.02	-	-	0.02	0.02	-	-	0.02
Delhi	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.04	1	1	0.2	0.05	2	1	0.2	0.05	2
South	**4,369**	**2,555**	**1,778**	**8,702**	**4,470**	**2,614**	**1,819**	**8,903**	**4,570**	**2,673**	**1,860**	**9,102**	**4,668**	**2,730**	**1,900**	**9,297**	**4,764**	**2,786**	**1,939**	**9,489**	**4,815**	**2,877**	**2,003**	**9,695**	**4,907**	**2,932**	**2,040**	**9,879**	**4,996**	**2,985**	**2,078**	**10,059**
Andhra Pradesh	2,211	1,235	616	4,062	2,262	1,263	630	4,156	2,313	1,292	644	4,249	2,362	1,319	658	4,340	2,411	1,347	672	4,429	2,437	1,391	694	4,521	2,483	1,417	707	4,607	2,528	1,443	720	4,691
Karnataka	1,158	801	551	2,510	1,185	819	564	2,568	1,211	838	576	2,625	1,237	856	589	2,682	1,263	873	601	2,737	1,276	902	621	2,799	1,301	919	632	2,852	1,324	936	644	2,904
Kerala	140	82	126	348	143	84	129	356	146	86	132	364	149	87	135	372	152	89	138	379	154	92	142	388	157	94	145	396	160	96	148	403
Tamil Nadu	829	422	472	1,724	848	432	483	1,764	867	442	494	1,803	886	451	505	1,842	904	461	515	1,880	914	476	532	1,922	931	485	542	1,958	948	494	552	1,994
Pondicherry	30	15	12	58	31	15	13	59	32	15	13	60	33	16	13	61	33	16	13	63	34	17	14	64	34	17	14	65	35	17	14	66
A & N Islands	0.5	0.4	0.2	1	0.5	0.4	0.2	1	0.5	0.4	0.2	1	0.5	0.4	0.2	1	0.5	0.4	0.2	1	0.5	0.4	0.2	1	0.5	0.5	0.2	1	0.5	0.5	0.2	1
Lakshadw eep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West	**5,585**	**3,300**	**1,097**	**9,982**	**5,715**	**3,376**	**1,122**	**10,213**	**5,842**	**3,451**	**1,147**	**10,441**	**5,968**	**3,525**	**1,172**	**10,665**	**6,091**	**3,598**	**1,196**	**10,885**	**6,156**	**3,716**	**1,235**	**11,107**	**6,273**	**3,786**	**1,259**	**11,318**	**6,387**	**3,855**	**1,282**	**11,524**
Gujarat	1,400	688	227	2,314	1,432	704	232	2,368	1,464	720	237	2,421	1,495	735	242	2,473	1,526	750	247	2,524	1,543	775	255	2,573	1,572	790	260	2,622	1,600	804	265	2,669
Madhya Pradesh	1,058	765	118	1,941	1,083	783	121	1,986	1,107	800	124	2,031	1,131	817	126	2,074	1,154	834	129	2,117	1,166	862	133	2,161	1,189	878	136	2,202	1,210	894	138	2,242
Chhattishgarh	385	209	80	673	394	213	82	689	402	218	84	704	411	223	86	720	419	227	88	734	424	235	90	749	432	239	92	763	440	244	94	777
Maharashtra	1,759	1,163	636	3,559	1,800	1,190	651	3,641	1,840	1,217	666	3,722	1,880	1,243	680	3,802	1,918	1,268	694	3,881	1,939	1,310	717	3,965	1,976	1,335	730	4,041	2,012	1,359	744	4,114
Rajasthan	978	471	32	1,481	1,001	482	33	1,515	1,023	492	34	1,549	1,045	503	34	1,582	1,067	513	35	1,615	1,078	530	36	1,644	1,099	540	37	1,676	1,119	550	37	1,706
Goa	4	3	3	11	4	3	3	11	5	3	3	11	5	4	3	11	5	4	3	12	5	4	3	12	5	4	4	12	5	4	4	12
Daman & Diu	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4	0.3	0.1	0.02	0.4	0.4	0.1	0.02	0.5	0.4	0.1	0.02	0.5	0.4	0.1	0.02	0.5	0.4	0.1	0.02	0.5	0.4	0.1	0.02	0.5
Dadra & Nagar Haveli	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2	1	1	0.1	2
All-India	**20,165**	**9,868**	**4,290**	**34,323**	**20,632**	**10,096**	**4,390**	**35,118**	**21,092**	**10,322**	**4,488**	**35,902**	**21,545**	**10,543**	**4,584**	**36,672**	**21,989**	**10,761**	**4,679**	**37,429**	**22,225**	**11,113**	**4,832**	**38,170**	**22,648**	**11,324**	**4,923**	**38,895**	**23,060**	**11,530**	**5,013**	**39,603**

CHAPTER-IX

9.0 MEASURES TO MEET THE DEMAND – (*Increasing indigenous production of fertilizers- (New capacities, capacity expansion, modernization and change-over of feedstock in urea), Joint Ventures Abroad and Long Term Offtake arrangements)* 9.9

To fulfill the projected demand during the Plan period, there is need for proper estimation of supply. It is imperative to make the projections of supply keeping in view the medium and long-term goals of the Fertilizer Sector.

Medium term: The medium term period may cover a period of five years (2012-2016-17). The goal of the fertilizer sector in medium term should aim at:

(i) Achieving self-sufficiency in nitrogen production through urea by the terminal year of the 12th Plan and
(ii) Maximization of the production of phosphate.

Nitrogen: Urea constitutes about 78 per cent of the total nitrogen consumption in the country. Currently, the gap between consumption and production is about 6 to 7 million tonnes. The gap will increase in coming years unless new capacities are created. At least 6 – 8 new projects of 1.2 million tonnes capacity each are needed to fill the present consumption – production gap and to meet the further increase in urea demand in next 5 years. A number of urea manufacturing companies are waiting for implementation of new capacities subject to the announcement of new investment policy for urea and additional allocation of gas at reasonable prices.

Phosphate: For meeting requirement of phosphatic fertilizers, the country has to use the judicious mix of manufacturing domestically through imported raw materials, like phosphate rock, sulphur and ammonia or through imported intermediates, viz., phosphoric acid and ammonia besides importing finished fertilizers to supplement the domestic production. The production of SSP is needed to be maximized to reduce dependence on imported DAP or other imported phosphatic fertilizers. However, quality of finished fertilizer products should be as per FCO, 1985 specifications.

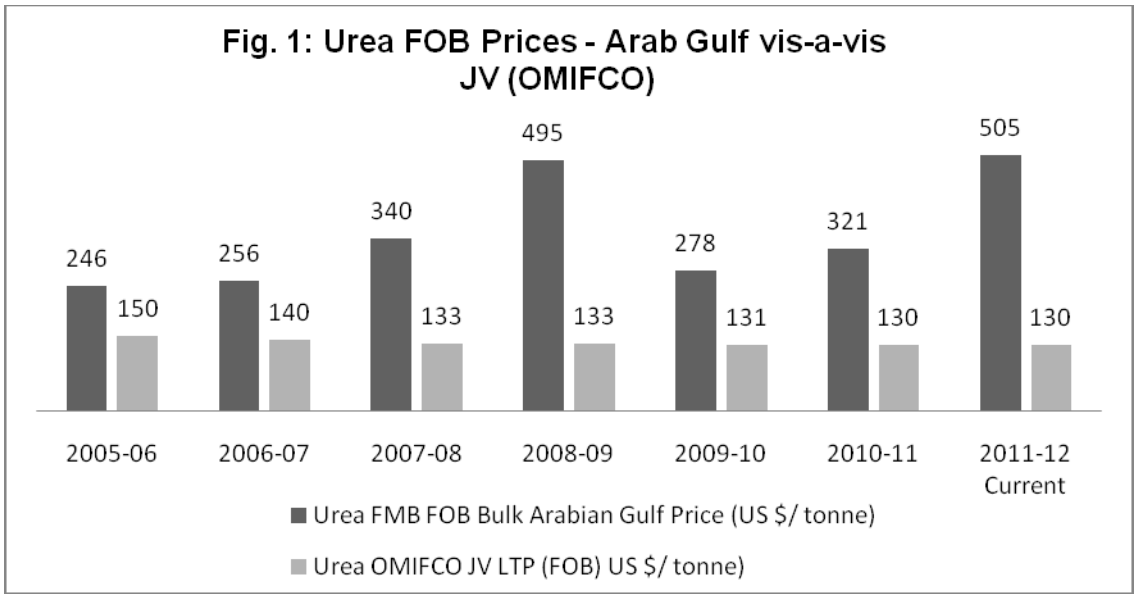
Long-term: The long term period may cover 5 to 10 years beyond 2016-17. In the long run, additional requirement of fertilizers is to be fulfilled through creation of domestic capacities and acquiring assets abroad for setting up joint ventures.

Domestic capacities: In the long run, for future domestic capacity additions, there is need for clear indication of domestic gas availability. The priority in allocation of

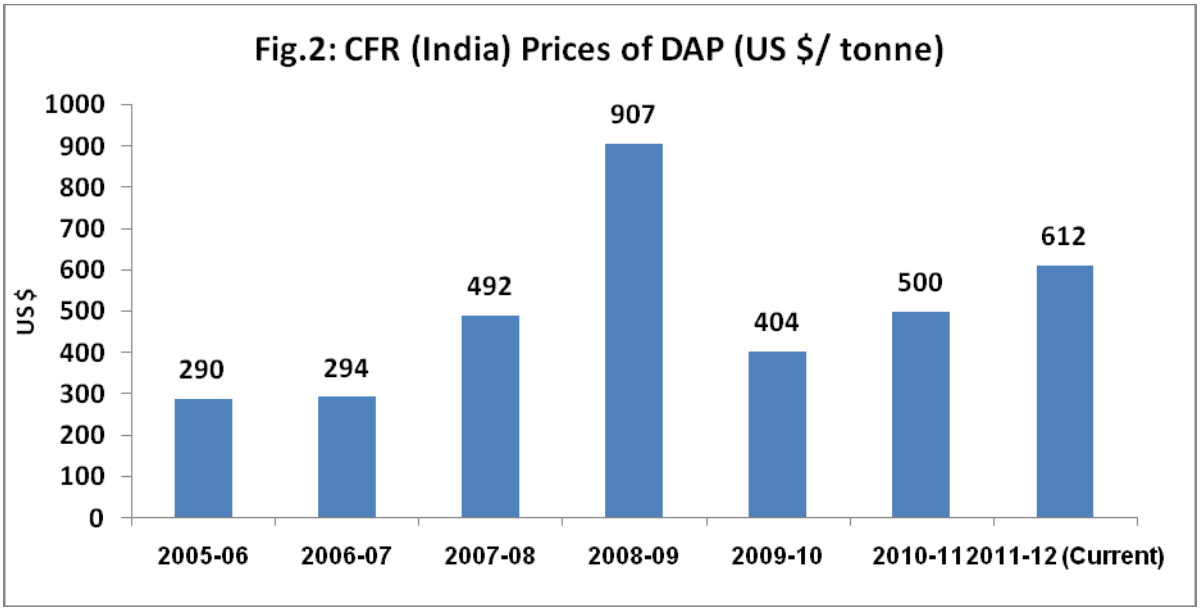
domestic gas must be maintained. Fertilizer industry should be allocated gas at reasonable prices. The options of coal bed methane and coal gasification as feedstock may also be considered for revival of sick units and creation of new capacities.

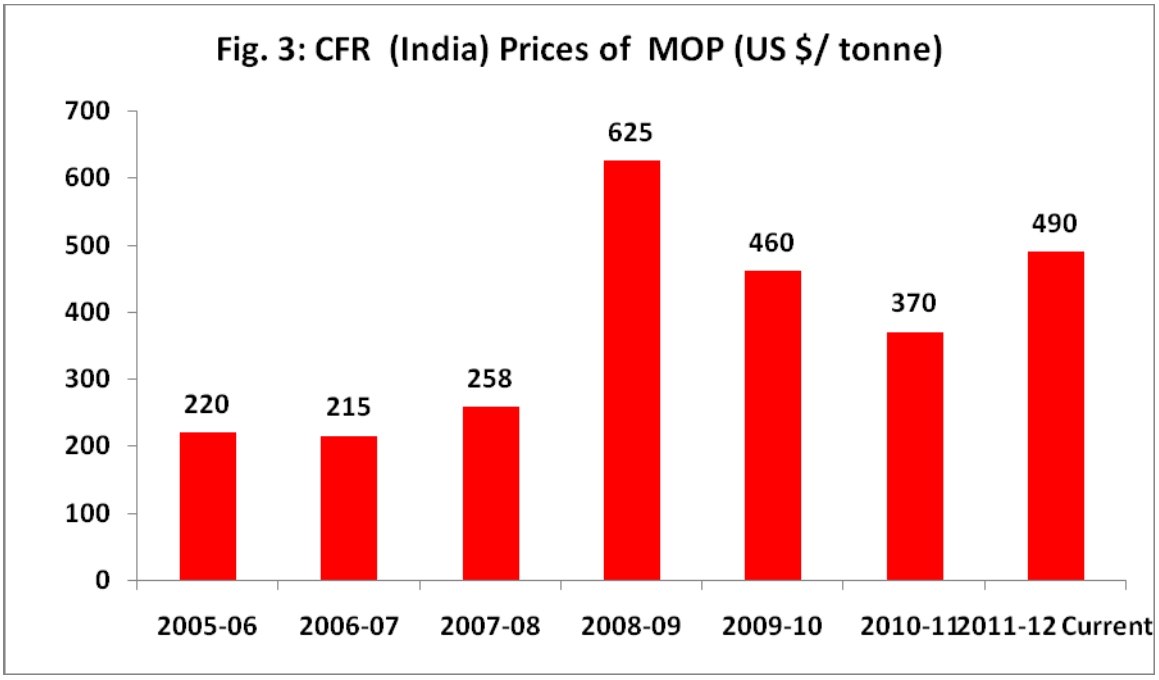
International prices of fertilizers are volatile. These are not governed by the cost of production and margin, and rather influenced by demand from major buyers. The country cannot afford to depend on imports of finished fertilizers and raw materials to such a huge quantity through spot purchases. India need to take steps in proactive mode to secure supplies of finished fertilizers and raw material and ensure steady and uninterrupted supplies to meet short fall through indigenous sources and imports at reasonable prices.

International spot prices are volatile. Comparative FOB prices of Urea from Arab Gulf and Long term Price through JV projects are given in **Figure 1.** CFR (India) prices of DAP and MOP are presented in **Figure 2** and **3,** respectively.



(Source: Fertecon /FMB)





(Source: Fertecon/FMB/FAI)

Industry structure has also undergone a change in recent period at global level with fewer players who have control over the mining resource and are calling the shots. Also strongly supported by high agricultural commodity prices, demand for these fertilizers has been growing very strong over the last 5 years. Consolidated Industry and strong demand have lead to very high price levels. Under these circumstances it is becoming increasingly difficult for India to secure supplies of phosphatic and potassic fertilizers. Due to subsidy support for fertilizers**,** burden on union budget is also increasing year on year. Thus, there is a strong need for the Government of India (GOI) and domestic Industry to work together in securing long term supplies.

Under the circumstances, there are two options available (i) Maximization of domestic production and (ii) Owning assets abroad.

9.1 POLICY INITIATIVES in UREA SECTOR FOR NEW INVESTMENTS-

A pricing policy was announced in January 2004 for setting up new urea projects and expansion of existing urea projects for augmenting the domestic production capacity of urea to meet the growing demand for enhancing the agricultural production in the country. As per this policy, the new/expansion projects will be based only on natural gas/LNG as feedstock, which is the most cost effective and least polluting feedstock in the fertilizer sector today.

9.2 New Investment Policy for incentivizing production

9.2.1 A new policy for investments in the urea sector both within and outside the country was notified by the Department for Revamp, Expansion, Revival/Brownfield and Greenfield projects on 4th September 2008. The New Investment Policy is based on the recommendations of the Committee chaired by Prof. Abhijit Sen, Member Planning Commission. The Committee recommended an Import Parity benchmark, with suitable floor and ceiling as the most suitable option for revamp, expansion and revival/Brownfield projects in the urea sector. For Greenfield projects, the Committee recommended a limited bidding option. The Committee also recommended a pricing principle for offtake of urea from joint ventures abroad. The committee also indicated that the recommendations have an underlying assumption regarding fructification of Gas

availability as decided by EGOM and linkages possible on this basis. It opined that if the above happens, the recommendations are likely to translate into required investments and take the country towards self sufficiency in Urea production.

9.2.2 The fertilizer industry responded positively to the new investment policy only for revamp projects. Many fertilizer companies informed the Government the intent to initiate investments for expansion of their existing units by setting up an additional capacity of 1.15 Million Tonne per annum Urea production unit in their existing premises subject to suitable protection of their proposed investments in the policy. In addition to the above, the proposal for revival of eight closed urea units of Fertilizer Corporation of India Ltd (FCIL) and Hindustan Fertilizer Corporation Ltd (HFCL) are at an advanced stage of processing. There are companies proposing investments in urea sector on alternative feedstocks, i.e., coal gas, CBM etc. In the absence of any commitment by the Government regarding allocation of natural gas at a pre-determined price, investments in urea sector through expansions, revivals or Greenfield projects have not taken place after the notification of above policy.

9.2.3 In the absence of commitment from MoPNG for firm allocation of long term gas at a particular price level, investments in the area of expansions/ revival / Greenfield projects, to the tune of about Rs 25,000 to 30,000 crore proposed by the companies are on hold. The decisions of EGOM clearly state that "Existing gas based Urea plants have been given first priority in allocation of 40 mmscmd of gas expected from KG basin. Further, "The demand emanating beyond 2008-09 from de-bottlenecking of the expansion of fertilizer plants, conversion of naptha-based and fuel oil-based fertilizer plants, and revival of closed fertilizer plants would be given the highest priority at that stage and will be met from production in subsequent years." However, since the expansion, revival or Greenfield plants are not yet ready to receive the gas, gas has been allocated to other sectors. Moreover, the indigenous gas mainly from KGD6 basin, instead of increasing to 80 mmscmd as per estimates has dwindled to around 40 mmscmd.

9.2.4 Currently, the import dependence of urea is around six million tonnes every year and it is likely to go up to nine million tonne unless indigenous capacities are created. Due to continuous dependence on imports, India had to procure high cost imported urea during the last few years, particularly in 2008 in which the import prices went upto USD 800/MT, resulting in an unprecedented subsidy outgo. Currently also the international prices of Urea are hovering around USD 510/MT FOB.

9.2.5 In view of increasing indigenous production of urea, there is an urgent need to make suitable amendments to the New Investment Policy of September 2008. To insulate the new investments of the industry from the vagaries of rising price of gas, some amendments to the new investment policy have been proposed by the Department, which are being reviewed by Planning Commission as per the directive of GOM. It is pressing necessity to have suitable amendments to the policy and allocation of gas by MOPNG so that the held up investments are initiated and indigenous production of urea is increased to at least meet major portion of the demand. The three Public Sector units namely BVFCL, FACT and MFL require to reorient and modernize and revive to augment indigenous capacity to produce urea. However, Govt. support for their revamp/expansion or Brown Field Plant needs to be funded through Govt. budgetary support.

9.3 Joint ventures abroad and long term offtake arrangements of raw material/ finished fertilizers

9.3.1 India is the 2nd largest producer of Urea after China, the 3rd largest producer of finished phosphate fertilizers after USA and China, the 2nd largest consumer of Urea after China, one of the largest consumers of phosphates along with China, USA and Brazil and the third largest consumer of potash after China and USA. In case of Urea, India is partially dependent on import. India imports nearly 30% of its urea requirements, which is about 20-22% of the global trade.

9.3.2 In the phosphate sector, the country is by and large import-dependent for critical phosphatic inputs such as rock phosphate and phosphoric acid. Rock phosphate imports is about 52-53 lakh MT against indigenous availability of 13-14 lakh MT. About 25 lakh MT of phosphoric acid is imported against the indigenous production of about 13-14 lakh MT. Even indigenous production of phosphoric acid is based on imported rock phosphate. Almost 90-95% of the P&K requirements are met through imports, either in the form of finished fertilizers or fertilizer inputs.

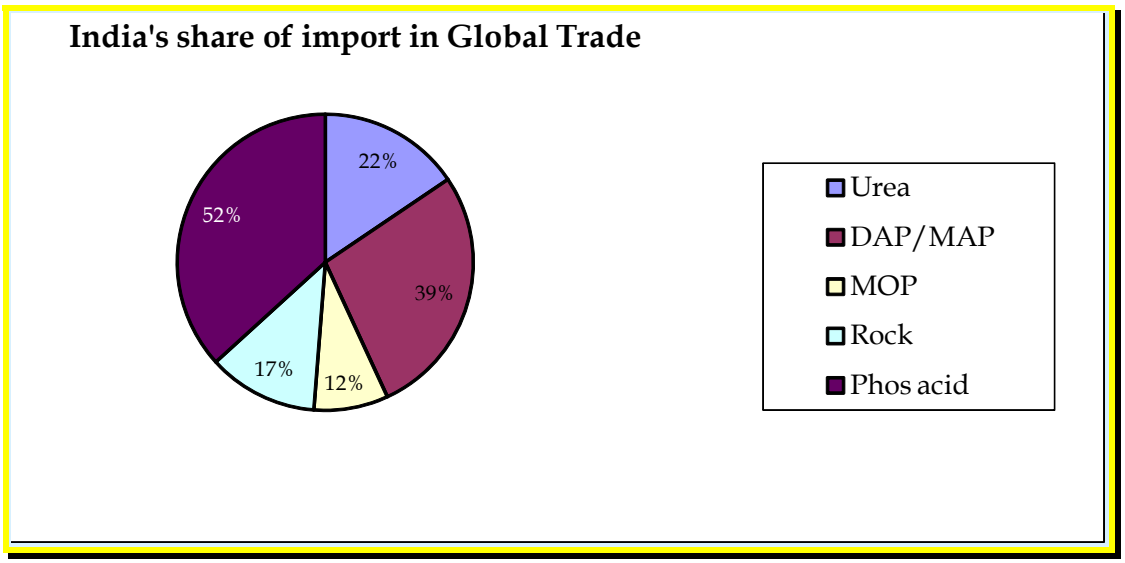
9.3.3. Presently, the country has no known source of potash and the entire requirement is met through imports. Indigenous production of rock phosphate is very limited and is available only through mines in Rajasthan and Madhya Pradesh. The quantity of indigenous rock phosphate is low in terms of Phosphorous Pentoxide (P2O5) content and is mainly suitable for the production of Single Super Phosphate (SSP) fertilizer.

9.3.4 Additionally, sulphur and sulphuric acid are available from oil refineries and smelter industries respectively, but the quantities are limited and the country is a net importer of the both. About 17-18 lakh MT of sulphur is imported yearly.

9.3.5 Annual import requirements are as given in the table below. The requirements are expected to grow in future.

Fertilizers/ Raw materials/ intermediates	**Annual Requirements (2010-11)**	**Ind. Prod (2010-11)**	**Import req.** (2010-11)	**Major sources of import**
	Lakh MT	Lakh MT	Lakh MT	
Urea	283	219	64	CIS, Gulf/ME, China, B'desh, Egypt
DAP/MAP/TSP	118	45	73	USA, China, Jordan, CIS, Aus., Morocco
MOP	60	0	60*	CIS, Canada, Jordan, Israel, Germany
SSP	30-35	30-35	0	Not imported

Complex Fertilizers	102.98	87.07	15.91	Not imported
Phosphoric acid	46	16-18	28-30	Morocco, Tunisia, Senegal, SA, Jordan, Israel, USA
Rock Phosphate	70	15	55	Morocco, Tunisia, Jordan, Togo, Algeria, Egypt, Iran, Israel, China
Sulphur (incl. sulphuric acid)	25	8	17	S. Arabia, UAE, Iran Qatar, Kazakhstan, Japan, Kuwait
Ammonia	142	122	20	S. Arabia, Iran, UAE, Bahrain, Indonesia, B'desh, Malaysia, Qatar, CIS (Ukraine, Russia), Australia



9.3.6 Since fertilizer resources such as rock phosphate, gas and potash are owned by only a limited number of countries, the Govt. has been encouraging Indian companies to establish joint venture production facilities, with buy back arrangement, in countries with rich resources of raw materials /feedstock.

9.4 Requirements and Initiatives in fertilizer Sector

9.4.1 Supplies of fertilizers and fertilizer inputs/raw materials for the country can be augmented and secured through the following mechanisms:

(i) Acquisition of fertilizer resources in fertilizer resource rich countries;

(ii) Joint Venture Projects in resource rich countries with long term offtake.

(iii) Stand-alone long term offtake contracts with major producer of fertilizers and fertilizer inputs.

9.4.2 While the second and third options are feasible, it is found that the joint venture projects in a number of countries established so far as well as the off take arrangements could provide only short to medium term security of quantity and no benefit of preferential pricing vis-à-vis international price or control of assets abroad. Countries owning fertilizer inputs such as gas, phosphate rock and potash are few and they do not let go their control over such resources. Control of such resources is either with the sovereign governments or entities directly or indirectly controlled by the sovereign governments. In such a situation, the best option to secure energy and fertilizer security would be to acquire fertilizer resources in resource rich countries abroad.

9.5 Joint Ventures and acquisition of mining assets Abroad:

In a global scenario of depleting natural resources /sources of energy and minerals, acquisition of raw material assets abroad is very important. The need to secure various input assets to ensure manufacturing and growth of the economy becomes more urgent given the limited availability of such inputs and their control by a few countries. Added to the above, there are initiatives by few countries to restrict their flow out of their countries. This is happening despite the WTO regime of non-restrictive trade practices. China is the foremost example which is known for putting trade related barriers, such as export quota, exorbitant export duty, etc., on export of various raw materials and finished products, particularly in the fertilizer sector. Many countries also exercise the option of dual pricing for mineral and energy raw materials and their supply to indigenous manufacturers are at lower price than the price paid by importers in India. In fertilizer sector, India is by and large import dependent in phosphate sector and entirely import dependent in potash sector. Need for securing

fertilizer inputs for the country invariably subject us to the volatility of international price, which euphemistically is garbed as demand – supply dynamics. In the given circumstances India need to pursue acquiring of assets abroad in a more aggressive way.

9.5.1 Oman India Fertilizer Company (OMIFCO) is a joint Venture between India Cooperatives, IFFCO and KRIBHCO (50% equity) and Oman Oil Company SAOC Oman (50% equity) in Oman. Government of India has an off take arrangement, called Urea Off Take Agreement (UOTA) for off take of about 16.52 lakh MT of urea annually at a predetermined price on long term basis. This arrangement has helped the country in securing urea at a cheaper price than the price prevailing in the international market and has resulted in subsidy saving.

9.5.2 IFFCO has joint venture with ICS Senegal in Senegal for production of 5.5 lakh MT of phosphoric acid and off take to India Indian companies, Tata Chemicals and Chambal-Zuari have a joint venture with Office Cherfian des Phosphates (OCP) of Morcco for production of 4.30 lakh MT of phosphoric acid and off-take to India. Since India imports nearly 50-55%% of globally traded phosphoric acid, off-take of phosphoric acid through joint venture arrangements have provided security of supply. Similar joint venture arrangements have been finalized by the Indian companies, Coromandel and GSFC with Tunisian company, Groupe Chemique Tunisian (GCT) in Tunisia and IFFCO with JPMC of Jordan for production of off-take of phosphoric acid. The off take arrangements have helped in securing supply of fertilizers and also fertilizer inputs for indigenous production.

9.5.3 The following table 1 shows the Joint Venture initiatives in fertilizers sectors:-

Table-1 : Existing JVs abroad

JV Project-Country	Entities	Product	Input tie up/ Model	Off take arrangement	Price preference
Oman India	Oman Oil	16.52	Gas tie from	- Urea Offtake	**Pre-determined**

Fertilizer Co. (OMIFCO), Oman	Co. (OOC-50%), IFFCO (25%) & KRIBHCO (25%)	lakh MT Urea & 2.48 lakh MT Ammonia	OCC	Agreement (UOTA) by GOI for off take of entire quantity on fixed price - Ammonia Offtake Agreement (AOTA) by IFFCO for off take of entire ammonia	**preferential price for long term off take**
ICS Senegal, Senegal	ICS Senegal and IFFCO consortium	6.60 lakh MT phosphoric acid	Rock phosphate mining at Louga is integral to the joint venture	Off take agreement upto 5.50 Lakh MT Phos. Acid by IFFCO for off take of entire qty of phos acid	Though there is benefit of integrated rock mine, there is **no price preference** for phos acid price being off taken
Indo-Jordan Chemicals Company (IJC), Jordan	JPMC (Jordan) & SPIC (India)	2.24 lakh MT Phosphoric acid	Rock supplied by JPMC at international price	Off take agreement by SPIC for off take of entire qty of phos acid	**No price preference** either for rock supplied or phos acid being off taken (now sold to JPMC)
JPMC – IFFCO JV, Jordan	JPMC & IFFCO	4.8 lakh MT phosphoric acid to be commissioned by 2010	Rock supplied by JPMC at international price	Off take agreement by IFFCO for off take of entire qty of phos acid (To be commissioned by 2013)	**No price preference** either for rock supplied or phos acid being off taken
IMACID, Morocco	OCP (50%) - Morocco, Chambal (25%) & TCL (25%)-India	4.25 lakh MT phosphoric acid	Rock supplied by OCP at international price	Off take agreement by Chambal-TCL with OCP for off take of entire qty of phos acid	**No price preference** either for rock supplied or phos acid being off taken
Tunisia-India Fertilizer Company (TIFERT), Tunisia	GCT (Tunisia), CFL & GSFC (India)	3.60 lakh MT of phosphoric acid	Rock supplied by GCT at international price	Off take agreement by CFL-GSFC with GCT for off take of entire qty of	**No price preference** either for rock supplied or phos acid being off taken

				phos acid (To be commissioned by 2011)	

Table-2 : JVs proposed

Name of JV	**Companies forming JV**	**Fertilizer project**	**Proposed offtake arrangement**
SPIC Fert. & Chem. Ltd	SPIC, India; ETA-Dubai	UREA - 4.00 lakh MT	Urea
NWCF	KRBHCO, India & NWCF, Australia	Urea, Ammonia	
Legend International Holdings Inc. Australia	Legend Inc., Australia & IFFCO	Rock Phosphate – Around 3 Million Tonne	Rock Phosphate Off-take by IFFCO
Grow Max Agri Corp, Canada	Growmax Agri Crop & IFFCO(20%)	2.5 million Tonne Potash	50% Potash off-take by IFFCO

9.5.4 In view of the above, Government while encouraging various public sector and private sector fertilizer and mining entities to pursue and enter into joint venture cooperation abroad to secure quantity of fertilizers and inputs, is also attempting to pursue the following strategies for securing fertilizer security for the country:

a) Strengthening of UVL - It is proposed that UVL may be strengthened on the lines of Petronet LNG LTD (PLL) or ONGC Videsh Ltd (OVL) by way of deploying personnel from respective PSUs, providing a back-up fund resource and providing some leverage to enter into direct negotiation with mine owners or gas suppliers.

b) Specific committees with a view on line of credit and national policy on offsets may look into the credit line being offered by GOI for infrastructure or other projects. The committee members should include senior officers drawn from various concerned Departments like Railways, Highway, Shipping & Port, Fertilizer, Oil & Gas, Commerce, Expenditure, MEA, Mining and others, who can discuss with government officials of respective countries and facilitate fertilizer and hydrocarbon resources in addition to taking up development projects.

c) Projects in following countries with rich resources of rock phosphate, potash and gas to be pursued aggressively:

i) Urea project in Ghana and Indonesia

Ghana is a country where already progress has been made on a proposal by RCF to set up a urea project and even a delegation from Ghana Visited India. Another Urea project based on coal-gasification is being pursued in Indonesia through RCF.

ii) Ammonia Urea and Phosphatic Complex in Mozambique/South Africa

It is estimated that there is a reserve of about 2500 million metric tonnes of Rock Phosphate in South Africa. Fosker is one of the major companies operating in South Africa Region and is one of the world's largest producers of phosphate and phosphoric acid. There was a proposal earlier to set up an integrated fertilizer plant in Mozambique near Maputo port using gas reserves from Mozambique and rock phosphate from the mines of South Africa, which can be revived.

iii) Ammonia-urea and phosphate project in Algeria

Algeria is another country, which has both gas and phosphate reserves in abundance. It is estimated that Algeria's phosphate rock reserves (all categories) at the Djebel Onk Mine, which is located in southeastern Tebessa Province, to be 2.2 Gt. It is also estimated that there is about 4.5 trillion cubic meter of proven natural gas reserves in Algeria. Possibility of joint venture project either for composite ammonia-urea and phosphate or an Ammonia Urea project in Algeria need to be explored.

iv) Ammonia Urea Project in Nigeria

Nigeria is another gas rich country where JV possibility needs to be pursued vigorously. Some of the Indian companies are already pursuing to set up urea project in Nigeria. Possibility of long term offtake arrangement should also be explored.

v) Stake in Potash mines of Belarus - Approximately 1 billion MTs of proven deposits of this commodity, is available in the south central region of Belarus. The State Enterprise "Belarus Kali" enjoys complete monopoly on exploration and exploitation of potash mines (4 mines in operation at present and 5th mine is under development) in Belarus. Possibility to have some stake in the mines needs to be explored.

vi) Sourcing Phosphate & Potash from Jordan or setting up another JV project

In view of huge availability of phosphate resource, ample potash resource and availability of gas in Jordan, it would be in our interest to explore the possibility of setting up fertilizer/ fertilizer input manufacturing facilities along with long term offtake arrangement.

vii) Rock Phosphate from Togo

Togo, with an estimated reserve of about 130 million tonnes of rock phosphate and total annual production of 2 million MT per year, is a major source of rock phosphate. Import of rock from Togo to India is about 5-7 lakh MT per annum. IFFCO, GSFC, Godavari Fertilizers, RCF, etc., have used Togo rock. At present SSP industry in India is also using Togo Rock blending with other high quality rock. Togo is thus a prospective country for long term offtake of rock phosphate or to invest in the country in phosphatic project.

viii) Fertilizer resources from Egypt

It is estimated that Egypt has rock phosphate deposit of about 100 million MT. Some of its important mines are at Al-Qahirah and Sebaiya. Egyptian Rock Phosphate has 27% to 32% of P2O5, which is very amenable to all type of production process. India annually imports approximately 4.5– 5.5 lakh tonnes of rock phosphate from Egypt. Pursuing phosphatic as well as gas based Ammonia

Urea Project in Egypt or to enter into long term offtake agreement of rock phosphate at preferred price should be looked into.

ix) Rock Phosphate in Syria

Total reserves of phosphate rock are estimated to be of 1700 million tonnes with grade varying from 24% to 26% P2O5. Syria is thus another potential country for investments.

x) Ethiopia

It is learnt that Allana Potash Corp of Canada has found potash which return 23.7% Potassium Chloride (KCl) from the Kainitite Zone. There has been no previous drilling in this area and no resource has yet been calculated in this region but Allana considers that due to the consistent nature of the Kainite Zone and the continuity supported by drilling, there is strong potential to add additional resources for potash exploration in this region. Ethiopia may become a potential country for investment.

xi) Australia

Australia produces and exports ammonia (in aqueous solution). Australia also has estimated rock phosphate reserve base of about 1200 million MT (of which about 100 million reserve currently exploitable). It is important to explore rock phosphate assets in Australia so that long term availability along with preferred price can be assured.

xii) Latin America Region - Peru, Argentina, Brazil etc.

It is learnt that in Peru about 380 million tonnes reserves as 66% bone phosphate of lime (BPL) concentrate Phosphate rock deposits exist around 30 km from the Pacific Ocean near Bayovar Bay. It is estimated that Argentina has potash deposit of nearly 100 million MT. Rock Phosphate reserves are estimated at 250 million tonnes in Brazil. Possibility of acquisition/ JV/ sourcing at preferred prices needs to be explored on long term basis in this region.

xiii) Potash from Canada

One-fifth of Indian import of MOP is from Canada. Possibility of setting up joint venture projects in mining and off take of potash to India should be explored.

9.5.5 The mechanism of Joint Working Groups / Joint Commissions between India and host countries should be utilized to further such interests. There are also bi-lateral declarations at the highest levels for cooperation in fertilizer sector, e.g., India-Russia, India-Saudi Arabia, India-Qatar etc.

9.5.6 Many resource rich countries are not able to exploit their resources optimally due to infrastructure deficit in the field of port, rail and road facilities as well as availability of water etc. These countries expect investment from the interested parties to undertake infrastructure development/building. The Government of India has proposed a National Policy on Offsets/Counter Trade (Industrial Cooperation). Given the tight availability as well as volatility in the prices of fertilizer items, and keeping in view the long-term objective of food security of the country, there is need to facilitate entry of Indian entities into the ownership and sourcing of basic raw-materials like gas, rock phosphate and potash abroad. The National Offset Policy should provide for leveraging high value Government purchases in other sectors for gaining entry of Indian entities in acquiring assets abroad (e.g., mining of rock phosphate/potash or for obtaining long-term gas linkage from countries, which are having abundant resources of these items for setting up units for captive use). Such offsets should aim to secure access to the basic raw material as well as price advantage. The

9.5.7 Diplomatic efforts are required in acquiring assets abroad by way of active involvement of Government to seek fiscal concession from Host Countries through Bilateral Negotiation at Government level and to get raw material/feedback allocation for Indian companies. Fiscal support is required for acquiring assets abroad by way of encouraging Indian Financial and Export Credit Agencies for lending, on attractive/ sustainable rates of interest and setting up a common fund for exclusively lending to Indian companies venturing overseas.

9.5.8 Some countries have formulated strategy for acquiring raw materials abroad. Chinese construction firms are building Dams, Telecoms Networks, Railways, Hotels, Airports and other major infrastructure. In exchange, their companies are buying dozens of Oil and Gas Concessions/ Mining rights in African countries rich in natural resources but having inadequate infrastructure. India may also adopt such Model for acquiring raw materials abroad by targeting initially for gaining Goodwill thereby ensuring material supplies. Further, liberal financing is required for acquiring raw materials in such countries. A consortium of Government organizations may be formed to support acquisition abroad and through Government to Government route.

Some of the countries with proven reserves of raw material are as under:

S. No	Item	Reserves (Million Tonne)	
		Region	**Capacity/Reserves**
1	Rock Phosphate	China, Morocco, US, Russia, Brazil & Tunisia	Capacity – 203 Million Tonne in 2017
2	Phosphoric Acid	China, US, Morocco, Russia, Brazil, Tunisia, Saudi Arabia, South Africa,Jordan	Capacity – 39 Million Tonne (P2O5) in 2017
3	Sulphur	Canada, UAE,Qatar, Saudi Arabia, Russia & Kazakhstan	Brimstone Production- 51.6 Million Tonne in 2017
4	Muriate of Potash	Canada	Reserves – 75 Billion Tonne KCl

9.5.9 The following initiatives for acquisition of raw material assets abroad need to be supported.

- Availability of financial resources for raw material assets acquisition and creation of funds for the purpose. This is needed to avoid failure/reluctance of individual entities vis-à-vis risk involved, high cost of investment, etc.;

- Simplification of the existing guidelines/procedures for the same so that the Public Sector Undertakings also leverage opportunities of acquiring such assets in a competitive manner and at a speedy pace;
- Coordination and facilitation through a centralized agency so that an integrated approach is adopted by the Indian entities, in public –private partnership mode, if necessary, to avoid competing against the same asset abroad, which invariably would escalate the acquisition price. This is also necessary to acquire assets with a view to ensuring long term food and energy security, which might not be considered by individual entities. There is also the need to create information and data base about assets abroad so that based on feasibility, quick decisions are taken. Joint venture efforts for acquiring control on assets will also require involvement of a centralized agency.
- Mechanism and ways to acquire assets in host countries where the latter expects investment in infrastructure development;
- In view of initiatives by other countries to acquire raw material assets abroad and the tendency of countries rich in such assets not to let go their sovereign control on such assets, there is an urgent need to expedite action on acquisition;
- To accelerate the pace of acquisition, PSUs can be allowed to entertain proposals from various routes directly or indirectly subject to feasibility. To ascertain feasibility, due diligence can be done with the assistance of a panel of experts. This could be supplemented by independent financial and legal advice by another panel of experts. Empowering the PSUs belonging to Maharatna (Rs. 5000cr), Navratna (Rs. 3000cr) and Minratna (Rs. 2000cr) categories and others (Rs. 1000cr) to take decision of investment up to a specified amount (amount under bracket). PSUs can enter into either joint venture or procure assets stand alone. Board of the PSUs should have flexibility to take decisions and should ensure various requirements of representation, due diligence, selection of partners etc.
- The Empowered Committee of Secretaries comprising M/o External Affairs, M/o Finance, D/o Legal Affairs, D/o Public Enterprises, Planning Commission and the

Department/Ministry having administrative control over the PSU whose proposal is under consideration involving financial decisions exceeding the prescribed limit as mentioned above should recommend such decisions. The recommendation of the Empowered Committee then could be directly submitted to the CCEA for approval. The progress and performance of the projects oversees by PSUs can be monitored by the ECOS on acquisition of assets abroad.

9.5.10 In view of risk and huge cost involved, a fund with an initial corpus of US $ 5 billion should be set aside for acquisition of raw materials abroad. Assistance from the fund can be available to the PSU/s or a JV by consortium on recommendation of the CCoS. In case of assistance being as loan, it should be at subsidized rate. The modality of creation and operation of the fund can be issued by the Ministry of Finance. The policy guidelines to give effect to the above recommendations can be issued by the respective departments after approval of these recommendations by the competent authority.

9.6 In this regard in January 2008 Prime Minister constituted a group under the Chairmanship of Dr. V. Krishnamurthy, Chairman, NMCC (National Manufacturing Competiveness Council) to look in the reasons behind the sluggish growth of the manufacturing sector and to suggest the measures to ensure sustained high growth.

9.7 **Steps taken by the Department for secured supply of fertilizer materials to cater the need of the Country**

9.7.1 The Department has constituted an Inter-Ministerial Committee to leverage opportunities available in the other sectors towards fertilizer security through joint ventures or acquisition of assets in resource rich countries. The Committee includes the Secretaries or their nominee from Economic Affairs, D/Commerce, M/P&NG), M/Coal, M/Mines, Chairman (Railway Board). In the Inter-Ministerial Committee meeting held on possibility of Joint Ventures abroad to augment and

secure supply of fertilizers, it was decided that "Department of Economic Affairs / Ministry of Externals Affairs would consider leveraging line of credit being provided to various countries for bargaining and securing concession on pricing, acquiring lease or concessional rights in fertilizer sector and setting up of fertilizer projects. It was observed that following Lines of Credit were extended to fertilizer/raw material resources rich countries as detailed below.

(i) Govt. of Ethiopia	for US$ 166.2 Mn.
(ii) Govt. of Senegal	for US$ 25 Mn.
(iii) Govt. of Mozambique	US$ 20 Mn and 25 Mn.
(iv) Govt. of Syria	for US$ 25 Mn.
(v) National Bank of Uzbekistan	for US$ 10 Mn.

It appears a good option to leverage these lines of credit provided to above countries for bargaining and securing concession on pricing, acquiring lease or concessional rights in fertilizers sector in these countries. Therefore, details of the Lines of Credit given to various countries rich in fertilizer resources may be prepared.

9.7.2 The Committee of Secretaries (COS) held few meetings recently on the status of requirements of fertilizer resources for the country, the extent of import dependence and to explore possibility of joint ventures abroad to augment and secure supply of fertilizers including long–term off-take arrangement. The proposals discussed by COS include:

(a) Initiatives taken at Belarus, Russia, Ghana and Indonesia may be followed up on a sustained basis by DOF with the assistance of MEA.

(b) UVL may be strengthened on the lines of Petronet LNG LTD (PLL) or ONGC Videsh Ltd (OVL) by way of deploying personnel from respective PSUs, providing a back-up fund resource and providing some leverage to enter into direct negotiation with mine owners or gas suppliers.

(c) Country or Continent specific groups/committees of few members may be created to look into the credit line being offered by GOI for infrastructure or other projects.

(d) Enhancing Urea production within the country by allocating gas

(e) While effort to secure fertilizers resources abroad, to examine the possibility of augmenting mining of rock through indigenous sources

(f) Department of Fertilizers to be represented on all the JWGs with various fertilizer resource rich countries in order to leverage our bilateral cooperation in other fields

(g) As and when any opportunity of investment in fertilizer sector is identified, Government may provide necessary support and incentives including tax benefit, interest subversion and extending line of credit to the host nation. Government may also provide necessary support for building infrastructural facilities like road, rail, port etc. for facilitating the proposed JV.

(h) Based on available information on possible resources in developing countries, especially Africa region, preliminary investigations may be done to confirm the availability of rock phosphate and potash along with other vital resources. For such purpose, land acquisition for mining can be done in such countries on an understanding that complete exploratory work shall be conducted by agencies requisitioned by Government of India and on successful exploitation of mines, a profit sharing arrangement will be made between the two countries, subject to the condition that pre-agreed amount of minerals shall brought back to the country at a preferred rate.

9.8 Foreign investment in Indian Projects

While, Foreign Direct Investment (FDI) has flooded other industrial sectors in India, fertilizer sector has remained high and dry. The flow of FDI in the fertilizer sector, which needs massive investment in the coming years to expand domestic capacities, is very important to supplement the domestic investment. Foreign companies with vast experience in manufacturing customized fertilizer/ value

added fertilizers may be allowed to ventures with Indian manufactures for providing right fertilizer at appropriate time. Revival of closed urea units of Fertilizer Corporation of India Ltd. and Hindustan fertilizers Corporation Ltd is being planned by the Government. Role of foreign companies can be envisaged in such revival, especially is they are able to provide technology on alternate feedstock resources like coal gasification etc.

During 2010-11, India imported about 22 million tones of finished fertilizers, of which import of urea, DAP and MOP was of the order of 6.61, 7.41 and 6.36 million tones, respectively. In addition, the import of MAP, TSP and NP/NPKs was of the order of 188, 98 and 981 thousand tones, respectively. During 2010-11, the share of urea import to its total consumption was 24 per cent. In case of DAP, it was 68 per cent and MOP 100 per cent.

CHAPTER-X

10.0 REQUIREMENT OF RAW MATERIALS, INTERMEDIATES AND FEEDSTOCK

10.1 FEEDSTOCK REQUIREMENTS FOR UREA

10.1.1 The objective of Government's policy has always been to maximize indigenous production of nitrogenous fertilizers based on utilization of indigenous feedstock to reach self sufficiency levels. In sixties and seventies, naphtha, coke oven gas and natural gas had been the main feedstock for nitrogenous fertilizers. In eighties, naphtha (51.7%), fuel oil (19.6%), natural gas (13%) and coal (9.9%) were the main feedstock for production of nitrogenous fertilizers. Four fuel oil based ammonia-urea plants at Nangal, Bathinda, Panipat and Bharuch were also set up during 1978 to 1982. In 1980, two coal based plants were set up for the first time in the country at Talcher (Orissa) and Ramagundam (Andhra Pradesh). With associated and free gas becoming available from offshore Bombay High and south based basins, a number of gas based ammonia-urea plants were set up later on. In view of the limitations in availability of gas, a number of urea expansion projects taken up during 1990s were based on naphtha as feedstock with the flexibility of switching over to gas during availability. Over the years, natural gas occupied the key position of feedstock as the share of natural gas in nitrogenous fertilizers was 62% during 2009-10.

10.1.2 To increase investment in exploration activities, in 1994, Government of India (GOI) initiated awarding exploration fields to JVs and Private Companies. Panna-Muka-Tapti (PMT) Gas Fields are a result of this particular Government initiative. The New Exploration Licensing Policy (NELP) was launched by the Government for accelerating the pace of hydrocarbon exploration in the country. This is the first instance in the country's hydrocarbon exploration history that deep-water

acreages were offered for competitive bidding. The NELP – I demonstrated the positive response by National Oil Corporations and medium to small private companies, both Indian and foreign. A number of significant discoveries of oil & gas have been made in NELP Blocks by Reliance Industries Ltd. (RIL), Cairn India Ltd., GSPCL and Essar Oil Ltd.

10.1.3 At present, there are 29 urea units having a capacity of 211.5 lakh metric tonnes per annum (LMTPA). Out of these urea units, 21 nos. are natural gas based units, which account for 80.98 % (171.303 LMTPA), 4 naphtha based units, which account for 8.92% (18.861 LMTPA) and 4 FO/LSHS based units, which account for 10.10 % (21.375 LMTPA) of the production capacity. It is estimated that for gas based units, cost of feedstock accounts for about 60% of the total cost of production, whereas for naphtha and FO/LSHS based units, it is about 75% of the total cost of production. Feedstock-wise of capacity of urea is as follows:

Feedstock-wise capacity in terms of percentage			
Feedstock	**No. of units**	**Production capacity (LMTs)**	**% share**
Gas	21	171.303	80.98
Naphtha	4	18.861	8.92
FO/LSHS	4	21.375	10.10
Total	**29**	**211.539**	**100**

10.1.4 The subsidy on urea was paid on the basis of retention price cum subsidy scheme from 1977 onwards till March, 2003. The difference between the retention price (normative cost of production of fertilizers as determined by the Government plus 12% post tax return on net worth) and the notified sale price minus the distribution margin used to be paid as the subsidy to individual manufacturing units, in addition to freight subsidy. From April 2003 onwards, a group based New Pricing Scheme (NPS) was introduced with an aim to encourage efficiency

and reduce subsidy. Currently, Stage-III of NPS is under implementation with effect from 1st October, 2006 till 31st March, 2010, which has been extended till any other policy is notified.

10.1.5 The production of urea based on natural gas as feedstock is energy efficient and cheaper as is evident from the tables below:

Latest weighted average rates of concession for different groups of urea units based on continuing rates w.e.f. 1.10.2010.

Group	**Latest weighted average group concession rate (Rs./MT)**
Pre-92 Gas	8998
Post-92 Gas	9509
Pre-92 Naphtha	25722
Post-92 Naphtha	12603
FO/LSHS	22736
Mixed feed	9683
Weighted Average	**13410**
BVFCL-II (outside grouping)	13044
Overall Weighted Average	**13406**

Statement showing actual average energy consumption per MT of urea by manufacturing units based on NPS-III pre set norms during the year 2010-11.

Group	**Average energy consumption per MT of urea (G Cal)** Provisional
Pre-92 gas	6.437
Post 92 gas	5.510
Pre 92 naphtha	7.116
Post 92 naphtha	5.555
FO/LSHS	9.298
Mixed feed	6.228
Weighted Average	**6.480**
BVFCL-II (outside grouping)	15.636
Overall Weighted Average	**6.566**

* *post 92 naphtha and mixed feed urea units have converted to gas*

10.1.6 The following table shows the urea manufacturing capacity, the cost of production and share of subsidy for the year 2010-11 **based on continuing rates w.e.f. 01.10.2010**

Statement showing the Estimated Share of Production & Subsidy for the year 2010-11

Feedstock	**Capacity**		**Weighted average group concession rate**	**Percentage of subsidy**
	Lakh/MT	Percent	Rs./MT	(%)
Pre-92 gas	49.68	25%	8998	12%
Post 92 gas	55.18	28%	9509	15%
Total gas	**104.86**	**53%**	**9267**	**27%**
Pre 92 naphtha	28.17	14%	25722	35%
Post 92 naphtha	17.29	9%	12603	8%
Total Naphtha	**45.46**	**23%**	**20731**	**43%**
FO/LSHS	21.38	11%	22736	23%
Mixed feed	26.22	13%	9683	7%
Grand total	197.92	100%	13410	100%
BVFCL-II (outside grouping	2.4		13044	
Grand total	**200.32**		**13406**	

** post 92 naphtha and mixed feed urea units have converted to gas*

10.1.7 It may be observed that the urea produced with gas accounts for approx. 80% of the total production including mixed feed units and pre & post naphtha based units converted to gas and the share of total subsidy is around 55%. The remaining subsidy goes to the naphtha (4 units) and FO/LSHS units which accounts for only 20% of the production capacity. This is mainly on account of the high cost of naphtha and FO/LSHS. Presently, Urea manufacturing units uses various feed stocks e.g. APM Gas, PMT Gas (APM price), PMT Gas (PSC price), K.G. Basin Gas, RLNG, Naphtha, FO and LSHS. From 1st June, 2010, GOI revised the price of APM Gas from Rs. 3200 per MSCM at 10000 Kcal per SCM to US$ 4.2

per MMBTU. The following table indicates the comparative landed cost of various feedstocks utilized in the manufacture of urea:

Comparative price of various feedstocks

Name of feedstock	**Price (US $/MMBTU on NCV basis)** 1.4.2011
APM Natural Gas	5-6
RIL (KG D-6) Gas	4.2 (Ex Kakinada)
PMT Gas (APM price)	5-6
PMT Gas (PSC price)	7-8
R-LNG	10-11
Naphtha	30-35
FO	25-28
LSHS	25-28

10.1.7 In the above background, the cost of feedstock is clearly a major consideration in formulation of fertilizer policies. The present fertilizer policy is aimed at greater usage of NG/LNG. This is not only because NG/LNG is cleaner, cheaper and more energy efficient, but would also help in bringing uniformity in the industry and help to move towards a single urea price and decontrol. Accordingly, the policy stresses the need for conversion of naphtha and FO/LSHS based units to gas-based units, and also that the creation of new capacity through expansion, new projects (including revival of closed units), de-bottlenecking/ revamp/ modernization, should be based on NG/R-LNG.

10.1.8 From mid 1990s, due to the dwindling supplies of natural gas, even the existing gas based units were facing shortage of natural gas. The supply of domestic Gas further reduced from 2000 onwards. Against the total requirement of 33.01 MMSCMD of gas for the gas based Urea units, the actual average supply during 2004-05 was 23.79 MMSCMD only. With the commissioning of LNG terminal of Petronet LNG Ltd. and commencement of supplies of RLNG to consumers w.e.f.

1.4.2005, the gas based urea units along the HBJ pipeline received 7.775 MMSCMD of R-LNG during 2005-06 and the average actual supply of gas to urea units during 2005-06 increased to 28.483 MMSCMD. With the supply of R-LNG, the supply position of gas to urea units along the HBJ pipeline improved and the extent of usage of costlier substitute has come down, but the shortfall in the case of gas based units in Kakinada and Uran region continued to be acute.

10.1.9 The availability of Natural Gas to Urea Units improved w.e.f. March, 2009 after commencement of supply of Gas by Reliance Industries Ltd. (RIL) from K.G. Basin. Empowered Group of Ministers (EGOM) allocated 15.5 MMSCMD of Gas from K.G. Basin to Urea Manufacturing Units on first priority to meet the shortfall of Gas. With this allocation, the total availability of Gas to Urea Units increased to around 42 MMSCMD and there was no shortfall of Gas in existing Urea Units.

10.1.10 The production of Gas from K.G. Basin was ramped up to more than 60 MMSCMD in first quarter of 2010. EGOM allocated 60 MMSCMD of Gas to Fertilizer Sector, Power Sector, CGD and other Industries on firm basis and around 30 MMSCMD on fallback basis. It was the very first time the country witnessed supply of Gas out pacing demand. However, the situation could not sustain for long. The production of Gas from K.G. Basin started declining from 2nd quarter of 2010 and came down to below 60 MMSCMD in December, 2010.

10.1.11 Due to decline in production of Gas from K.G. Basin, the supply of Gas to fertilizer units was reduced on pro-rata basis by around 10% of contracted quantity since December, 2010. Subsequently, Ministry of Petroleum and Natural Gas issued a directive to RIL, the operator of K.G.-D6 Field that the Gas produced from K.G. D6 Field to be supplied to fertilizer units on first priority without any cut in supply. Since, May 2011, Fertilizer Units are being supplied their contracted quantity of Gas from K.G. Basin.

10.1.12 In 2009, Gas was allocated to the existing Urea units from K.G. Basin to meet their shortfall in Gas supply. Subsequently, the APM Gas supply to some of the units has reduced due to decline in production. Further, production capacity of some Urea units has increased after implementation of debottlenecking projects. Because of this, some of the units are facing shortage of Gas. At present, the availability of Gas to Urea Units is around 41 MMSCMD against their requirement of 43.14 MMSCMD.

10.1.13 Apart from the requirements for the existing gas based units, NG/LNG will also be required in the near future for other purposes as well, such as conversion of naphtha and FO/LSHS based units to NG/LNG, incentivising of existing urea units, setting up of new and expansion urea units and revival of closed urea units of Hindustan Fertilizer Corporation Ltd. (HFCL) and Fertilizer Corporation Ltd. (FCIL). Based on the proposals received for de-bottlenecking and expansion projects and if all the proposals for revival of closed urea units fructify and all non-gas based urea units convert to NG/LNG, then the total requirement of gas for the fertilizer sector by the end of XIIth Plan Period would be more than 100 MMSCMD.

10.1.14 The demand for natural gas by the fertilizer sector, which is already ahead of supply, is expected to increase significantly during the coming years. Besides satisfying the full demand from the existing gas based plants, additional gas would be needed to enable existing naphtha and fuel oil based plants to switchover to gas and also for additional/ new capacity to be created through de-bottlenecking, revamping and expansion. The anticipate increase in demand is from 45.72 million standard cubic meters per day (MMSCMD) in 2012-13 to 72.39 MMSCMD per day in 2016-17 based on the conservative estimates of supply of urea by 2016-17 through indigenous production.

Projected Gas Demand in the XIIth Plan Period - Urea Sector

Item	2012-13	2013-14	2014-15	2015-16	2016-17
Supply ('000 MT)	24,202	25,473	26,743	27,898	31,825
Natural Gas / LNG, mmSCMD	57.99 mmscmd (including for conversion & revamp projects)	60.39 (1 urea plant)	62.79 (1 urea plant)	65.19 (1 urea plant)	72.39 (3 urea plants)

(Conservative estimates)

10.1.15 The availability of APM gas supplied by ONGC and OIL from their nominated blocks is expected to decline in the coming years. At the same time, the availability of gas from domestic, Joint Ventures and private suppliers is likely to witness an appreciable increase. The total production of natural gas and availability including RLNG, during the terminal year of 12th Plan, i.e. 2016-17, is expected to be 247 MMSCMD and 373 MMSCMD respectively. The gas supply projections during the 12th Plan are indicated below:

Natural Gas Production Projection (12th five year plan) – (in MMSCMD)

Year	Total Domestic Production (A)	Import at LNG Terminals	Total Import (B)	Total Sales (A + B)
2012-13	**192**	52	**52**	**244**
2013-14	**198**	81	**81**	**279**
2014-15	**203**	99	**99**	**302**
2015-16	**239**	117	**117**	**356**
2016-17	**247**	126	**126**	**373**

- *Domestic production estimation is based on DGH projection up to 2017-18.*

The break-up of availability of gas from various sources is shown below:

Gas supply projections during XIIth Plan (MMSCMD)		
Sources	**2012-13**	**2016-17**
ONGC + OIL	83.90	111.50
Pvt./JVs (certified by DGH)	104.3	126.5
CBM	3.4	9.3
Total LNG supply	52.0	126
Total Projected Supply	243.6	373.3

Projected additional gas requirement for fertilizer industry, unit-wise, during 2012-13 to 2016-17 is at **Annexure-10.1**

10.1.16 As regards the question of availability of gas for fertilizer industry, the sector has been treated as priority sector along with power in the context of allocation of APM gas. For allocation of K.G. Basin Gas, fertilizer industry has been given first priority. In view of the need to increase agricultural growth to 4%, fertilizer needs to be seen as a strategic sector. Further, the subsidy on fertilizers, in overall terms, has already reached a level of more than Rs.50,000 crores in 2010-11 and with increasing demand which can be anticipated, growth in the subsidy level could be very significant. The only way in which increasing fertilizer production and managing the subsidy burden can be reconciled is by ensuring availability of gas for the existing and proposed projects in the fertilizer sector. One of the most important factor to be considered while deciding the priority of allocation of Gas is that fertilizer sector is the only sector which uses both the heat value and chemical components of Gas. All other sectors use only heat value of the Gas. Other sectors may use alternate fields e.g. Coal, Fuel Oil/LSHS

etc. whereas fertilizer sector has constraint to use alternate fuels. Therefore, fertilizer sector should be allocated Gas on priority.

10.2 CONNECTIVITY, AVAILABILITY AND PRICING OF GAS

10.2.1 Three elements come into play in respect of conversion of non-gas based units to gas viz. connectivity, supply and pricing of gas. In so far as connectivity and supply are concerned, the matter has been discussed in detail between DOF and Ministry of Petroleum & Natural Gas (MoPNG). Broadly, the 37 urea units can be placed in 5 categories, namely (a) 13 gas based units on the HBJ pipeline (b) 9 gas based units on other pipelines (c) 5 naphtha based units (d) 3 fuel oil/low sulphur heavy stock (FO/LSHS) based units (excluding GNVFC-Bharuch, which currently uses FO/LSHS as feedstock for urea but has gas connectivity) and (e) 7 closed units (excluding Korba) of HFCL and FCIL.

10.2.2 While connectivity already exists for the units in the first two categories, it is likely to be available in the next 3 to 4 years, in respect of other units (Naphtha/ FO/LSHS) too. Various entities have proposed to lay pipelines which will connect most of the fertilizer units to gas grid. However, progress of laying of pipelines is gradual. A statement indicating the unit-wise pipeline connectivity is at **Annexure-10.2.**

10.2.3 As per the existing guidelines, fertilizer sector has been given first priority for allocation of domestic Gas. The additional Gas available from domestic fields is being allocated to the existing fertilizer units. However, as per EGOM decision, Gas is not being allocated for planned new fertilizer projects, which is a major hurdle for setting-up new capacities. The new fertilizer projects, being high capital intensive projects, are not able to achieve financial closure without firm tie-ups for feed stock/fuel. To meet the future demand of fertilizers, Gas need to be allocated to new fertilizer projects from domestic sources on priority.

10.2.4 On the issue of pricing, MoPNG has expressed the view that while APM gas quantity will continue to dwindle, future gas requirement can be made available to fertilizer sector by various domestic/international gas producers only on market prices.

10.3 COAL GASIFICATION TECHNOLOGY

10.3.1 Coal Gasification Technology involves conversion of coal gas into synthesis gas. Synthesis gas derived out of coal gasification can be used for power generation, production of fertilizers, methanol, hydrogen etc.

10.3.2 Considering the uncertainty about the pricing and tenure of natural gas supply, DoF has explored the possibility of using coal gas through coal gasification route as an alternative feedstock. It is learnt that over 70% of Ammonia production in China is from coal using coal gas as feedstock and the cost of synthesis gas is approximately 20%-30% less than current level of cost of natural gas. It would be worthwhile to revive Talcher, Sindri and Korba units of FCIL, which are located in proximity to coal pitheads, especially in view of dwindling gas resources and increasing price of gas.

10.3.3 A consortium consisting of GAIL, Coal India Ltd. (CIL) and Rashtriya Chemicals and Fertilizers Ltd. (RCF) have planned to set-up a coal gasification project cum fertilizer project at Talcher at an estimated cost of Rs. 8000 crore. A coals block at Talcher Coalfields under the command area of Mahanadi Coalfields Limited (MCL), a subsidiary of CIL, has been identified for this surface-based coal gasification project. This coal block has a capacity of 5.5 million tonnes per annum and once washed, it will yield 3.7 million tonnes. The Gas so generated would be used for making urea and ammonium nitrate, one of the important explosives used by CIL. The fertilizer plant is expected to meet around 30 per cent of CIL's requirement of ammonium nitrate.

10.3.4 CIL had also planned an underground coal gasification project with Oil and Natural Gas Corporation (ONGC). The coal block identified for the coal gasification project is spread over an area of 4 sq km and it is located in the command of Eastern Coalfields Limited (ECL), a subsidiary of CIL.

10.3.5 The cost of Syn gas is expected to be less than the price of R-LNG and much less than that of naphtha and FO/LSHS. This would be of a major advantage for the fertilizer industry as it will result in availability of a cheaper feedstock derived from coal which is available within the country in abundant measure, more particularly in the eastern region. However, the capital cost of fertilizer plant along with coal gasification plant is substantially high around 1.8 times the capital cost of fertilizer plant on standalone basis. However, competitiveness of coal based urea fertilizer plants cannot be ascertained since no plant has yet come in to operation.

10.4 UNDERGROUND COAL GASIFICATION (UCG)

10.4.1 Underground coal gasification is a promising technology as it is a combination of mining, exploitation and gasification. The main motivation for moving toward UCG as the future coal utilizing technique is the environmental and other advantages over the conventional mining process. Some of these benefits include increased worker safety, no surface disposal of ash and coal tailings, low dust and noise pollution, low water consumption, larger coal resource exploitation and low methane emission to atmosphere. UCG is particularly advantageous for deep coal deposits and steeply dipping coal seams since at these conditions less gas leakages to the surroundings and high pressures favor methane formation.UCG is relatively well developed in countries like the USA, Russia, France, Spain and China. UCG operation in Chinchilla is the longest in duration and the largest outside Russia. The UCG technology was provided to Linc Energy by Ergo Exergy Inc. (Canada).

10.4.2 The main uses of the UCG product gas are:

1. Fuel gas used for electricity generation: The UCG operation is optimized to produce a high calorific value product gas for this purpose. The gas turbine (simple or combined cycle) and boiler plant (alone or as supplementary fuel) can be used for power generation.
2. Syngas for synthesis of chemicals or liquid fuels: The conditions in UCG operation may be manipulated to produce high hydrogen content in the product gas, typically a H_2: CO ratio of 2:1 is optimal. The syngas can be used for the manufacture of Ammonia.

10.4.3 India is the third largest producer of coal in the world. India has some of the largest reserves of coal in the world (approx. 267 billion Tonne) and a significant portion is deep underground. 81% of production is from open cast mines and 19% from underground mines. Indian coal is of bituminous, sub-bituminous and lignite type. The high ash content and poor quality of these coals leads to operational problems in industries. Hence, the consumption of coal is reduced. To utilize the vast coal reserves underground coal gasification is a promising technology. With a vast proven reserve of coal, India has the potential to use UCG technology to utilize coal effectively.

10.4.4 In the interest of development of UCG techniques on a fast track, it would be necessary to promote setting-up of demonstration-cum commercial UCG projects for utilization of deep seated coal and lignite deposits.

- The main constituents of the product gas from UCG is H_2, CO_2, CO, CH_4 and steam, which is suitable for the manufacture of hydrogen and chemicals such as ammonia, urea, methanol, acetic acid and so on.
- Underground coal gasification is a promising technology as it is a combination of mining, exploitation and gasification.

- UCG is the only feasible technology, which enables exploitation of deep (> 700m) coal reserves, which are not amenable to known conventional mining methods.
- An increased investment and proper exploitation, UCG can emerge as a probable source of gas in the country at competitive price.

10.4.5 Policy & Regulation: Grey Areas

- No existing act/regulation covers UCG development
- Present legal framework does not specify grant of Reconnaissance Permit (RP), Prospecting License (PL) or Mining License (ML) for lignite or coal mining for underground or surface coal gasification
- Area overlap: Coal/lignite areas suitable for UCG overlap the deeper oil & gas PELs
- Applications by companies other than PSUs for UCG blocks await clearance owing to the above reasons

10.4.6 Key Fiscal Recommendations Similar to CBM & NELP policies

1. Zero customs duty
2. Tax holiday of 7 years
3. No carried interest of the government
4. No upfront payments
5. Freedom for marketing and pricing of produced gas

10.5 COAL BED METHANE (CBM)

10.5.1 Coal bed Methane (CBM) is an environmental friendly clean fuel similar to Natural Gas and can also be used as feedstock in the manufacture of urea. CBM consists primarily of methane and is formed along with water during the process of coal formation. India has the world's fourth largest coal reserves with total available coal bearing area of 26,000 sq. kms. Of this, exploration has been initiated in 52% of the area while 12% have been offered for exploration in the fourth round of CBM bidding. Twenty six CBM contacts were signed for

exploration of CBM gas with estimated resources of about 1354.45 BCM. Out of total blocks offered, exploration activities have been completed in 18 blocks, commercial assessment in four blocks and development plan has been approved for three blocks and commercial production has been started in one block i.e. Rani Ganj (South) block in West Bengal since July, 2007. CBM gas production in January, 2010 was at the rate of 1,19,742 cubic metres per day. As of now, 250 BCM reserves have been established in 5 CBM blocks. In the fourth round of CBM Policy, Government has received 27 bids for 8 CBM blocks as against 10 offered blocks, from 19 companies including 3 foreign companies.

10.5.2 In the year 2009, RIL has established over 100 BCM of Gas reserves in its 2 CBM blocks in Sohagpur, Madhya Pradesh. The work of exploration is at various stages of progress. Once the blocks become operational, the revival of some of the closed urea units of FCIL and HFCL can be based on supplies of CBM from blocks located in state of Madhya Pradesh, Rajasthan and Gujarat.

10.5.3 **Ammonia-Urea plant based on Coal Bed Methane (CBM):**

Matix Fertilizers and Chemicals Ltd. is setting up a green field fertilizer complex with a capacity of 3 million ton per annum (MTPA) in Panagarh, West Bengal in a phased manner. In Phase 1, they are setting up a 1.3 MTPA single stream Ammonia Urea plant with integrated facilities. The entire production of the plant can be sold within a radius of 350 km in the states of West Bengal, Bihar, Jharkhand and Orissa. The plant will bridge the supply-demand gap in Eastern India which currently has a small production capacity. Coal Bed Methane (CBM) gas would be used as feedstock for the proposed Fertilizer Complex, in conjunction with Essar Exploration & Production Limited. This will be one of the world's largest single stream plants and the first with a feedstock supply made entirely of Coal Bed Methane (CBM) gas, which will be sourced from the Raniganj block, near Panagarh in West Bengal.

10.6 REQUIREMENT OF NAPHTHA

10.6.1 Consumption of naphtha for the production of urea from 2006 to 2011 is given below.

2006-07	1.980 Million MT
2007-08	1.689 Million MT
2008-09	1.803Million MT
2009-10	0.844 Million MT
2010-11	0.701Million MT

10.6.2 The consumption of naphtha for urea production reduced considerably after commencement of supply of K.G. Basin Gas from 2nd quarter of 2009. Naphtha is a very expensive feedstock for the production of urea. After the conversion of naphtha based urea units to Natural Gas, the requirement of naphtha for fertilizer industry will be nil. Year-wise demand of naphtha for fertilizer units during Eleventh Plan Period is given in Table.

Requirement of Naphtha

2012-13	2013-14	2014-15	2015-16	2016-17
0.85	0.85	0.50	-	-

10.7 REQUIREMENT OF FUEL OIL/LSHS

10.7.1 Consumption of fuel oil/LSHS during 2006 to 2011 years is given below.

2006-07	1.824Million MT
2007-08	1.641Million MT
2008-09	1.664 Million MT
2009-10	1.636 Million MT
2010-11	1.436 Million MT

10.7.2 During the course of last 10 years, there was a negative average growth rate in the consumption of FO/LSHS by the fertilizer sector. None of the new plants are

likely to be based on FO/LSHS as feedstock. The existing FO/LSHS based plants will be converted to Gas based plants by 3rd quarter of 2012. From 4th quarter of 2012, the consumption of FO/LSHS for production of urea has been assumed to be nil. Some quantity of FO/LSHS may be required as fuel in the existing boilers even after switchover to NG/LNG. But this quantity would be small (of the order of few lakh tonnes).

10.8 REQUIREMENT OF COAL

10.8.1 Apart from gas, Coal is an essential input for urea units as some of the urea units utilize coal as fuel for power and steam generation. Coal is a cheap source of fuel for the fertilizer units. The captive power plants have been installed by most of the units due to poor quality of grid power and frequent interruptions. There are 7 urea units namely IFFCO-Phulpur-I, NFL-Nangal, NFL-Bhatinda, NFL-Panipat, DIL-Kanpur, GNVFC-Bharuch and SFC-Kota which use coal in substantial quantity for power and steam generation.

10.8.2 The actual consumption of coal during 2007-08 to 2010-11 by fertilizer units is given in the table below:

S. No.	Year	Coal consumption (LMT)
1.	2007-08	29.18
2.	2008-09	28.65
3.	2009-10	29.68
4.	2010-11	32.61
5.	2011-12 (Est.)	34.87

10.8.3 Expected Requirement of coal by fertilizer units during 12th Five Year Plan is projected as follows:

S. No.	Year	Projected coal requirement (LMT)
1.	2012-13	31.26
2.	2013-14	27.74
3.	2014-15	27.80
4.	2015-16	27.80
5.	2016-17	27.80

Above projections exclude coal requirement by Greenfield unit being set up at Durgapur and three units of FCIL expected to be revived on coal gas route.

10.8.4 In case FCI-Talcher is revived on coal gas, then the estimated annual coal requirement for this unit would be approx. 60 LMT per annum.

10.9 RAW MATERIAL FOR DAP

A) ROCK PHOSPHATE

10.9.1 Self-reliance has been the key motivating factor behind the Five Year Plans. In the case of fertilizers this philosophy is constrained by the fact that even the raw materials required for their manufacture have to be imported as they are either not available in the country or available in insufficient quantities and are of inferior quality. Nevertheless, policy makers have aimed at domestic production of a substantial part of our consumption even if it was by using imported raw materials.

10.9.2 In case of phosphates, the paucity of domestic raw material constrains the attainment of self-sufficiency. At present, most of the indigenous rock is used in SSP Plants. The rock phosphate exploitable reserves in the country are limited and it is expected that the country will continue to depend upon imported rock phosphate for meeting its demand in the years to come. It is, however, required that survey and exploration on a large scale need to be carried out in this sector

for finding out new geological reserves of rock phosphate which can be mined economically in the increased price scenario. The indigenous production of Rock Phosphate during 2009-10 was 1.18 million tonnes and the imports were around 5.33 million MT.

Production and Import of Rock Phosphate during XIth plan period,(million MT)

Year	Indigenous Prod	Imported	Total
2007-08	1.54	5.24	6.78
2008-09	1.47	5.26	6.73
2009-10	1.18	5.33	6.51

B) SULPHUR

10.9.3 Sulphuric acid is an intermediate in the manufacture of P_2O_5 fertilizers. Small quantity of sulphuric acid is available as by-product in copper and zinc smelters. India does not have any reserves of sulphur and only moderate quantities of sulphur are available as recovered from the Oil and Gas Sector. Requirement of sulphur is imported from Iran, UAE, Saudi Arabia, Kuwait, Bahrain, Qatar etc.

C) PHOSPHORIC ACID

10.9.4 Global phosphoric acid capacity is forecast to increase by 9.2 million tonnes to 57.6 million tonnes P_2O_5 between 2010 and 2015. Expansions in China account for one-third of this increase. Close to 34 new acid units are planned for completion between 2010 and 2015, of which 15 would be located in China, 6 in Morocco and 3 in Saudi Arabia. On a global basis, the net addition to merchant grade acid capacity is estimated at 1 million tonnes P_2O_5, of which 0.86 million tonnes will come from two large stand-alone units in Tunisia and Jordan.

10.9.5 Approximately, 85% of the world production of phosphoric acid is for captive consumption and only 15% is traded in the international market. Out of the total trade of approximately 5 million tonnes of phosphoric acid (as P_2O_5), India

imports more than 2.5 million tonnes every year. It is found that the trade of phosphoric acid is not a free trade and more than 50% of the international trade is by way of long-term supply arrangements between the producers and the importers. It is evident that in case our country has to service the increasing demand of P_2O_5 through import of phosphoric acid, then the Indian companies need to participate in more joint ventures for production of phosphoric acid in phosphate rich countries, with long-term supply arrangements. Otherwise, any increase in Indian demand for phosphoric acid without corresponding increase in international trade of P_2O_5, will lead to sharp increase in international prices due to tight supply position.

10.9.6 The indigenous production of phosphoric acid remained stagnant during the 11th plan period with 1.16 million MT production in 2009-10 against 1.33 million MT in the terminal year of 10th plan. Production and import of phosphoric acid for the 11th plan period are given in the Table below.

Production and Import of Phosphoric Acid during XIth plan period,(million MT)

Year	Indigenous Production	Imported
2007-08	1.21	2.21
2008-09	1.20	1.58
2009-10	1.16	2.72

The total installed capacity for indigenous production of merchant grade phosphoric acid is 1.76 million tonnes and therefore, there is a substantial indigenous capacity, which is under utilised due to tight demand-supply position of imported rock phosphate and sulphuric acid. There is need to facilitate the fertilizer companies to source additional raw materials for 100% utilization of indigenous capacity during the plan period.

10.10 DAP

10.10.1 The increasing imports of DAP during last few years is shown in the following table

Years	DAP Import (MMT)
2005-2006	2.828
2006-2007	2.876
2007-2008	2.973
2008-2009	6.210
2009-2010	5.760
2010-2011	7.410

The import of DAP during the XIIth Plan period will depend upon increase in indigenous production of phosphoric acid, increased supply of imported phosphoric acid, better capacity utilization in IFFCO's plant at Paradeep, smooth production of phosphoric acid by the Senegal joint venture, etc. In the event of above improvements, it is likely that the import of DAP will stabilise during the plan period at around 1 to 1.5 million tonnes in 2011-12. However, if there is no further addition to indigenous production, the imports can go up further.

10.10.2 Due to constraints in raw material availability, the indigenous production has been decreasing, while imports have risen. However, with the estimated increase in production of phosphatic fertilizers, import of intermediates and raw materials is expected to grow significantly during the coming years. Imports of ammonia, phosphoric acid, rock phosphate and sulphur are expected to be 4, 2.07, 8.92, and 5.56 million tonnes, respectively, by the end of the Twelfth Plan. Estimated requirement of various inputs for fertilizer production are presented in the following Tables.

Raw Material Requirement

('000 Tonnes)

Fertilizer/ Input	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
DAP					
Supply (1000MT)	4,418	4,506	4,596	4,688	4,782
i) Ammonia(1000MT)	1,016	1,036	1,057	1,078	1,100
ii) Rock Phosphate (1000MT)	2,824	2,880	2,938	2,997	3,057
iii) Phosphoric Acid (1000MT)	1,272	1,298	1,324	1,350	1,377
iv) Sulphur(1000MT)	847	864	881	899	917
v) Sulphuric Acid (PA) (1000MT)	133	135	138	141	143
SSP					
Supply (1000MT)	3,743	4,117	4,528	4,981	5,479
i) Sulphur (1000MT)	321	353	388	427	469
ii) Rock Phosphate (1000MT)	2,171	2,388	2,627	2,889	3,178
i) Sulphuric acid (1000MT)	404	445	489	538	592
MOP					
Supply (1000MT)	0	0	0	0	0
NP/NPK					
Supply (1000MT)	9,227	9,873	10,564	11,303	12,094
i)Ammonia (1000MT)	2,214	2,369	2,535	2,713	2,903
ii) Rock Phosphate (1000MT)	2,510	2,685	2,873	3,074	3,290
iii) Phosphoric Acid (1000MT)	1,772	1,896	2,028	2,170	2,322
iv) Sulphur(1000MT)	4,706	5,035	5,387	5,765	6,168
Total Natural Gas/LNG MMSCMD	57.99	60.39	62.79	65.19	72.39
Total Ammonia (1000MT)	3,230	3,406	3,592	3,791	4,002
Total Rock Phosphate(1000MT)	7,504	7,953	8,438	8,960	9,524

Total Phosphoric Acid (1000MT)	3,044	3,193	3,352	3,520	3,699
Total Sulphur (1000MT)	5,874	6,252	6,657	7,090	7,555
Total Sulphuric Acid (1000MT)	537	580	627	679	735

Requirement of Raw Material/Intermediate for Fertilizer Production

('000 Tonnes)

Item	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**
Rock Phosphate					
- Indigenous	1,600	1,600	1,600	1,600	1,600
- Imported	5,904	6,353	6,838	7,360	7,924
Sulphur					
- Indigenous	2,000	2,000	2,000	2,000	2,000
- Imported	3,873	4,252	4,657	5,090	5,555
Ammonia					
- imported	3,230	3,406	3,592	3,791	4,002
Phosphoric Acid					
- Indigenous	1,343	1,410	1,480	1,555	1,632
- Imported	1,701	1,783	1,871	1,966	2,067
Sulphuric Acid					
- Indigenous	537	580	627	679	735

Annexure-10.1

Yearwise, Plantwise additional requirement of NG and pipeline connectivity								
S.No.		Name of the Unit						Pipeline status
	A	Naphtha based	2012-13	2013-14	2014-15	2015-16	2016-17	
1		ZIL-Goa	1.28	1.28	1.28	1.28	1.28	Dabhol - Gogak- Bangalore Pipeline (GAIL) - 2012
2		MCFL-Mangalore	1	1	1	1	1	Chennai - Tuticorin Pipeline (RGTIL) - Dec' 2012
3		SPIC-Tuticorin	1.66	1.66	1.66	1.66	1.66	Chennai - Bangalore- Mangalore pipeline (RGTIL) - Dec' 2012
4		MFL-Manali	1.54	1.54	1.54	1.54	1.54	Kakinada - Chennai pipeline (RGTIL) - Dec' 2011
5		FACT-Udyogmandal	0.94	0.94	0.94	0.94	0.94	Kochi - Kanjrikkod- Bangalore - Mangalore Pipeline (GAIL) - 2012
6		DIL-Kanpur	1.7	1.7	1.7	1.7	1.7	Adjacent to existing pipeline network
	I	Sub-Total of Naphtha based plants	8.12	8.12	8.12	8.12	8.12	
	B	Fuel-Oil Based						
7		NFL-Panipat	0.9	0.9	0.9	0.9	0.9	
8		NFL-Nangal	1	1	1	1	1	Dadri-Bawana-Nangal Pipeline (GAIL) in synchronisation with the commissioning of plant
9		NFL-Bathinda	0.9	0.9	0.9	0.9	0.9	
10		GNVFC-Bharuch	0.95	0.95	0.95	0.95	0.95	Already Connected
	II	Sub-Total of Fuel-Oil Based	3.75	3.75	3.75	3.75	3.75	
	C	Expansion Units						
11		IFFCO-Kalol	0.027	2.927	2.927	2.927	2.927	
12		IFFCO-Aonla	0.1	0.1	0.1	0.1	0.1	
13		IFFCO-Phulpur	0.3	0.3	0.3	0.3	0.3	
14		Kribhco-Hazira	0	2.2	2.2	2.2	2.2	
15		RCF-Thal	0	2.2	2.2	2.2	2.2	
16		CFCL-Gadepan	0	2.4	2.4	2.4	2.4	
17		TCL-Babrala	0	2.2	2.2	2.2	2.2	
18		IGFL-Jadgishpur	0	2.2	2.2	2.2	2.2	
19		KSFL-Shahjahanpur	0	2.22	2.22	2.22	2.22	
20		NFCL-Kakinda(AP)	0	2.4	2.4	2.4	2.4	Connected
		Sub-total of Expansion Units	0.427	19.147	19.147	19.147	19.147	
		Total of I+II+III	12.297	31.017	31.017	31.017	31.017	
	D	Closed Units						
21		HFCL-Durgapur	0	0	2.2	2.2	2.2	Jagdishpur Haldia Pipeline (GAIL) in synchronisation with the commissioning of plant
22		HFCL-Barauni	0	0	2.2	2.2	2.2	Same as above
23		HFCL-Haldia	0	0	2.2	2.2	2.2	Same as above
24		FCI-Ramagundam	0	0	2.2	2.2	2.2	Existing Kakinada - Hyderabad-Uran-Ahmedabad Pipeline (RGTIL)
25		FCI-Talcher	0	0	2.2	2.2	2.2	Kakinada - Haldia Pipeline (RGTIL)/ Coal Gas based
26		FCI-Sindri	0	0	2.2	2.2	2.2	Jagdishpur Haldia Pipeline (GAIL) in synchronisation with the commissioning of plant
27		FCI-Korba	0	0	2.2	2.2	2.2	Same as above
28		FCI-Gorakhpur	0	0	2.2	2.2	2.2	Same as above
		Sub-Total of closed units	0	0	17.6	17.6	17.6	
	E	REVAMP PROJECTS						
29		KRIBHCO-Hazira	0.8	0.8	0.8	0.8	0.8	Existing Pipeline
30		NFL-Vijaipur	0.6	0.6	0.6	0.6	0.6	Existing Pipeline
31		NFCL-Kakinada	0.6	0.7	0.7	0.7	0.7	
32		RCF-Thal	0.45	0.45	0.45	0.45	0.45	
		Sub total of Revamp Projects	2.45	2.55	2.55	2.55	2.55	
	F	GREEN FIELDS PROJECTS						
33		MATIX Fert. & Chem, Burdwan	4.2	4.75	4.75	4.75	4.75	
34		ZIL-Greenfield project-Belgaun	0	2.46	2.46	2.46	2.46	Dabhol - Belgaun - Bangalore Pipeline
35		DIL-Kanpur	0	4.6	4.6	4.6	4.6	
36		GSFC-Dahej	0	3.5	3.5	3.5	3.5	
37		GNVFC	1	1	1	1	1	
38		Oswal Chem & Fertilizers Ltd	2.4	2.4	2.4	2.4	2.4	
39		IFFCO-Nellore Fertilizer Project	0	0	3	3	3	
		Subtotal of Greenfield Projects	7.6	18.71	21.71	21.71	21.71	
		G. TOTAL	22.35	52.28	72.88	72.88	72.88	

Annexure-10.2

Pipeline Connectivity

	Name/Number of Plants	Pipeline	Connectivity	Expected Gas Supply (Year)
A	**Gas Based Plants on HBJ Pipeline**			
1	KRIBHCO - Hazira	On HBJ Pipeline	Existing	-
2	TCL - Babrala	On HBJ Pipeline	Existing	-
3	KSFL - Shahjahanpur	On HBJ Pipeline	Existing	-
4	IGL - Jagdishpur	On HBJ Pipeline	Existing	-
5&6	NFL - Vijaipur I & II	On HBJ Pipeline	Existing	-
7&8	IFFCO - Aonla I & II	On HBJ Pipeline	Existing	-
9&10	IFFCO - Phulpur I & II	On HBJ Pipeline	Existing	-
11&12	CFCL – Gadepan-I & II	On HBJ Pipeline	Existing	-
13	SFC – Kota	On HBJ Pipeline	Existing	-
B	**Gas Based Plants on other Pipelines**			
14 15	RCF, Thal RCF Trombay	Uran Sector	Existing	-
16&17	Kakinada – I & II	K G Basin	Existing	-
18&19	BVFCL, Namrup – II & III	North East	Existing	-
20 21 22	IFFCO, Kalol GSFC Vadodra GNVFC Bharuch	Gujarat Region	Existing	-
C	**Naphtha Based Plants**			
1	ZIL, Goa	-	Dabhol –Bangalore pipeline	2011-12
2	MCFL, Mangalore	-	Kakinada – Chennai – Mangalore pipeline	2014-15
3	FACT, Cochin	-	From Kochi LNG terminal	2012-13

4	SPIC, Tuticorin	-	Kakinada-Chennai-Tuticorin pipeline	2015-16
5	MFL, Chennai	-	Kakinada – Chennai pipeline	2014-15
D	**FO/LSHS Based Plants**			
1	NFL, Nangal	-	Dahej - Dadri	2011-12
2	NFL, Panipat	-	Dahej – Dadri/ Pipeline to Panipat	2011-12
3	NFL, Bhatinda	-	Dahej – Dadri / Pipeline to Bhatinda	2011-12
E	**Closed Units**			
1	FCI, Ramagundam	-	Spur on Kakinada to Uran via Hyderabad	-
2	FCI, Talcher	-	Coal Gasification	-
3 4 5 6 7	FCI, Sindri FCI, Gorakhpur HFC, Barauni HFC, Durgapur HFC, Haldia	-	Spurs from the following options: (i) Jagdishpur - Haldia (ii) Orissa Coast to Haldia & towards Gujarat	-

CHAPTER-XI

11.0 LOGISTICS AND INFRASTRUCTURE REQUIREMENT FOR MOVEMENT OF FERTILIZERS

11.1 With the increase in demand and corresponding supply of both domestic and imported fertilizers, rail traffic in fertilizers is projected to increase from 45 million tonnes during 2012-13 to 53 million tonnes during 2016-17. The development and maintenance of road transport will have to be substantially increased by way of widening and proper matting of road to withstand increasing load on the national and state highways which should be able to take high capacity trucks.

11.2 It is important to ensure the timely availability of wagons at ports during peak arrivals. Most ports face severe capacity constraints in handling high volumes on a sustained basis. Excepting Mundra port, no other port is currently able to handle with panamax vessels. With the movement by sea from the CIS countries and the US gulf increasingly being taken up through these large vessels, accepting and handling them at Indian ports has become a severe limitation. With increasing pressure of demand and faced with a static indigenous production capacity, it is only natural that imports would assume a significant role and as such there is an urgent need to review infrastructure capacities at ports for discharge and evacuation of fertilizers.

11.3 Port capacities need to be augmented. The existing facilities at present just about match the needs of the manufacturing units. In particular, special attention is called for at ports like Vishakhapatnam, Kakinada, Paradeep, Kandla, Mundra, etc. There is a pressing need for upgrading and modernizing the shore

support for achieving higher discharge rates through mechanical unloading and bagging facilities, raising the number and quality of barges at the anchorage ports and an increase in godown capacities. There is also an imperative need for creating facilities for handling panamax vessels at selected ports.

11.4 Facilities Available, Constraints and Remedies

11.4.1 Rail Transportation

a) Facilities

1) Total Route, kms	63327 km
• BG	49820 km
• MG	10621 km
• NG	2886 km
2) Total Track, kms	109996 km
• BG	1676 mm
• MG	1000 mm
• NG	762 mm & 610 mm
3) Railway Stations	6909
4) Stations open for goods rake handling	800+
5) Locomotive	8153
6) Wagons (29% covered / 47% open)	207719
7) Freight lifted daily	1.65 million

b) Constraints:

1) Congested bottleneck routes

2) Congested terminals

3) Bad condition of rake handling terminals:

- No paved circulating area for trucks,
- no lighting ,
- not enough covered sheds,
- no full rake length sidings

4) Shortage of covered Wagons

5) No User friendly Rules an d Attitudes

6) Transit hazards due to pilferage etc.

c) Remedies:

a) Own your Wagon Scheme

b) Engine on Load Scheme

c) Long-haul Trains

d) High Powered Locos

e) Electrification

f) Gauge Conversion / Doubling

11.4.2 **Road Transportation**

a) Facilities

• Total length of Indian Roads	3 Million kms
• Prime Arterial Routes (National Highways)	52000 kms
• Freight Traffic carried by NHs	40%
• Heavy Duty Trucks	22 Lakhs
• Light Duty Trucks	6 Lakhs
• Permissible Axle Loads	9-10 MTs

b) Constraints:

1) Poor riding quality of roads.

2) Weak and narrow culverts & bridges with insufficient clearance for movement of higher dimensional vehicle and the Octroi and Check Posts.

c) Remedies:

Plan to upgrade NHs with a provision of 4 to 6 lane highways connecting four metropolis cities. Require up gradation of 15000 kms of highways with an estimated expenditure of Rs. 20,000 crores.

11.4.3 **Transportation through Port**

1) Imported Fertilizer received in loose / bulk.

2) Ships berth alongside Wharves at major ports, bagged by mechanical arrangement & transferred by Conveyor belts to Railway Wagons or Trucks.

3) Ships anchor at outer sea bagging done manually and bags loaded into barges / boats which are carried to wharves by tugs or launches.

4) Input for Phosphatic /Potassic fertilizer mostly imported.

a) Facilities:

- Coastline : 6000 kms
- Ports : 11 Major & 139 Minor Ports
- 95% Cargo handled by major ports but 35% fertilizer handled by Minor ports.

b) Constraints:

1) Ships have to wait long for berthing.

2) Manual handling and poor labour productivity at berths.

3) Old type of equipment.

4) Draft Restrictions

5) Night navigation unavailable. Berthing by day time only.

6) Poor availability of Railway wagons & road trucks

7) Insufficient warehousing

8) Tardy procedure

c) Remedies:

1) Substitute manual work by mechanization.

2) Computerize operations

3) Additional Berths

4) Dredging for deeper draft

5) Improving road rail links streamline procedures

11.5 To ease the pressure on rail and roadways for movement of fertilizers to the consuming areas during the peak agriculture season, an alternate is to be looked into. The inland water transport provides necessary facilities like night navigation, suitability in transporting higher tonnage, economic and competitive rates to match with the railways etc., fertilizer can be moved through this system. For this purpose a composite study has to be made by the fertilizer companies and each company has to identify the bottleneck in usage of this system and the possibilities in overcoming them.

11.6 There are 3 National Waterways available as of now for movement of fertilizers which are NWW-1, Haldia-Allahabad (1620 km) (Haldia-Farakka: Farakka-Patna; Patna-Varanasi and Varanasi-Allahabad) through Ganga. NWW-2, Dhubri-Sadiya (891 km) through Brahmaputra and NWW-3, Kottapuram-Kollam (205 km) in the West Coast canal.

11.7 This mode of transportation would only supplement the rail and road movement during peak agronomic seasons and as such it has to be integrated with the road transportation for moving the material to be interior hinterland. Therefore to promote this multi model transportation, it would be necessary to indicate the tonnage for getting response of the private operator in respect to the competitive freight rates.

CHAPTER-XII

12.0 REVIVAL OF CLOSED UREA UNITS OF FCIL AND HFCL

Status of existing plants, location & infrastructure.

12.1 There are five closed units of Fertilizer Corporation of India Ltd. (FCIL) at Sindri (Jharkhand), Talcher (Odisha), Ramagundam (Andhra Pradesh), Gorakhpur (Uttar Pradesh) & Korba (Chhattisgarh) and three closed units of Hindustan Fertilizer Corporation Ltd. (HFCL) at Durgapur (West Bengal), Haldia (West Bengal), Barauni (Bihar). The major details of the various units of FCIL & HFCL are placed at **Annexure-I**. Government of India (GOI) decided to close these Units in the year 2002. These Units have huge infrastructure facilities like sizeable land bank, quarters, railway siding, tied up sources of electricity and water and the infrastructure facilities available at these Units are given at **Annexure-II**. These companies do not have secured liabilities. Further, these units don't also have any other major financial liabilities other than GOI loans and interest thereon and have virtually no liability towards manpower.

12.2 Further, all the units of the closed Companies have excellent infrastructure and they are strategically located near coal pitheads, ports or in the vicinity of proposed National Gas Grid. Moreover, there are no functional urea plants in the States of Bihar, Jharkhand, Chhattisgarh, Odisha and West Bengal and revival of closed units will ensure availability of fertilizer nearest to the consumption centers contributing to agricultural development in such areas.

Revival feasibility and participation of Public and Private Sector.

12.3 **Revival feasibility**:

(i) Given the lack of potash (K) and phosphate (P) in the country, self-sufficiency is focused on Urea (N). Further, there has been negligible

Urea capacity increase in the country over the last 10 years. As a result, the demand-supply gap has increased to more than 25% as compared to about 4% in 2003-04. It is estimated that even after successful debottlenecking as planned, projected gap by 2016-17 would be 9 million tonnes.

(ii) In addition, availability of huge tract of land and readily available infrastructural facilities at most of the units, saves a period of 2-3 years required for a Greenfield Project location.

(iii) Apart from setting up a Urea Plant, the locations and the quantum of land & infrastructure at these units seem to facilitate setting up of other industries.

(iv) Most of the concerned State Governments have provided 'Comfort Letters' agreeing to (a) extend the concessions available to mega industries; (b) provide supply of necessary quantities of water & power and (c) change in the use of the land, wherever necessary, to facilitate the revival.

(v) Most facilitating decision of GoI for revival is to agree 'in principle' to waive off GoI loan and interest to make the net worth of these companies positive, so that investments are attracted for the revival of these closed Public Sector Units.

(vi) The revival also does not envisage any fund infusion by GoI.

12.4 **Participation of Public Sector in the revival**

(i) The original intent of the Investment Policy envisaged revival of all the closed units of FCIL & HFCL by PSUs only, to avail 95% IPP. However, at a later stage, ECOS has been constituted to examine roadmap for investments through public sector as well as through private sector. Once the projects are initiated by public sector consortiums in few locations, the private sector will also have sufficient confidence to invest in various other locations.

(ii) the Department of Fertilizers had announced the Nutrient Based Subsidy (NBS) regime in P&K sector, which, inter alia, envisages the freeing of the MRP. Although at this stage, NBS is not implemented in Urea sector, but in the event NBS is implemented in Urea sector in future, after freeing MRP, if only private sector dominates (exists) in Urea manufacturing, there could be the possibility of domestic cartelization. Therefore, we need to have a judicious mix of PSUs and private sector in urea manufacturing. Therefore, it is crucial that the PSUs are operational in the country, so as to avoid internal cartelization under the nutrient-based subsidy regime, considering that the consumption of urea is nearly 55 % of the total fertilizer consumption in the country.

(iii) It is recommended by the Empowered Committee of Secretaries that the units which have definite proposals from public sector for revival, may be given on nomination basis, by offering 11% of the equity to FCIL/HFCL and land use through a Concessionaire Agreement.

12.5 Participation of Private Sector in the revival

(i) Gorakhpur Unit & Korba Project of FCIL and Durgapur, Barauni & Haldia Units of HFCL are proposed to be offered to private sector. Private sector is allowed to participate in the revival through a transparent bidding

process. They would have to pay an initial biddable 'upfront' fee and also have to bid for the 'revenue share' that they would pay to FCIL or HFCL, as the case may be.

(ii) A Concessionaire Agreement would enable usage of land and assets of the Unit for 33 years, extendable suitably later.

(iii) The 'upfront fee' in case of private sector and value of unusable items paid by PSUs in case of revival by PSUs would be used by FCIL & HFCL for the settlement of liabilities, other than GoI loan & interest.

12.6 Participation of Public Sector consortiums in revival of few closed units

i) Department of Fertilizers have received intent from the three Public Sector Consortiums for revival of three units of the Fertilizer Corporation of India Limited. ECOS has recommended revival of the following 3 units on nomination basis by the identified PSU Consortiums:

Unit	Identified PSU Consortiums
Sindri	SAIL and NFL
Talcher	Consortium of GAIL, Coal India and RCF
Ramagundam	NFL and EIL

ii) For each of the above units, a Special Purpose Vehicle (SPV)/ Joint Venture (JV) is proposed to be formed between FCIL and identified PSUs (lead shareholder), such that a minimum of 11% stake is held by FCIL, and combined stake of all PSUs remain at more than 51% at all times. FCIL's equity participation in the SPV/JV is proposed to be based on:

- Value of usable assets and other items (excluding land)
- Concession Fee for transfer of right to the SPV for use of land

iii) The proposal includes FCIL to retain a Board seat in the SPV and in case, due to any reason, if equity of FCIL needs to be diluted, the Company would always continue to have a Board representation to safeguard its rights on the land. Further, in order to speed up the process of settlement, the creditors are proposed to be settled from the receipt of the proceeds to be realized from sale/ transfer of unusable items/scrap items (at a value based on asset valuation) of Sindri, Talcher and Ramagundam units to the nominated (lead) PSU for revival. FCIL, subject to approval of BIFR/GOI, may transfer all unusable items/ scrap to the identified lead PSU, who in turn can sell these items through MSTC or utilize them.

12.7 Availability of feedstock and sourcing of feedstock

(i) The five closed units, namely, Sindri & Gorakhpur of FCIL and Barauni, Durgapur & Haldia of HFCL are located in proximity to the Jagdishpur-Haldia Pipeline.

(ii) Ramagundam Unit of FCIL is located close to the East-West Pipeline (Kakinada-Hyderabad-Uran-Ahmedabad Pipeline of RGTIL), which is already commissioned.

(iii) Talcher Unit of FCIL is proposed to be revived as a coal-based fertilizer unit along with Ammonium Nitrate Project by a consortium of RCF-GAIL-CIL (PSUs) and Coal India Limited (CIL) has agreed to supply the required quantity of coal.

(iv) EGoM has already decided that allocation of Natural Gas for the revival of the closed units would be given the highest priority, as & when the units become ready to receive the Gas.

12.8 Production in Eastern Sector to meet their requirements from fertilizer units in proximity

i) The overall demand-supply status of Urea in the country by the terminal year of XIth Five Year Plan and the XIIth Five Year Plan is estimated to be as

All quantities in million tons

Particulars	2008-09	2011-12	2016-17
a Demand	26.70	28.76	33.99
b Production	21.03	21.03	21.03
c Capacity Shortfall	5.67	7.73	12.96
d Proposed Revamp		2.56	2.56
e Projected Supply form OMIFCO		1.65	1.65
Projected Demand Supply Gap		**3.52**	**8.75**

ii) At present, there are no functional Urea plants in the States of Bihar, Jharkhand, Chhattisgarh, Orissa and West Bengal. The demand of Urea is being met by the producers from other regions, which also results in higher transportation costs. The commissioning of the Urea Plants in these States would make a favourable impact on the timely availability of Urea at all the Block-levels and improve self-sufficiency of the fertilizer in the region.

12.9 Proposed schedule of bidding process for revival of balance units

(i) After obtaining the approval of CCEA for the proposed Rehabilitation Scheme, it may take 3-4 months time to obtain the approval of BIFR for publication of bids in the newspapers. The activities involved are release of advertisement, pre-bid conferences, Investor queries, receipt of EoI, followed by short-listing of qualified bidders and finalization of bid pack.

(ii) At this stage, we may need to take the approval of ECOS to finalize short-listed bidders, followed by activities leading to receipt of bids and bid evaluation.

(iii) Selection of the Bidder and seeking the approval of ECOS/ GoI.

(iv) Final signing of the Concession Agreement and Financial Closure.

(v) Commissioning of the Urea Plant.

The Project Advisor has projected a tentative timeline of 7 months from the date of approval of BIFR till the finalization and approval of the selected Bidder, followed by a year's time for financial closure and a period of 36 months' for commissioning Urea Plant. However, considering a period of about 6 months for financial closure, a period of 4 years would be required, after the CCEA approval for the production of Urea to start. Thus, the production of Urea could commence at the best from 1st July 2015, assuming obtaining approval of CCEA by August 2011.

12.10 Worst case, most likely and best case scenario of revival, availability of urea in next four to five years period and reduction in import dependence.

The best case scenario of revival could be by PSUs on nomination basis, who can come forward immediately with fully tied-up financial proposals, so that the production may start by 1st April 2015 and in the worst case scenario, it could get extended up to 1st April 2016. However, assured Gas availability and attractive Investment Policy would speed up the revival process.

12.11 Role of various Government Ministries to make the revival process a success.

Government approvals/ clearances, if given in time, with respect to short-listing of qualified bidders and finalization of Bid Pack, evaluation of bids, final signing of Concession Agreement, etc., would make the revival process a success.

ANNEXURE - I

Major details of the Units of FCIL & HFCL

The Unit-wise major details of Fertilizer Corporation of India Ltd. (FCIL) and Hindustan Fertilizer Corporation Ltd. (HFCL) are as under:

a. FCIL

Name of Unit	Location		Date of commis-sioning	Date of shutdown	Land (acres)	No. of quarters
	District	State				
Sindri	Dhanbad	Jharkhand	1979	March, 2002	6652	6542
Gorakhpur	Gorakh-pur	U.P.	1969	1990	993	1301
Talcher	Angul	Odisha	1980	1.4.1999	890	1036
Ramagun-dam	Karim-nagar	A.P.	1980	1.4.1999	1284	1310
Korba	Korba	Chhattis-garh	Never commis-sioned	Not applicable	664	73 (Temp sheds)
Total			-	-	**10483**	**10262**

b. HFCL

Name of unit	Location		Date of commis-sioning	Date of shutdown	Land (acres)	No. of quarters
	District	State				
Barauni	Begu Sarai	Bihar	1976	1999	686	1378
Durgapur	Burdwan	West Bengal	1974	1997	785	1191
Haldia	Midnapore	West Bengal	Never commissi oned	Not applicable	250	1347
Total					**1721**	**3916**

ANNEXURE - II

Infrastructure Facilitées at FCIL

Unit	Utilities	Facilities Available
Sindri	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo-30,000 MT Urea Storage, 132 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 6,542 Quarters - 205 Bedded Hospital - 2 Community Centres - 12 Schools/ Colleges - 2 guest houses (40 rooms) - 81 km Road - 100 km Sewerage System
Gorakhpur	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo-35,000 MT Urea Storage, 132 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,301 Quarters - 50 Bedded Hospital - 2 Community Centres - 1 School/ College - Guest houses (37 rooms) - 92 shops - 36 km Road - 18 km Sewerage System
Talcher	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo-45,000 MT Urea Storage, 132 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,238 Quarters - 40 Bedded Hospital - 2 Community Centres - 3 Schools/ Colleges - Guest houses (50 rooms) - 113 shops - 17 km Road - 17 km Sewerage System
Ramagundam	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo-45,000 MT Urea Storage, 132 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,310 Quarters - 40 Bedded Hospital - 2 Community Centres - 2 Schools/ Colleges - Guest houses (23 rooms) - 20 shops - 12 km Road - 10 km Sewerage System
Korba	Project construction not taken up.	73 quarters (temporary)

Infrastructure Facilities at HFCL

Unit	Utilities	Facilities Available
Barauni	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo for Urea Storage, Coal Handling, 11 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,374 Quarters - 1 Hospital - 1 Community Centres - 2 Schools - 1 College building - 1 guest house (10 rooms)
Durgapur	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo-48,000 MT Urea Storage, Coal Handling, 11 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,191 Quarters - 30 Bedded Hospital - 1 Community Centre - 2 Schools/ Colleges - 2 guest houses (10 rooms) - 22 Shops - 12 km Road - 16 km Sewerage System
Haldia	Raw Water Pump House, Water Treatment Plant, DM Water Plant, Railway Siding, Bagging Plant, Silo for Urea Storage, Coal Handling, 11 KV Electric Sub-Station, Stores, Workshops, Training Center, Administrative Office, Fire Services	- 1,435 Quarters - 1 Hospital - 1 Community Centres - 2 Schools - 1 College building - 1 guest house (10 rooms)

CHAPTER-XIII

13.0 SUBSIDY ON FERTILIZERS –PROJECTIONS AND ISSUES

13.1 Chemical fertilizers play a significant role in the development of agriculture sector and successful management of food security concerns in the country. Since the land resource is finite and there are increasing food requirements, the only way forward is to sustain increase in agricultural productivity. The government has been pursuing policy conducive to increase availability and consumption of fertilizers to meet the objective of increased productivity and higher agricultural growth in the country. Fertilizer subsidy has been one of the important features of the fertilizer policy of Government of India. The objective of fertilizer subsidy has been to provide adequate fertilizers to farmers at affordable prices so as to induce consumption. The subsidy has been transferred to the farmers in the form of subsidized Maximum Retail Prices (MRPs) of a basket of fertilizer products.

13.2 The Department of Fertilizers (DOF) provides subsidy to fertilizer manufacturers/importers equivalent to the gap between the normative delivered costs of subsidized fertilizers and the notified selling prices (MRPs) at the farm gate level. The fertilizers currently covered under the subsidy regime are Urea, Di Ammonium Phosphate (DAP), Muriate of Potash (MOP), Mono Ammonium Phosphate (MAP), Triple Super Phosphate (TSP), Ammonium Sulphate (AS), Single Super Phosphate (SSP) and complex fertilizers.

13.3 Urea, which is the main nitrogenous fertilizer, is under statutory price control. The subsidy on urea was paid on the basis of retention price cum subsidy scheme from 1977 onwards till March, 2003. Under the retention price, the normative cost of production of urea inclusive of a post tax return of 12% on equity was

determined separately for each unit based on its project cost and efficiencies of production. From April 2003 onwards, a group based New Pricing Scheme (NPS) was introduced with an aim to encourage efficiency and reduce subsidy. Currently, Stage-III of NPS is under implementation with effect from 1st October, 2006.

13.4 Under NPS III, the existing urea units are divided into six groups based on vintage and feedstock. The units within a group are allowed the group average concession price updated up till March 2003, or their own concession price, whichever is lower. The energy efficiency is allowed as per the pre-set energy norms which are based on best achieved energy levels up till March 2003. The cost of fuel / feedstock is completely pass-through under the subsidy regime. The fixed costs, which include conversion costs, market & distribution costs etc. remain fixed for the whole pricing period for each Unit. These costs have wide variations interse within the Units due to varying vintage and depreciation levels. The fuel / feedstock cost however, have risen sharply with the rising prices of energy basket (Gas, LNG, Fuel Oil, Naphtha etc.) leading to sharp increase in cost of production and consequently subsidy. The process of costing under the existing regime involves each and every parameter of cost of production based on historical data provided by the Units.

13.5 Phosphatic and Potassic Fertilizers were also part of the retention price cum subsidy scheme from November, 1977 till 24th August, 1992. The price and movement control over these fertilizers was completely withdrawn with effect from 25th August, 1992, based on the recommendations of a Joint Parliamentary Committee. As a result, the farm gate price of these fertilizers increased sharply leading to perceptible decline in its consumption. Keeping in view the need for balanced application of all nutrients (N, P & K), an ad-hoc concession scheme was introduced with effect from October, 1992. The ad-hoc subsidy on sale of these fertilizers was made available by the Central Government through the

State Governments, who were also mandated to fix the selling prices within the State. From April, 1994 onwards, disbursement of subsidy to manufacturers / importers was made directly by the Central Government, on receipt of certification of sales from the State Governments. The above arrangement was further modified in April, 1997, with Government of India fixing uniform Maximum Retail Prices (MRPs) of these fertilizers under the concession scheme. The ad-hoc subsidy under the concession scheme was also changed to normative cost of production based subsidy with effect from April, 1999 onwards. A nutrient based subsidy policy has been introduced in phosphatic and potassic sector w.e.f 1.4.2010 with the objective of curtailing subsidy payout and balanced fertilization, wherein subsidy per kg of nutrients N,P,K & S are fixed by the government for the year in consideration and retail price has been freed.

13.6 One of the major concerns pertaining to fertilizer sector is the increase in fertilizer subsidy in recent years. The quantum of fertilizer subsidy is a function of consumption of fertilizers, the normative delivered cost of fertilizers and the notified selling prices of fertilizers. The requirement of fertilizer subsidy in last few years has risen sharply as can be seen from the table below:

Fertilizer Subsidy,

(Rs.in Crores)

Years	UREA			P&K			Total subsidy disbursed/ due
	Urea - Indigenous - Subsidy	Urea - Imp- Subsidy	Urea - Total- Subsidy	Indigenous (P&K)- Subsidy	Imported (P&K)- Subsidy	Total (P&K)-Subsidy	
2005-2006	10653	2141	12793	4499	2097	6596	19390
2006-2007	12650	5071	17721	6648	3650	10298	28019
2007-2008	16450	9935	26385	10334	6600	16934	43319
2008-2009	20969	12971	33940	32957	32598	65555	99495
2009-2010	17580	7000	24580	16000	23452	39452	64032
2010-2011	15081	9256	24337	20650	20850	41500	65837
2011-12(Est)	18775	10575	29350	27410	28084	55494	84844

13.7 The increase in fertilizer subsidy has been partially due to increase in consumption of fertilizers and mainly due to sharp increase in price of fertilizer inputs and finished fertilizers leading to increase in normative delivered cost of subsidized fertilizers at farm gate level. It is estimated that only approx. 15% increase in subsidy beyond 2005 is due to rise in consumption of fertilizers. The remaining approx. 85% has been due to the increase in international prices of fertilizers and its consequent impact on delivered cost of subsidized fertilizers at farm gate level, all of which has been absorbed in the form of increased subsidy.

13.8 The increase in Indian imports and the tight demand supply position of fertilizers in the international market has led to a sharp increase in international prices of fertilizer inputs and finished fertilizers over last five years.

Lakh MT

Import of straight fertilizers			
Years	**Urea**	**DAP**	**MOP**
2005-2006	20.56	28.28	45.29
2006-2007	47.19	28.76	34.48
2007-2008	69.28	29.73	44.21
2008-2009	54.09	62.1	53.46
2009-2010	52.09	57.6	49.08
2010-2011	66.09	76.97	45*

** for Agri Use*

13.9 The increase in international priced of fertilizers and raw materials has been particularly steep in 2008-09 over 2006-07, in some cases being more than 200% viz., 440% in Sulphur, 381% in MOP, 376% in Rock Phosphate and 221% in Phosphoric Acid. The international prices fell down in the year 2009-10 but gradual increased in the year 2010-11 and from April 2011 are on the rise more steeply as can be seen from the table below:

Price Trend in International market as per Fertilizer Market Bulletin (FMB)

USD/MT

Month	DAP	MOP	Urea	Phos acid	Ammonia	Sulphur	Rock
US $	C&F US	FOB	FOB	India C&F	C&F	C&F	C&F
2006-07	342	171	270	461	304	76	79
2007-08	658	263	341	566	342	324	158
2008-09	911	824	496	1480	454	412	377
% increase 2008-09 over 2006-07	166%	381%	83%	221%	49%	440%	376%
2009-10	404	515	279	633	303	95	149
2010-11	**589**	**358**	**324**	**791**	**402**	**172**	**161**
%increase in 2010-11 over 2006-07	**72%**	**109%**	**20%**	**71%**	**32%**	**125%**	**103%**
2011-12							
Apr-11	664	438	343	980	507	234	169
May-11	659	438	404	980	510	235	193
Jun-11	681	463	496	980	527	243	195
Jul-11	702	463	508	1050	530	232	178
%increase in Jul' 11 over 2006-07	**105%**	**170%**	**88%**	**128%**	**74%**	**204%**	**125%**

13.10 In order to check the rising subsidy levels, MRP of urea was increased by 10% w.e.f 1.4.2010 while nutrient based subsidy was introduced in phosphatic and potassic sector. However, due to steep rise in international prices of raw material and fertilizers, especially in phosphatic and potassic sector which is understood to be cartelized as the resources are limited and exist in few countries, has led to continuous increase in subsidy payout to the extent of about 2% of GDP. Even introduction of Nutrient Based Subsidy in Phosphatic & Potassic sector has not given the appropriate dividend as the subsidy payout has risen and so has the retail price levels. It has been a loose – loose scenario for the Government as well as the farmers. The trend of retail prices of various fertilizers can be seen from the following table:

Statement showing the MRP of fertilizer w.e.f 1.4.2007 onwards (in Rs. Metric Tonne)							
Sr. No.	**Grade of Fertilizer**	**MRP during 1.4.2007 to 17.6.2008**	**MRP during 18.6.08 to 31.3.2009**	**MRP during 1.4.2009 to 31.3.2010**	**MRP from 1.4.2010 (kharif 2010)**	**MRP during Rabi 2010-11**	**MRP during Kharif 2011 as per FMS**
1	DAP (Indigenous)	9350	9350	9350	9950	10750	11765/12500
	DAP (Imported)	9350	9350	9350	9950	9950	12000
2	DAP Life (Introduced w.e.f. feb 2011)	---	---	---	----	Not yet in the Market	--
3	MAP	9350	9350	9350	9950	10750	--
4	MOP	4455	4455	4455	5055	5055	6000/6064
5	TSP	7460	7460	7460	8060	8860	--
6	SSP	3400	4600	4600	3200	3200	4200
7	16-20-00-13	7100	5875	5875	6475	7800	9466/9645
8	20-20-0-13	7280	6295	6295	6895	8216	9803/10488
9	20-20-00-00	7280	5343	5343	5943	7995	7500/9861
10	23-23-00-00	8000	6145	6145	6745	7445	--
11	24-24-00-00 (Introduced w.e.f. 1.10.2010)	--	---	---	----	Not yet in the Market	10000
12	28-28-00-00	9080	7481	7481	8281	11628	11577/11810
13	10-26-26-00	8360	7197	7197	7897	9256	10458/10910
14	12-32-16-00	8480	7637	7637	8337	9568	11200/11313
15	14-28-14-00	8300	7050	7050	7650	7650	----
16	14-35-14-00	8660	8185	8185	8785	10296	11272/11622
17	15-15-15-00	6980	5121	5121	5721	7121	8200
18	15-15-15-09 (Introduced w.e.f. 1.10.2010)	---	---	---	---	Not yet in the Market	8000/9300
19	17-17-17-00	8100	5804	5804	6404	6404	---
20	19-19-19-00	8300	6487	6487	7287	7287	---
21	16-16-16-00 (Introduced w.e.f. 1.7.2010)	---	--	---	6560	7100	---
22	Ammonium Sulphate	---	10350	10350	8500	7800	7000/7900
23	Urea	4830	4830	4830	5310	5310	5310

13.11. Subsidy projections – As discussed above, the subsidy payout has been rising mainly due to increase in international prices of fertilizers and raw material. It is also true that the country shall remain dependent on 100% import of MOP in times to come, largely dependent on imports of phosphatic fertilizers, rock phosphate, sulphuric acid, phosphoric acid etc due to constraints in its indigenous availability and also to an extent on imports of hydrocarbon for manufacturing nitrogenous fertilizers. Since there has been sharp increase in international prices from the year 2008 onwards, CAGR from year 2006-07 to 2011-12 (Est.), 2007-08 to 2011-12 (Est.) and 2009-10 to 2010-11(Est.) has been calculated. The CAGR from 2008-09 to 2011-12(Est.) has been left out as the year 2008-09 was exceptional year when the international prices sky rocketed and thereafter came down in next year and have been showing growing trend thereafter. Even if 50% of the average of CAGR for these periods is considered, it is estimated that the subsidy payout in the year 2016-17 compared to that estimated in 2011-12 shall go up by at least 59%.

Fertilizer Subsidy,							
(Rs.in Crores)							
Years	UREA			P&K			Total subsidy
	Urea - Indigenous - Subsidy	Urea - Imp- Subsidy	Urea - Total- Subsidy	Indigenous (P&K)- Subsidy	Imported (P&K)- Subsidy	Total (P&K)- Subsidy	
2006-2007	12650	5071	17721	6648	3650	10298	28019
2007-2008	16450	9935	26385	10334	6600	16934	43319
2008-2009	20969	12971	33940	32957	32598	65555	99495
2009-2010	17580	7000	24580	16000	23452	39452	64032
2010-2011	15081	9256	24337	20650	20850	41500	65837
2011-12(Est)	18775	10575	29350	27410	28084	55494	84844
CAGR 2006-07 - 2011-12	8.22%	15.83%	10.62%	32.75%	50.39%	40.06%	24.81%
CAGR 2007-08 - 2011-12	3.36%	1.57%	2.70%	27.62%	43.62%	34.55%	18.30%
Exclude 2008-09- exception year							
CAGR 2009-10 - 2011-12	3.34%	22.91%	9.27%	30.89%	9.43%	18.60%	15.11%
50% of Average of CAGRs Calculated	2.49%	6.72%	3.76%	15.21%	17.24%	15.53%	9.70%
Projected Subsidy							
2012-2013	19242	11286	30455	31579	32926	64114	93076
2013-2014	19720	12044	31602	36382	38603	74074	102107
2014-2015	20211	12853	32791	41915	45259	85580	112014
2015-2016	20713	13717	34026	48290	53062	98874	122882
2016-2017	21228	14639	35307	55635	62211	114233	134805

13.12 In view of above, there is an urgent need to rationalise fertilizer subsidy and at the same time induce fertilizer industry to grow in order to meet the increasing requirement of fertilizers in the country. We need to look at various alternatives and draw upon the international experiences in this sector to review the existing subsidy regime without impacting the agriculture growth and productivity. Currently, the subsidy is available to all agriculturists irrespective of the fact whether they are practicing subsistence or commercial farming, growing food grains or cash crops etc. Moreover, the increasing subsidy is not resulting in commensurate increase in food production.

13.13 It is a pertinent question that how subsidy payout can be reduced. It can be reduced either by fixing the subsidy at particular levels every year and freeing the retail price, it can get reduced if the consumption drops or the international prices fall or by targeting the subsidy to only to small and marginal farmers. In phosphatic & Potassic sector, the subsidy is being fixed every year and the retail prices have been freed, however, it has also not resulted in lowering of subsidy payout as the international prices have risen steeply and to keep the fertilizers at affordable levels the subsidy on fertilizers have also been increased. Though, the reduction in consumption for fertilizers can definitely lead to reduction in subsidy, but the same may also impact agricultural production leading to significant food deficiencies and resultant food imports. Rather, there is a need to further increase consumption of fertilizers in order to increase the agricultural productivity, which is also currently much below the best international benchmarks. Thus, reduction in consumption of fertilizer in the country is not desirable. It is important to increase nutrient uptake efficiency of fertilizers through balanced fertilization, application of micro & secondary nutrients and provision of timely irrigation facilities which can provide a way out, wherein the lower level of consumption of fertilizers can be more than made good through more efficient nutrient uptake. The international prices of fertilizers vary according to international demand and supply scenario. Since the fertilizer resources especially phosphatic and potassic, are concentrated only in a few countries, the international market for these commodities is far from perfect. Any marginal increase in demand for fertilizers / fertilizer inputs can trigger sharp increase in international prices. It is, therefore, necessary for the country to gain a significant foothold in the international fertilizer sector through strategic investments by Indian entities in resource rich countries abroad.

13.14 Under current dispensation, subsidy is available to all consumers of fertilizers at a uniform rate per tonne of fertilizer. The advantage of subsidy is more to the large and medium farmers (21.6 million holdings with 94.2 million hectares of land) who consume more fertilizers as compared to small and marginal farmers

(107.6 million holdings with 65.1 million hectares of land). Moreover, the advantage of subsidy remains more with the farmers growing cash crops, horticulture products or the agricultural products allowed to be exported at international prices. In respect of crops where the output price is also controlled, the advantages of subsidy do not accrue to such farmers. There is need to explore the feasibility of targeted fertilizer subsidy, which is available to a targeted group of farmers like small and marginal farmers etc. The targeting of subsidy can be done by making available subsidized fertilizers only for small and marginal farmers through the existing public distribution network meant for subsidized foodgrains. Alternatively, all farm holdings can be provided with fixed amount of subsidized fertilizers every year irrespective of the land holding size. The remaining requirement will have to be sourced by the farmers from the open market. The quantities can be decided based on requirements of an average land holding size for small and marginal farmers. Subsidy can also be provided directly to the farmers through smart cards issued to each consumer of fertilizer in the country.

13.15 The proposed subsidy framework - Direct Subsidy to farmers

i) Presently, the fertilizer subsidy is given by the Government to the manufacturer/importer directly. To address the current challenges in the subsidy framework it is proposed that a phase approach to reform the subsidy disbursement mechanism be adopted. A task force headed by Shri Nandan Nilekani has been set-up to work out the modalities for the proposed system of direct transfer of subsidy for fertilizers. The Task Force has submitted the Interim Report in June 2011 with a detailed plan of action for the pilots for an implementable solution.

ii) In the Interim proposed framework, the subsidy is planned to be provided to the retailers and ultimately to the intended beneficiaries (farmers). It is proposed to be done in 3 phases:

Phase I : Information visibility till the Retailer

iii) The objective of this Phase is to create information visibility of the movement of fertilizers along the supply chain from the manufacturer till the retailer. National Informatics Centre (NIC) has been mandated with the task of systems implementation support. The existing FMS will be used to map the process flow till the dispatches to the wholesaler. The constraints in the implementation include, inter-alia, the linking of over 2.3 lakh retailers across the country, varying levels of connectivity, technical prowess, financial capacity, physical capacity and storage capacity among the retailers, as also multiple sources of fertilizers.

Phase II: Subsidy Payment to Retailer

iv) In the interim stage, it is envisaged that the subsidy will be released to the retailer when he receives the fertilizer. This will involve transfer of subsidy directly to the retailer's bank account on receipt of fertilizer from the wholesaler. It was recognized that this phase would have the advantage of the fertilizer moving at the full value across the supply chain upto the retailer. This stage will also provide crucial lessons for a smooth switch over to the next phase of direct transfer of subsidy to the intended beneficiary, which is much more complex due to the scale as well as the eligibility issues involved. This phase is dependent on linking the retailers to the core banking network. This will also involve, inter-alia, the need to look into the payment procedure adopted will be electronic, non-repudiable, credible, and auditable and will not require extra development of manpower. The primary challenges in this phase would include increase in working capital requirements for stakeholders across the supply chain, increased credit requirement, space constraints at the retailer level, who now becomes the primary stockiest, credit rating of retailer that may affect disbursal of subsidy and therefore, supplies to famers, issues in automated payment of subsidy, probable amendment of financial payment rules in Government and linkages with the core banking system for the retailers. The DOF has been mandated

to address these challenges in a time bound manner with various stakeholders in government as well as outside.

Phase III: Subsidy Payment to Farmers

v) It is envisaged that the subsidy disbursement to the farmer can be done directly into the bank accounts of the intended beneficiary. However, this phase would require that the eligibility of an intended beneficiary is clearly mandated by the Government It is proposed to be done in two phases: (i) Information flow on sales to individual farmers and (ii) Transfer of subsidy to farmers (intended beneficiary). The Government has submitted that Phase-I would be accomplished by December 2011 whereas Phase-II is expected to be implemented by June 2012 and a decision on Phase-III could be taken based on the experiences of implementation of the first two phases.

vi) The pilot for Phase-I includes field testing applications in selected locations in Odisha, Rajasthan, Tamil Nadu, Assam, Maharashtra and Haryana in October-November, 2011. The pilot for Phase-II will be undertaken in the first half of 2012 while for Phase-III pilots will depend on the stabilization of Phase-II as well as clarity with respect to the eligibility norms for the intended beneficiaries. The learning from the Pilots would be examined to decide on the final strategy with respect to direct transfer of subsidies to the intended beneficiary. A decision on Phase-III could be taken based on the experiences of implementations of the first two phases.

CHAPTER-XIV

14.0 TECHNOLOGICAL AND R&D ISSUES RELATING TO FERTILIZER INDUSTRY

Indian fertilizer industry has kept pace with technological development with upgradation and utilization of better feedstock. It is comparable to the best in the world in terms of efficiency, capacity utilization, energy consumption and utilities like power and water. Domestic fertilizer industry has established strong distribution network throughout the country and has developed skilled manpower. The industry has been proactive in development and propagation of new and more appropriate grades of fertilizers. It has introduced innovative, coated and fortified fertilizers, crop specific and location specific customized fertilizers and specialty fertilizers to improve fertilizer use efficiency and improve agricultural productivity to enhance income of the farmers.

14.1 Ammonia Plants

Almost all the fertilizer producers in the country (ammonia-urea complexes), have implemented energy saving measures, and, are producing urea with minimum possible energy consumption. Sizeable numbers of fertilizer complexes of older vintage have adopted energy saving measures and are operating with lower energy consumption, which are economically viable. In the process, almost all energy saving measures available to-day and are being practiced worldwide, have been implemented in the Indian plants. The type of energy saving measures have been adopted in the ammonia-urea complexes, on a case to case basis, befitting the technology, plant conditions, vintage, etc., prevailing in various plants.

(a) The energy saving measures which have been already implemented in the Indian plants, are as follows:-

i) Replacement of existing combustion air preheater with new PLATE & FRAME air preheater, in convection section of primary reformer.

ii) Installation of additional coil bank in convection section, for bringing down flue gas temp. exit ID Fan, from 170°C-180°C to around 150°C.

iii) Use of superior material namely, microalloys for catalyst tubes in primary reformers.

iv) Lowering of steam/carbon ratios in primary reformer.

v) Use of Gas turbine drive for process air compressor.

vi) Energy recovery by reducing fuel NG pressure from plant inlet battery limit pressure of supply NG.

vii) Changing of steam turbine drives to electric motor drives, in plants with in-plant power generation through GTG sets.

viii) Adopting / changover to energy economic CO_2 removal processes, like GV-Glycine, or BASF aMDEA process.

ix) Installation of Guard Bed upstream of main L.T. Shift conversion reactor.

x) Installation of parallel L.T. Shift reactor,

xi) Installation of pre-reformer.

xii) Installation /changing of tower packings in CO_2 removal section to combination of IMTP & structured packings.

xiii) Using H.T. Shift Conversion catalyst having lowest desulphurization time with lowest quantity of sulphur in catalyst, as sulphate.

xiv) Using Medium Pressure (MP) condensate stripping, in plants having low pressure condensate stripping.

xv) For reducing energy loss, use of ceramic fibre lining for primary reformer furnace.

xvi) Use of parallel methanator

xvii) Use of super-methanation catalyst in place of ordinary methanation catalyst.

xviii) Changing of baskets of ammonia synthesis convertors

xix) Use of lower size, (1.5-3.0mm) catalysts in place of higher size, (4.5-6.0mm) catalysts.

xx) Use of additional convertor, downstream of existing ammonia synthesis convertor.

xxi) Use of mechanical seals in place of water-seals, stuffing box, etc. for pumps.

xxii) Installation of advanced process control

xxiii) Installation of Purge Gas Recovery Unit.

xxiv) Coro-coating of pump casing of large size cooling water pumps.

xxv) Use of dry gas seals for compressors

xxvi) Use of electronic governors for steam turbine drives of large compressors.

xxvii) Use of saturator water-heater in reforming section.

xxviii) Liquid Ammonia Wash for purification of make-up gas.

xxix) Installation of molecular sieve driers for removal of H_2O, CO_2 and NH_3 content from make-up synthesis gas.

xxx) Installation of suction chiller for synthesis gas compressor.

xxxi) Installation of suction chiller for process air compressor.

(b) Stagnation in Technological Front:

It is agreed worldwide that, ammonia technology has reached its peak, especially with regards to process of manufacture. Whatever savings in energy consumption that can be achieved, can be in the following areas:

v) Adopting plants of very high capacities.
vi) Better efficiencies of machines.
vii) Better Catalysts
viii) Higher plant 'on stream' factors

- Stand-alone energy efficient ammonia plants, worldwide, consume around 6.7 – 6.8 GCal/MT ammonia.

- Indian ammonia plants, where total ammonia is converted to urea, consume much higher energy i.e. around 7.1 to 7.2 GCal/MT and is perfectly comparable with world standards

(c) Areas for Carrying out Developmental work:

Developmental work in the following areas can be carried which shall amount to energy savings, and/or result in higher on-stream factors of the fertilizer complexes in following areas:

i) Better insulation material for reducing heat losses.

ii) Better material/type of tower internals for reducing pressure drop & thus improve energy efficiency.

iii) New non – nickel based honey comb structure catalysts for reducing NO_X & SO_X level in flue gases & allow plants to run at higher loads & higher on-stream factor on a sustained basis.

iv) New nickel based catalysts for reducing NO_X level in the Tail gases of Nitric Acid Plants.

v) Removal of carcinogenic hexavalent chromium from effluents disposal from HT Shift catalyst plant.

vi) Better Catalysts:

- Better catalysts, to enable achieve higher conversion and thus reduced energy consumption.
  - Therefore R&D work on development of catalysts with higher activity has to go on unabatedly.
  - Catalyst development in the technological (process) area, where impact on lower energy & lower plant cost can be clearly visible.
- Recent trend has been to develop fresh catalyst from spent catalyst charges, discarded from ammonia plants.

- Fresh catalyst produced from spent catalyst is much better activity-wise, than, catalyst prepared from original raw material.
- Preparation from spent catalyst discarded from the fertilizer factors, solves the problem of disposal of spent catalyst.

o Spent Catalyst disposal problem shall boom large in the near future due to stringent international laws.

vii) Better Insulation

- Substantial amount of heat is lost to atmosphere as un-recoverable heat losses.
- Curbing such heat losses automatically increases energy efficiency of plants.
- For 'hot' insulation in ammonia & urea plants, the customary types like rockwood, calcium silicates, etc. can be replaced by the ceramic fiber insulation.

  Though ceramic fiber insulation is costlier, the pay-back shall easily outweigh its cost.
- For 'cold' insulation used in cryogenic areas of ammonia synthesis, ammonia refrigeration and ammonia storage, vacuum insulated pipe can be used.

14. 2 Urea Plants

Possible measures for reduction of energy in Urea Plant may include:

i) Vacuum Pre-concentrator is one major technique for reduction of energy in SAIPEM Urea Plant. Originally LP Steam was used in concentrating Urea Solution from ~70% to ~95% in 1st Vacuum Concentrator and Vapours from MP stage was condensed by cooling water. In vacuum Pre-Concentration System, Urea solution from LP stage is concentrated by condensing vapours available from MP Stage from ~ 70% to ~85%. In this process both steam and equivalent Cooling Water duty are saved. Advantage is twofold: Steam consumption is reduced. Heat lost to Cooling Water is effectively utilized reducing heat load in Cooling Tower. All the SAIPEM Urea Plants have already installed or under process of installing Vacuum Pre-concentrator system.

ii) HP ammonia & HP Carbamate pre-heating by LP vapours and by hot condensate is considered in some of the plants. This pre-heating recycles process heat which other-wise would have dumped in to Cooling Water.

iii) Part of MP Decomposer may be heated with surplus LP steam (if available) boosted to intermediate pressure steam which in turn will reduce MP steam consumption in the plant.

iv) Generally HP ammonia Pumps and HP Carbamate Pumps are motor driven. Oil Torque converter is used to control the speed of Plunger Pumps wherever used for the services. Generally, after continuous use, efficiency of these torque converters reduce. These torque converters may be replaced with frequency converter for the motors which in turn will reduce consumption in electrical energy.

v) Major amount of entrained Urea in Vapours of 2nd vacuum concentrator may be scrubbed to recover as Urea solution. This Urea is concentrated and recovered for which LP steam will be consumed. However, as urea becomes less in vacuum condensate, MP steam required for Urea Hydrolysis will be reduced. Overall energy reduction may not be possible by this process, but quality of treated process condensate will be improved.

vi) LP steam generation at two different pressure levels may be adopted for better utilization of generated Steam. Simultaneously there is a possibility of operating HP Stripper with lower bottom temperature distributing decomposition heat load judiciously to maintain zero or minimum LP steam export from the plant.

14.3 DAP/NP/NPK Plants

Following measures are suggested for saving energy in DAP/NPK Plants.

i. Wherever conventional slurry granulation process is still existing, these should be replaced by Pipe Reactor system, which will greatly help in energy saving. Heat of reaction helps in evaporation of water from the granulated mass thereby reducing dryer heat load. Lower water load in dryer also reduces recycle ratio from 5:1 to 4:1 and hence dryer size is substantially reduced.

ii. Variable frequency drives should be used specially for i) Dryer Exhaust Fan & ii) Ammonia Scrubber Fan.

iii. Use of vapor ammonia in the pipe reactor in place of liquid ammonia helps in lowering water feed to dryer, thereby reducing fuel demand.

iv. Where Sulphuric Acid Plant is there along with DAP/NPK plant, hot condensate from TG set may be use for ammonia vaporization.

v. Use of ammonia air chiller for cooling air entering product cooler, which helps in reducing cooler size. Approximately 17% of ammonia would be sufficient to cool the air.

vi. Cooler exit air may be used as secondary air to the dryer, after passing through dust collector.

vii. Installation of power saving device in centralized lighting DB in all DAP plants.

14.4 R&D Centres

14.4.1 A number of fertilizer producers have R&D centers like GSFC Baroda, FEDO Cochin, RCF Trombay, GNFC Bharuch, etc. Most of the R&D centers in fertilizer companies are recognized as in-house R&D centers by Department of Scientific and Industrial Research, Ministry of Science and Technology (DSIR). According to information available, fifteen fertilizer producers were involved in some kind of R&D activities. There has not been much of change in R&D activities during last five years. However, it should be noted that full-fledged exercise like taking feedbacks from various companies has not been carried out. The companies are mainly concerned with trouble shooting, technical audit & inspection exercises and other short-term problems. PDIL in the past, and presently, GSFC, GNFC and RCF are going beyond these exercise and have produced some encouraging results including development of new products. The current activities in PDIL are related only to the day to day operations of catalyst plant.

14.4.2 R&D projects are also sponsored by the Department of Fertilizers (DOF)/Industry for the work to be carried out by various research institutes, which have been created in the country. Barring a few, no major R&D programme appeared to have been taken up by the public funded institutions in the country, in the area of fertilizer. In this regard, development of technology for recovery of potash from sea bittern by Central Salt and Marine Chemicals Institute, Bhavnagar,

some years back is note worthy, but it is yet to be commercialized. The assessment of R&D work has been done based on the following parameters:

- Expenditure made on each R&D projects
- Actual achievement in terms of products and patents if any
- Benefits to the industry on implementation of the project

14.4.3 While the actual expenditure on the R&D projects could not be collated, however, based on past data, it is expected to be miniscule and not commensurate with the size of the industry.

(i) Areas of Strength:

Indian engineering and consultancy organizations are providing services not only for the design and engineering work, but also for procurement, inspection, expediting, and supervision of construction and erection of fertilizer plants. Initially, all the equipment down to structurals, bolts and nuts were imported. However, capabilities now have been built in mechanical equipment fabrication and machinery manufacturing areas. At present there are very few items, which needs to be imported even for large modem fertilizer plants. Catalyst plays an important role in the manufacture of fertilizers. Indian companies manufacture now almost entire range of catalysts based on indigenous and/or imported knowhow. Highly qualified scientists and technologists are employed in the R&D centers.

(ii) The identified strengths are:

- Facilities are available with various organizations in different areas such as
    - Catalyst research - PDIL & CSIR Laboratories
    - Zeolite based catalyst- Associated Cement Company Ltd (ACC)
    - Process design- PDIL & FEDO

- Pollution control - PDIL, CSIR Laboratories (NEERI)
- Coal gasification study facilities at IICT Hyderabad

- Highly qualified technical manpower
- High confidence level because of some technical achievements (like hydrolyser of PDIL and bio hydrolyser)
- Long experience
- Scope to develop several new products

(iii) Areas of Weakness:

In spite of tremendous efforts made in developing our technological base in the fertilizer sector, gap still exists. The country still imports basic process knowhow for ammonia, urea and phosphoric acid plants. Some critical mechanical and electrical equipment and micro processor based instrumentation are also imported.

14.4.4 Despite vast knowledge pool in the country there are several weak points in the systems itself. Some of these have been identified as under:

- Lack of Policy direction for R&D by GOI
- Resource crunch
- Lack of vision for technology and product development
- Insufficient incentive/remuneration to attract talent to R&D
- Lack of modern facilities compared to world standards
- Lack of coordination among various research/academic institutions
- Lack of interaction between industry and research/academic institutions

14.4.5 The fertilizer industry is highly regulated and almost half of its turn over comes from the budget of Indian government. In such a situation, it is necessary that the government takes an initiative not only in terms of arranging money but also providing a mechanism for boosting the R&D activity in the sector. A

coordination group for R&D may be set up in the Department of Fertilizers consisting of representatives of other departments of the government, FAI, Industry and CSIR. The activities of the group should include invitation and assessment of R&D proposals, arrangement of funds, monitoring of the progress of the R&D projects and finally commercialization of the successful R&D results. In this connection, the DOF has funds for S&T projects. It invites proposals for R&D projects from academic and research institution. Proposals should also be invited from the industry. There are project screening and project approval committee in the DOF for the purpose. However, these need to be institutionalized. It should be emphasized that the Department of Fertilizers needs to be strengthened in terms of technical manpower because it will work as a nodal point for the R&D efforts in the fertilizer sector.

14.4.6 A fertilizer research institute may also be established on similar lines as of road research institute, coal research institute, steel research institute, cement research institute etc. to carry out various researches related to fertilizer industry. This research institute should always maintain link with the coordination group for R&D as a suggested above and with various laboratories and other research institutes and academia. Identification of new thrust areas for future R&D and preparation for time bound programmes as also fund requirement and means to source them have to be carried out by the coordination group.

14.4.7 <u>Areas of R&D:</u>

Given the worldwide hardening position on various raw materials, especially Phosphate and Potash, an urgent focus is required to exploit indigenous raw material resources. Potash extraction from Brine has been initiated by a few companies, in association with Marine Research bodies and such effort needs to be further continued. A few of the proposals that can be worked upon are:

- Coal gasification
- Development of process of Potash production from gluconite
- Recovery of potash from sea water
- Exploitation of indigenous rock phosphate

14.4.8 Long term R&D proposals

- Development of Membrane based CO2 removal system in ammonia plant
- Running of front end ammonia plant at high pressure and study of performance of catalyst at higher pressure in PR, HT, and LT reactors
- Development of Synthesis catalyst for operating at lower pressure
- Incorporation of idea of Fuel Cell based power generation in fertilizer plants

14.4.9 Medium term R&D proposals

- Development of new solutions for CO2 removal process
- Improvement in efficiencies of various process steps in conventional ammonia technology
- Improvement in efficiencies of various process steps in urea process technology
- Recovery of CO2 from the flue gases
- Specifically, development of conventional ammonia synthesis catalyst from Indian magnetite
- Efficient alumina support for steam reforming catalyst
- Primary reformer catalyst
- Improvement of HT shift catalyst
- Sulphuric acid catalyst
- Total recycle concept in cooling tower water
- Recovery of fluorine compound from phosphatic fertilizer and development of a technical know-how for production of dense AIF3.

- Sulphur resistant catalyst for NOx abatement
- Development of improved dianodic inhibitor for cooling water system
- Studies on hydrolysis of polyphosphates in cooling towers and its control
- Urea/CAN coating
- Utilization of waste materials to produce value added products
- Research on recovery of precious metals from spent catalyst of fertilizer industry

14.4.10 Advantages of R&D Institute:

- Encourages the cross fertilization of ideas
- Offers temporary, education focused work in the industry for faculty
- Develops joint projects for increased knowledge
- Support for research
- Consultancy for faculty
- Rapid commercialization of institutional research (often benefits society as well)

14.4.11 Advantages for industry

- An increased knowledge base for
  - Cross fertilization of ideas
  - More option for new and better products
  - More flexibility in R&D spending (e.g. institutional support can be listed for an urgent but speculative project without making long term internal commitment for adding laboratory employees)
- Greater professional development of employees, through;
  - Teaching and lecturing opportunities in institution
  - Internal short courses given by academic consultants
- Reduce the time between innovation and commercial exploitation:

- By getting methods, tools and people that allows industry to meet its need by tying science and engineering
- Provides inter-connection between various branches of science to achieve the objective at fast pace

- Approaches for Industry – Institution Interaction
  - Joint Projects
  - Consultation
  - Mini courses for R&D scientists of industry on particular subject
  - Consortia: basic research projects jointly sponsored by number of corporations interested in the same field
  - Commercial testing

- Methods to enhance Industry – Institution Linkage
  - To give sponsored R&D projects to institutions
  - To retain professors from academia as consultant
  - To create forum which should organize meetings, seminars, discussions where both industry and institution should interact
  - Invite eminent personalities from institutions for delivering talks on specific subjects
  - Explore the possibility of short-term deputation of technical staff from industry to institutions and vice versa.
  - Nearby institutes should be in focus for the cooperation with industry
  - Research sabbaticals

As in any cooperative venture, it is important that the relationship be founded on the mutual respect, interest, support and long term benefits rather than on selfish expediency.

14.4.12 **Recommendations**

a) There is need to establish a coordination group in the DOF to encourage and coordinate R&D activities nationwide retailed to fertilizer production.

b) There is need for permanent technical manpower in the DOF.

c) Possibility of establishing fertilizer R&D institute should also be explored to strengthen efforts for R&D activities.

d) R&D centres in the industry should be encouraged

CHAPTER-XV

15.0 BALANCED FERTILIZATION AND NEW FERTILIZER PRACTICES

15.1 Inadequate and imbalanced use of fertilizers

India is the second largest consumer of fertilizer in the world next to China. However, per hectare consumption in India is lower than developed and many developing countries including neighbouring countries. The table given below shows per hectare use of total fertilizer nutrients in India vis-a-vis selected countries.

Per hectare consumption of fertilizer nutrients in selected countries - 2009	
Country	Per hectare consumption of fertilizer nutrients (N+P+K) (Kg.) [1]
Egypt	375.0
China	396.0
India	156.1 (144.1)
Bangladesh	188.3
Indonesia	101.0
Korea Rep.	284.0
Malaysia	191.4
Pakistan	204.9

[1]= Per hectare of arable land and land under permanent crops.

Note: Figure in parenthesis shows per hectare consumption of gross cropped area during 2010-11.

Imbalanced use

There is wide variation in fertilizer use among different states in the country. Table given below shows fertilizer nutrient consumption per hectare of gross cropped area in 2010-11. While per hectare use of fertilizer nutrients is 253 kg in Andhra Pradesh and 242 kg in Punjab, it is only 4 kg in Nagaland and 3 kg in Arunachal Pradesh. Besides wide variation in fertilizer use, the pattern of use is skewed in favour of nitrogen in some of the states.

STATE-WISE CONSUMPTION OF PLANT NUTRIENTS PER UNIT OF GROSS CROPPED AREA
2010-11 (Provisional)

(kg/ha)

Zone/State	2010-11			
	N	P_2O_5	K_2O	Total
EAST	**63.2**	**30.7**	**20.5**	**114.4**
Arunachal Pradesh	1.9	0.8	0.3	3.0
Assam	35.8	14.9	18.8	69.5
Bihar	116.4	37.1	20.0	173.5
Jharkhand	46.8	22.6	5.3	74.7
Manipur	21.6	4.7	1.3	27.5
Meghalaya	9.0	4.5	1.4	14.9
Mizoram	21.6	25.6	11.8	58.9
Nagaland	1.9	1.2	0.4	3.5
Orissa	32.5	17.0	9.8	59.3
Sikkim	-	-	-	-
Tripura	27.2	15.1	11.7	54.0
West Bengal	72.7	50.6	37.1	160.4
NORTH	**128.2**	**45.0**	**9.8**	**183.1**
Haryana	150.2	51.8	7.3	209.4
Himachal Pradesh	34.8	11.5	12.6	58.9
Jammu & Kashmir	64.0	32.8	9.8	106.7
Punjab	177.3	55.0	9.3	241.6
Uttar Pradesh	115.5	43.0	10.5	169.0
Uttarakhand	94.2	26.0	11.8	132.0
Delhi	8.6	1.2	-	9.8
SOUTH	**108.2**	**59.9**	**37.5**	**205.6**
Andhra Pradesh	142.2	74.6	36.0	252.8
Karnataka	82.2	56.3	32.2	170.6
Kerala	43.7	25.6	35.9	105.2
Tamil Nadu	110.4	48.1	52.6	211.1
Pondicherry	580.0	145.8	164.5	890.3
A & N Islands	21.7	18.3	10.6	50.6
WEST	**61.4**	**35.8**	**13.1**	**110.3**
Gujarat	107.3	44.8	15.6	167.6
Madhya Pradesh	48.3	35.9	6.2	90.4
Chhattisgarh	56.7	30.1	12.1	98.9
Maharashtra	75.0	50.9	30.4	156.3
Rajasthan	38.2	18.2	1.5	57.9
Goa	20.0	13.7	10.8	44.5
Daman & Diu	84.0	32.0	6.0	122.0
D & N Haveli	26.7	19.6	1.1	47.4
All India	**84.9**	**41.3**	**18.0**	**144.1**

Note : Consumption of plant nutrients per hectare have been worked out on the basis of gross cropped area available for the year 2008-09.

Table below shows the NPK use ratio in different states.

STATE-WISE CONSUMPTION RATIO OF N & P_2O_5 IN RELATION TO K_2O 2010-11			
Zone/State	2010-11 (P)		
	N	P_2O_5	K_2O
EAST	**3.1**	**1.5**	**1**
Arunachal Pradesh	5.8	2.4	1
Assam	1.9	0.8	1
Bihar	5.8	1.9	1
Jharkhand	8.8	4.2	1
Manipur	17.0	3.7	1
Meghalaya	6.3	3.2	1
Mizoram	1.8	2.2	1
Nagaland	4.5	2.8	1
Orissa	3.3	1.7	1
Tripura	2.3	1.3	1
West Bengal	2.0	1.4	1
NORTH	**13.0**	**4.6**	**1**
Haryana	20.5	7.1	1
Himachal Pradesh	2.8	0.9	1
Jammu & Kashmir	6.5	3.3	1
Punjab	19.1	5.9	1
Uttar Pradesh	11.0	4.1	1
Uttarakhand	8.0	2.2	1
SOUTH	**2.9**	**1.6**	**1**
Andhra Pradesh	3.9	2.1	1
Karnataka	2.6	1.7	1
Kerala	1.2	0.7	1
Tamil Nadu	2.1	0.9	1
Puducherry	3.5	0.9	1
A & N Islands	2.1	1.7	1
WEST	**4.7**	**2.7**	**1**
Gujarat	6.9	2.9	1
Madhya Pradesh	7.8	5.8	1
Chhattisgarh	4.7	2.5	1
Maharashtra	2.5	1.7	1
Rajasthan	24.9	11.8	1
Goa	1.9	1.3	1
Daman & Diu	14.0	5.3	1
D & N Haveli	24.0	17.7	1
All India	**4.7**	**2.3**	**1**
(P) = Provisional.			

The imbalanced use of chemical fertilizers and neglect of organic manure caused many problems, like stagnation in productivity, soil sickness, widespread deficiency of secondary and micro nutrients, spread in salinity and alkalinity, etc. On an All-India basis, the deficiency of sulphur has been found to be 41%, zinc 48%, boron 33%, iron 12% and manganese 5%

Table: Extent of Multi-nutrient Deficiency in Indian Soils	
Nutrient	% deficient samples
Nitrogen	89
Phosphorous	80
Potassium	50
Sulphur	40
Zinc	48
Boron	33
Iron	12
Manganese	5

Declining response on fertilizer use particularly on food grains has been noticed in the decade of 2000. The average response to fertilizer application used to be around 10:1 during 1960s and 1970s. The response ratio obtained by research scientists which had been adopted by Department of Agriculture and Cooperation, GOI, for calculating demand projections was 1:7.5 for the 8^{th} Plan, 1:7 for 9^{th} Plan, 1:6.5 for 10^{th} Plan and 1:6 for 11^{th} Plan. However, IASRI, ICAR has made a study in the recent years to work out the response ratio of fertilizers for food grains based on the farmers field data and has concluded the response ratio of NPK as 1:7.8, but the response ratio varied for different crops from 1:4.9 for oilseeds to 1:7.1 for pulses and 1:8.6 for cereals.

Not only that about 85% of the total consumption of fertilizer nutrients is consumed in 273 districts (about two third) only. While per hectare use of fertilizer nutrients is more than 400 kg in some of the districts of Andhra Pradesh (424 kg in Guntur 417 kg in West Godavari, it is as low as less than 40 kg in some of the districts of Rajasthan (22 kg in Nagaur, 31 kg in Jodhpur). There is need for efficient use of fertilizers in the high consuming districts and stepping fertilizer use in low consuming areas and also there is need for integrated and balanced use of fertilizers. Besides application of fertilizer in a judicious manner, there is need for stepping up the use of secondary (sulphur) and micro nutrients (zinc, boron, etc.).

15.2 About Balanced Fertilization

15.2.1 Balanced fertilization refers to application of essential plant nutrient particularly the major nutrients N, P and K in optimum quantity and in right proportion through correct method and time of application suited for a specific soil-crop-climate situation. Balanced nutrition of the crop is a key factor to enhance crop yields. It also ensures increased quality of produce, maintenance of soil productivity and conservation of our precious soil and water resources. Application of balanced fertilizers in crops shows maximum fertilizer use efficiency, thereby providing maximum profit to the farmers.

15.2.2 There are two points of real importance in balanced fertilizers use, they are i) the rate of application and ii) ratio in use. For examples, let us consider fertilizer recommendation for wheat which is 120-60-30 kg of N-P_2O_5-K_2O (total nutrients=210 kg/ha) representing NPK ratio of 4:2:1. If one applies 60-30-15 kg/ha of N-P_2O_5-K_2O the use ratio is still 4:2:1 but the total NPK use is only 105Kg/ha which is not the absolute amount of plant nutrients and crop yield will suffer.

15.2.3 Therefore, balanced fertilization does not mean a certain proportion of nitrogen, phosphorus and potash (or other nutrients) to be added in the form of fertilizers, but it has to take into account the availability of nutrients already present in the soil, crop requirement and other factors. It is not a static but a dynamic concept. It should not mean that every time a crop is grown, all the nutrients should be applied in a particular proportion, rather fertilizer application should be tailored to the crop needs keeping in view the capacity of these soils to fulfill these needs. To achieve this it is necessary to keep an overall balance in a total cropping system. This may indicate the need of the application of different

nutrients at specific times in a particular order to derive the maximum benefit from the application of a given quantity of nutrients.

15.3 Importance of Balanced fertilizer Use:

15.3.1 In India, while the consumption of N, P & K has been increasing, the ratio of use of N, P & K is imbalanced. The use of nitrogen is much more as compared to other nutrients. Nitrogen has a definite role in crop production but only nitrogen cannot serve the purpose of getting higher yield. For getting maximum yield and maintaining the soil fertility, all the essential nutrients must be supplied in required quantity and in balanced proportion. The balanced use of fertilizers is not limited to NPK only but also includes adequate application of secondary and micronutrients.

15.3.2 Balanced nutrient supply ensures efficient use of all nutrients. One nutrient may affect the efficiency of other nutrients. For examples, research has shown that response of the yield to applied fertilizer N is limited, if P requirement of the crop is not satisfied. Similar results are found, if K or a secondary or micro-nutrient is deficient.

15.3.3 Imbalanced nutrition produces low yields, low fertilizer use efficiency and low farmer profit. It also results in further depletion of the most deficient nutrients in the soil. Once the critical level of a nutrient is reached, yield fall dramatically even through large aggregate amounts of other nutrients may have been applied. Hence, the importance of balanced fertilization in increasing crop yield must be realized.

15.4 Role of soil testing in balanced fertilizer use :

15.4.1 Soil testing is a prerequisite to know the fertility status of the soils. However, the analyzing capacity of soil testing labs is grossly inadequate. During 1955-56, a modest beginning of soil testing was made in India with the establishment of 16 Soil Testing Laboratories (STLs) under the 'Indo-US Operational Agreement for Determination of Soil Fertility and Fertilizers Use'. The network of STLs has been expanding continuously and at present a total of 715 STLs (585 static and 130 mobile) are in place. Most of these are owned and operated by government departments, but for various reasons their ground level impact on facilitating balanced nutrient application is not adequate. A faithful soil testing and performing fertilizer recommendations for individual field is important for precise assessment of nutrient needs of diverse crops and soils (particularly for farmers having small holdings). This will ensure judicious use of fertilizers, organics and amendments.

15.4.2 There is a need to establish a National Level Centre of Soil Health Monitoring and Training under DAC, Ministry of Agriculture and Government of India. This centre should be equipped with a central soil testing laboratory with a mechanism of sample exchange and monitoring of the quality of analysis.

15.5 Increasing Use Efficiency

15.5.1 Once plant nutrient supply has been properly balanced, it has to be ensured that nutrients supplied are used in most efficient manner. Efficient use of fertilizers ensures increased crop production per unit area, improved produce quality, minimum losses of nutrients through leaching and high profits. Efficient use of applied nutrients can be achieved by combining balanced application with best management practices.

15.5.2 The efficiency of different fertilizers varies. It also varies with respect to crops. N use efficiency for rice is 30-35%, wheat 40-55%, Maize 18-36% and cotton 18-36%. Phosphorous use efficiency is 10-20%, K 60-65% and Zn is merely 5%. In addition, about one third of N applied is immobilized and retained in soil while the rest is lost. Increase of the other nutrients, a major part of remaining amount is retained in the soil and leads to it build up. It is clear from the Table 6 that the efficiency of different nutrient applied is very low. So the farmer must concentrate on efficient fertilizer use to increase Fertilizer Use Efficiency (FUE). When fertilizers are used efficiently, a given quantum of crop production can often be obtained with lower input and the cost of production per unit goes down and minimum possible adverse effect on the environment is expected.

Table : Nutrient use efficiency status in India (by different methods)

Nutrient	Efficiency (%)
Nitrogen (N)	30-50
Phosphorus (P)	10-20
Potassium (K)	70-80
Zinc (Zn)	2-5
Iron (Fe)	1-2
Copper (Cu)	1-2

15.5.3 There are three ways by which fertilizer use efficiency can be increased: (i) by adoption of better agronomic practices, (ii) use of more efficient fertilizer materials and (iii) integrated nutrient management involving combined use of fertilizers, organic manures, bio-fertilizers, etc. Agronomic practices such as choice of right crops and their varieties, right type of fertilizer, correct dose, appropriate time and method of fertilizer application, weed control and water

management that result in increased yield and also increases fertilizer use efficiency. Applying the recommended dosage in installments at the right stage of plant growth would improve fertilizer use efficiency and crop productivity. The application of fertilizer through fertigation leads to saving in fertilizers applied to the extent of 40-60 % without affecting the yield. Use of water soluble fertilizers through micro-irrigation systems like drip irrigation should be promoted for increasing water and fertilizer use efficiency.

15.6 Agronomical importance of low analysis fertilizers, specially SSP as well as that of city compost, organic and bio-fertilizers.

15.6.1 The low analysis fertilizers are as good as high analysis fertilizers. SSP is one of the important phosphatic fertilizer which contains 16% water soluble P_2O_5, 12% sulphur, 21% calcium and some other essential micro-nutrients.

15.6.2 Organic fertilizers are although low analysis fertilizers having nutrients (NPK) in the range of 1.5 to 3%, but their importance is mainly attributed to their potential in increasing the soil organic carbon and supporting the microbial life into the soil, which is very vital to various biological functions leading to the operation of natural nutrient cycles. Increased values of organic carbon and increased biological activity also helps in better use efficiency of applied chemical inputs. Higher response ratio of chemical fertilizers in earlier years of green revolution is attributed to the inherent fertility of the soil due to higher organic carbon present in the soils at those times. Over the years excessive nitrogen application and practically no use of organic manures has resulted into depletion of soil organic matter resulting into reduced response of chemical inputs. Therefore all out efforts are needed to promote strategies which help in restoration of soil organic carbon.

15.6.3 Nitrogenous biofertilizers (such as Rhizobium, Azotobacter, Azospirillum, BGA and Acetobacter etc) can replace 25 to 35 kg of chemical nitrogen nutrient per ha per cropping season when used in conjunction with recommended fertilizer doses. N-contribution under low or no fertilizer use along with some quantity of organic manures is significantly higher and can meet 35-50% N demand of plants.

15.6.4 PSB biofertilizers are known to replace 10-15 kg/ha of phosphorus use (Uptake of phosphorous by plants from phosphatic fertilizers is only about 20%. Remaining P stays in soil. It is not lost as in case of N. PSB helps to make this P available to the plants, thus reducing requirement of application of phosphatic fertilizers. PSB biofertilizer along with mineral grade rock phosphate applied through composts can replace the requirement of single super phosphate application.

15.6.5 City Compost contains all 17 essential elements derived from bio-gradable food waste they are produced from and can counter faster depletion of micro and secondary nutrients. Organic and bio-fertilizer are also important for soil health point of view as they not only supply the nutrients but also mobilise the inherent soil nutrients.

15.7 Deficiencies of secondary and micro-nutrients in the soil(other than NPK)

15.7.1 Extensive use of high analysis fertilizers coupled with neglected use of organic fertilizers resulted in increased deficiency of secondary and micronutrients in the soils. Moreover, out of 17 nutrients focus has been on nitrogen followed by phosphorus. Secondary and micro-nutrients have not been given the due attention. As a consequence deficiencies of nitrogen, phosphorus, potassium, sulphur, zinc, boron, iron, manganese, and copper have been recorded to the extent of 89, 80, 50, 41, 48, 33, 12, 5 and 3% respectively. The deficiencies of

sulphur, zinc and boron are becoming more wide-spread and critical. The use efficiency of applied N, P, K, Zn, Fe and Ca in Indian soils are 30 -50, 15 - 20, 70 - 80, 2 - 5, 1 - 2 and 1 - 2 respectively. Thus, the problem of nutrient deficiencies are aggravated further because of low efficiency of applied fertilizers particularly of P & micro-nutrients. Emphasis should be on improving fertilizer use efficiency. Models of Integrated Nutrient Management for diverse but well defined agro-ecological zones and cropping system should be developed to provide guidance for rational and efficient fertilizer use. There is a need to create awareness and convince the industry and policy makers that micronutrients should be given due attention. Micronutrients should be the part of any soil fertility or Integrated Plant Nutrient Supply (IPNS) programme.

15.8 Water Soluble Fertilizers

15.8.1 The process in which fertilizer is dissolved and distributed along with water in drip or spray irrigation system is called Fertigation. There is abundant research available that supports the superiority of Fertigation as compared to traditional fertilizing techniques. Most Fertigation systems require the use of liquid fertilizers or 100 % water-soluble fertilizers. Fertigation is the application of soluble fertilizers (plant nutrients) through an irrigation system which reduce fertilizer need substantially.

15.8.2 **Advantages of fertigation:**

- Improves efficiency of fertilizer use
- Increases nutrient availability
- Saves 20-40% fertilizer without affecting growth and yield
- Saves labour and energy in application of fertilizer
- Reduce environmental contamination
- Reduces leaching of nutrients

15.8.3 Limitations

- Initial investment is high
- Chemical reaction in drip system leading to corrosion and precipitation of fertilizer

15.8.4 Nitrogen Fertigation

- Nitrogen is most commonly used nutrient through drip Fertigation .
- Almost all nitrogenous fertilizers are suitable for drip Fertigation, except ammonium sulphate which causes precipitation of calcium sulphate and magnesium sulphate.
- Among the nitrogenous fertilizers, urea is well suited for in for injecting through drip irrigation, since it is readily dissolve in non ionic form and does not react with the substance in the water (Haynes, 1985)

15.8.5 Phosphorus Fertigation

- It was not been generally recommended for application through drip irrigation system because of its tendency to cause clogging.
- If irrigation water has high amount of calcium and magnesium causes the precipitates of insoluble Ca and Mg.

15.8.6 Trace elements

- Trace elements such as Mg, Zn, B, Fe, Cu etc ., are difficult to apply through drip irrigation because they need in very low quantities, may reacts with salt in water and causes clogging.

15.8.7 Department of Agriculture & Cooperation, under Fertilizer (Control) Order,1985 has so far notified 13 number of 100 % water soluble fertilizers. The cost of these fertilizers in comparison to traditional fertilizer is very high and most of these

fertilizers are used in high value crops. Agronomic efficiency of these fertilizers is very high and these require to be promoted.

15.9 **Organic Fertilizers**

15.9.1 Organic fertilizer means substances made up of one or more unprocessed material(s) of a biological nature (plant/ animal) and may include unprocessed mineral materials that have been altered through microbiological decomposition process" (FCO 1985).

15.9.2 Though Organic fertilizers are low analysis fertilizers having nutrients (NPK) in the range of 1.5 to 3%, their importance is mainly attributed to their potential in increasing soil organic carbon and supporting the microbial life into the soil, which is very vital to various biological functions leading to the operation of natural nutrient cycles. Increased values of organic carbon and increased biological activity helps in better use efficiency of applied chemical inputs. Higher response ratio of chemical fertilizers in earlier years of green revolution is attributed to the inherent fertility of the soil due to higher organic carbon present in the soils at those times. Over the years excessive nitrogen application and practically no use of organic manures has resulted in depletion of soil organic matter resulting into reduced response of chemical inputs.

15.9.3 Therefore, all out efforts are needed to promote strategies which help in restoration of soil organic carbon. Some of the important strategies which can be considered under policy planning are as follows:

a. Use of organic manures and recycling of biomass/crop residues to be made mandatory through policy support and incentivization.

b. Encourage mixed/ intercrops of pulses in all major cropping systems. At least one pulse crop to be brought in rotation every year in intensively cultivated areas
c. Encourage N_2-fixing and other useful trees/ bushes as hedges on bunds for in-situ production of biomass. Wherever possible green manure crops to be promoted and farmers need to be compensated appropriately
d. Chemical nutrients need to be used only on soil test based recommendations in optimum quantities along with adequate quantity of composts/ biomass
e. Biofertilizers need to be promoted on massive scale similar to chemical fertilizers
f. Encourage use of mineral nutrient resources such as rock phosphate along with composts.
g. In case of micronutrient deficient soils use of micronutrients be encouraged through composts for their better use efficiency and long lasting impact.
h. Encouragement for integration of trees and cattle in farming system mode
i. Use of lime, gypsum, basic slag and other soil amendments in problem soils also need support similar to chemical fertilizers
j. Promotion of organic farming in low fertilizer use areas, rain-fed tracts.

15.9.4 Requirement

To maintain reasonable health of the Indian soils, each and every field is to be manured with at least 7 to 10.0 tons of organic fertilizers. With this assumption there is a need for about 850 to 1200 million tons of organic fertilizers. Keeping in view of the overall availability of cattle dung, agro-waste, city waste and crop residue etc vis-a-vis their other uses and actual quantity available for manuring purpose, it may not be possible to harvest the potential from these sources.

Therefore to meet the challenge, the requirement for organic carbon needs to be met from following resources:

- Organic fertilizers
- Green leaf manuring from fertilizer trees grown on bunds
- Pulses integration in cropping systems
- Biofertilizers and on-farm dung-urine based liquid manures

15.10 Bio-fertilizers

15.10.1 Bio-fertilisers or microbial inoculants are carrier based ready to use live bacterial or fungal formulations, which on application to plants, soil or composting pits, help in mobilizing of various nutrients by their biological activity. Biofertilisers are not the replacement of chemical fertilizers but can complement and supplement the use of nutrients. Besides providing nutrients, use of biofertilisers also enrich soil microbiologically strengthening natural cycles and soil health. Biofertilisers are also known to contribute to overall soil health enrichment of the soil.

15.10.2 Ministry of Agriculture brought bio-fertilizers under Section 3 of the Essential Commodity Act, 1955 (10 of 1995), in fertilizer control order 1985 in March 2006. Now bio-fertilizer production is more regulated than before. Five biofertilisers viz. Rhizibium, Azatobacter, Azospirillum, Phosphate solubilising Bacteria and Mycorrhizal biofertiliser are specified under FCO, 1985.As per FCO, no person shall carry on the business of preparing bio-fertilizers except under and in accordance with the terms & conditions of the certificate of manufacturer granted to him under clause 15. The bio-fertilizers demand for 2011 has been estimated at 30,000 tonnes by an Expert Committee constituted by Ministry of Chemicals and Fertilizers.

15.10.3 As per the latest compilation India has about 150 biofertilizer production units with an installed production capacity of about 85,000 MT per annum. Against this the actual production during the year 2009-10 was 20,000 MT (remaining capacity is being used for production of bio-pesticides). Out of various types of biofertilizers PSB biofertilizers accounted for nearly 45% of total production and use.

15.11 Customized Fertilizers

15.11.1 In furtherance of the concept of balanced use of fertilizers, clause 20 B has been introduced recently in the Fertilizer Control Order with the main objective to promote site specific nutrient management so as to achieve maximum fertilizer use efficiency of applied nutrient in a cost effective manner. These fertilizers are multi nutrient carrier designed to contain macro and micro nutrient. These are soil specific and crop specific based on soil testing. 24 grades of these fertilizers have so far been notified. Manufacturers viz. Tata Chemicals, Nagarjuna Fertilizer, Coromandel International Ltd. and Deepak Fertilizers have been permitted to manufacture these customized fertilizers.

15.11.2 The use of customized fertilizers not only encourages the balanced use of application of fertilizers but also results in optimal use of nutrient. The response of companies for establishment of customized fertilizer manufacturing unit is however not encouraging. In order to promote and encourage manufacture of customized fertilizers the companies are allowed to use subsidized fertilizers. The present soil fertility status, climate, and cropping pattern in a region have the way for the development of customised fertilizer formulations for that location/region which leads to integrated, balanced and efficient use of fertilizers.

15.12 New Varieties based on crops and crop productivity

15.12.1 Agricultural intensification in the twentieth century represented a paradigm shift from traditional farming systems, based largely on the management of natural resources and ecosystem services, to the application of biochemistry and engineering to crop production. Following the same model that had revolutionized manufacturing, agriculture in the industrialized world adopted mechanization, standardization, labour-saving technologies and the use of chemicals to feed and protect crops. Great increases in productivity have been achieved through the use of heavy farm equipment and machinery powered by fossil fuel, intensive tillage, high-yielding crop varieties, irrigation, manufactured inputs, and ever increasing capital intensity.

15.12.2 Sustainable crop production intensification will use crops and varieties that are better adapted to ecologically based production practices than those currently available, which were bred for high-input agriculture. The targeted use of external inputs will require plants that are more productive; use nutrients and water more efficiently, have greater resistance to insect pests and diseases, and are more tolerant to drought, flood, frost and higher temperatures. New varieties will need to be adapted to less favoured areas and production systems, produce food with higher nutritional value and help improve the provision of ecosystem services.

15.12.3 Those new crops and varieties will be deployed in increasingly diverse production systems where associated agricultural biodiversity – such as livestock, pollinators, predators of pests, soil organisms and nitrogen fixing trees – is also important. Varieties suitable will need to be adapted to changing production practices and farming systems and to integrated pest management. Increased genetic diversity will improve adaptability, while greater resistance to biotic and abiotic stresses will improve cropping system resilience. The management of plant genetic resources (PGR), development of crops and

varieties, and the delivery of appropriate, high quality seeds and planting materials to farmers are the needs of hour.

15.13 Continual knowledge enhancement of farmers on fertilizer usage based on soil condition and cropping pattern.

15.13.1 At present, the country is having vast agricultural extension system to educate the farmers on improved farm technologies. Central/State Governments, State Agriculture Universities, ICAR, NGOs etc. are engaged for this purpose. However, Farmers' knowledge regarding the right product, dosage, time and method of application of fertilizers based on soil condition is very limited, leading to inefficient use of fertilizers. Extension services are required to be rejuvenated and reoriented with focus on the poor farmers and low fertilizer consumption areas for increasing farm profitability.

15.13.2 Under National Project on Management of Soil Health & Fertility (NPMSH&F) of Department of Agriculture & Cooperation, the knowledge of farmers on fertiliser usage is enhanced continuously through farmer's training, field demonstrations, etc. Financial assistance is provided to State Governments/ICAR/SAUs/Fertiliser Industry for farmer's training @ Rs.10,000 per training programme for two days duration on balanced use of fertilisers. Similarly, field demonstrations on balanced use of fertiliser @ Rs.10,000 per demonstration is provided. Finance assistance is also provided for adoption of villages by Soil Testing Laboratories (10 villages each) through Frontline Field Demonstrations (FFDs) @ Rs.20,000 per FFD. Field day-cum-farmer's fair are organised under field demonstrations and FFDs.

CHAPTER-XVI

16.0 RECOMMENDATIONS

16.1 GLOBAL DEMAND & SUPPLY

Keeping in view the surplus availability of urea at global level, it is suggested that Government should enter into negotiations or encourage Indian fertilizer companies for tying up for long term supplies of urea from the countries which will have surplus urea capacities after commissioning of the urea projects, which are at present under construction.

16.2 DEMAND AND SUPPLY POSITION OF UREA IN THE COUNTRY

Over and above the present installed capacity of 238.52 LMTPA of urea (222 LMT from domestic units plus 16.52 LMT from OMIFCO), additional capacity is expected to come in the next Plan Period as follows:

a) 19.96 LMT from additional production from existing units

b) 38.12 LMT from 3 brown field expansion projects and 12.71 LMT from one green field project.

c) 12.71 LMT from revival of one urea units of HFC/FCI.

Gap of around 30 LMT to be met from JV projects abroad based on low price gas/ LNG and imports. Few JV projects are expected to come up in the countries which have abundant reserves of gas with a buy back arrangement for urea produced by these projects. The above projects should be taken up for building the capacity of Urea in the country. With the increased capacity in fertilizer production, India will become self-reliant in Urea production.

16.3 MEASURERS FOR ATTRACTING INVESTMENT IN THE FERTILIZER SECTOR

Suitable amendments to the new investment policy in urea sector are required for creating conducive incentive based environment for new investments in Urea sector. The country would require an investment of about Rs 40,000 crore in the fertilizer sector to build up the additional capacity of about 12 million tonnes of urea by 2016-17. Besides this, investment in potash and phosphate assets/ mines for raw materials and joint ventures for finished fertilizers is required to ensure long-term supply of P & K fertilizers.

The Fertilizer Industry should be declared an industry of national importance. New investments need to be attracted to the special economic zones where fiscal benefits are provided to attract investments. Besides fiscal benefits (including exemptions on various taxes and duties), the fertilizer industry could

be provided incentives in the form of a) viability gap funding for investment in new projects, b) Facilitating long term contracts for gas, c) Securitization of subsidy receivables to ensure regular cash flow. Investor friendly look has to be given to New Investment policy declared in 2008.

16.4 FREIGHT SUPPORT FOR TRANSPORTATION OF FERTILIZERS TO HILLY AND DIFFICULT AREAS

The Tariff Commission has conducted the study and submitted the report to DOF on finalizing per tone per Km rates for transportation of fertilizers by road. In case of J&K, the rates recommended by Tariff Commission for Jammu region (Rs 5.29 PTPK) will be treated for all the districts in Jammu and in Srinagar.The adhoc transportation rate in Himachal Pradesh of Rs 4.13 PTPK and North Eastern States (Rs 2.2 PTPK for Arunachal Pradesh, Rs 4.38 PTPK for Manipur,Rs 6.39 PTPK for Meghalaya, Rs 3.44 PTPK for Mizoram, Rs 3.50 PTPK for Nagaland, Rs 7.07 PTPK for Sikkim and Rs 4.27 PTPK for Tripura) will continue. Final rates for these areas shall be notified after completion of study by Tariff Commission.

16.5 DISTRIBUTION OF FERTILIZERS

The fertilizer industry as also the state governments need to be pro-actively involved in making Fertilizers Monitoring System (FMS) a meaningful instrument for monitoring the availability and flow of fertilizers to the various consuming areas and to pre-empt shortages in a timely manner.

16.6 FEEDSTOCK REQUIREMENTS FOR UREA

The Government should ensure the assured supply of natural gas for long term at reasonable prices with pipeline connectivity which is crucial to attract fresh investment in urea sector. As per conservative estimates considering the revamps under execution, conversion projects to gas, four expansion projects, one Greenfield project and one revival project, at least 72.39 mmscmd gas shall be required by XIIth Plan. However, based on the proposals for nine expansion units, revival of all the closed units of FCIL and HFCL, and proposed Greenfield units in addition to the revamp projects and changeover projects, more than 100 mmscmd gas would be required.

16.7 IMPORT OF FERTILIZERs, RAW MATERIALS & INTERMEDIATES FOR PHOSPHATIC SECTOR - ROADMAP

Due to dependence of phosphatic industry on imported raw materials/intermediates, it is necessary to keep both indigenous and imported routes for supply of fertilizers to meet the nutrient demand of the agriculture sector. To ensure sufficient supplies of raw materials and intermediates relating to phosphatic sector over a sustained period, the Indian companies need to invest outside in the resource rich countries by way of joint ventures in mining, production of phosphoric acid, production of finished fertilizers, etc. This will not only provide some control over the world resources, which are so vital to our

agriculture, but will also help in stabilising the international prices in what is primarily a seller's market.

Since the country is import dependent in the phosphatic & potassic sector and is devoid of any substantial economically exploitable reserves of P&K, it is in the interests of the nation to maintain a certain degree of self-sufficiency in production and control over the inputs of production in this sector. While the country has acquired substantial self-sufficiency in terms of production capacity in the phosphatic sector, it will not be possible to sustain it on higher costs of production vis-à-vis international prices, even though these higher costs are due to higher costs of raw materials/intermediates. It is, therefore, imperative that the Indian industry invests abroad in phosphate & potash rich nations for ensuring sustained supply of phosphates and potash in all forms along with long term offtake arrangements at preferred prices.

16.8 ROADMAP FOR SSP

SSP is agronomically important for the Sulphur deficient Indian soils. With the agricultural yields plateuning, it is important that balanced fertilization is encouraged. Use of Sulphur in conjunction with NPK increases the nutrient uptake efficiency resulting in higher crop yields of all crops and especially for oil seeds and pulses. SSP is a phosphatic fertilizer, with 12% Sulphur and its use should be encouraged.

The major impediment in the growth of the SSP sector has been its quality, which has always been a matter of concern. The Government has embarked upon technical audit of all SSP manufacturing units to ensure better quality and has even notified various grades of rock phosphate, which can be used for manufacture of SSP. FCO amendment order for SSP quality has also been issued in 2011.

16.9 SOURCING OF MOP

In the potassic sector, the country is completely dependent upon imported MOP to meet the indigenous demand. The world trade of MOP is essentially in the hands of a few producers like Canada, Belarus, Russia, etc. and it is getting further consolidated in the hands of few companies by way of investments, mergers, etc. The country is paying heavily for lack of potassic resources in the country and its heavy demand for sustenance of Indian agriculture. There is a need to encourage Indian companies especially in the public sector to explore the possibility of sourcing MOP from other new sources and procuring mining concessions in new areas, wherever feasible. The Indian investments in potash rich countries can provide a certain level of comfort to this highly import dependent sector. Long-term buy-back arrangements with present suppliers can also be an alternative strategy to control the present trends of price increases.

16.10 POTASH FROM ALTERNATIVES SOURCES

In parallel, intensive R&D in this sector to explore the possibility of extraction of potash from other natural sources in the country like marine sources in addition to the land sources could also be explored. ICAR and agriculture universities may also explore the alternatives to potash in agriculture, if any, through focused research.

16.11 EXPLORING SETTING UP OF JVS ABROAD OR SOURCING FEEDSTOCK, RAW MATERIALS AND INTERMEDIATES FROM ABROAD

As the cost of gas in countries, such as Nigeria, Ghana, Egypt, Qatar etc who have large reserves of gas, is less than US $ 2/MMBTU as compared to Indian price of about US $ 4.2/MMBTU and RLNG of about US $ 10-15/MMBTU, the option of setting up joint venture urea projects abroad with buy-back arrangements can be considered. Alternatively, urea companies can also enter into long term arrangements for procuring feedstock from abroad. Department of Fertilizers has been in negotiations with countries such as Nigeria, Ghana, Egypt, Qatar Algeria where JVs can be set up or from where supplies of feedstock can be tied up.

16.12 INVESTMENT IN MINING ABROAD

The world rock phosphate production will increase from 203 million MT in 2010 to 257.5 million MT in 2015. The rock phosphate production (excluding China) is forecast at 179 Million MT in 2015. Production is projected to increase in West Asia, Africa, East Asia and Latin America. (*Source: IFA).* The Government should proactively encourage Indian investments in the new mining capacities coming up in next 5 years.

16.13 REVIVAL OF CLOSED FERTILIZER PSUS

All the units of the closed Companies have excellent infrastructure and they are strategically located near coal pitheads, ports or in the vicinity of proposed National Gas Grid. Moreover, there are no functional urea plants in the States of Bihar, Jharkhand, Chhattisgarh, Odisha and West Bengal and revival of closed units will ensure availability of fertilizer nearest to the consumption centers contributing to agricultural development in such areas. The revival of the closed urea units of Fertilizer Corporation of India Limited (FCIL) at Sindri, Talcher, Ramagundam, Gorakhpur & Korba and Hindustan Fertilizer Corporation Ltd. (HFCL) at Durgapur, Haldia, Barauni will significantly bridge the gap between production and demand of urea in the country.

16.14 INFRASTRUCTURE CAPACITIES AT PORTS

Most ports are severely constrained to handle high volumes on sustained basis. With the sea movement from CIS countries and US gulf increasingly being taken up through large vessels, accepting and handling them at Indian ports has become a severe limitation. While the ports have the draft to handle large vessels, these are limited by the lack of necessary infrastructure to handle and evacuate material to the hinterland. With increasing pressure on demand side and faced with a static indigenous production capacity, it is only natural that the imports would assume a significant role and as such there is an urgent need to review infrastructure capacities at ports for discharge and evacuation of fertilizers.

16.15 MODERNIZATION OF SHORE SUPPORT

There is a pressing need for upgrading and modernizing the shore support for achieving higher discharge rates through mechanical unloading and bagging facilities, raising the number and quality of barges at the anchorage ports and an increase in godown capacities. There is also an imperative need for creating facilities for handling panamax vessels at selected ports.

16.16 ROAD TRANSPORT

The development and maintenance of road transport will have to be substantially increased by way of widening and proper matting of road to withstand increasing load on the national and State highways.

16.17 PORT RAILWAYS FACILITIES AND PORT-RAIL CONNECTIVITY

Port Railways facilities and port-rail connectivity need to be strengthened to ensure the timely availability of fertilizers.

16.18 INLAND WATERWAYS AND COSTAL SHIPPING

There is a need to provide a thrust to the development of Inland Waterways and Costal Shipping for movement of fertilizers. At present, it is being used only on a very small scale by the fertilizer industry. For a country, which has experienced an appreciable growth in industrial and agricultural sector in the recent years the existing vessels of the costal merchant fleet are not adequate.

16.19 MEASURES FOR INCREASING ENERGY EFFICIENCY OF PLANTS

By undertaking certain additional revamp / modernization measures after undertaking the study for each plant, the energy efficiency of these plants can be further increased.

16.20 SETTING UP R & D CENTRES

As discussed in the report, R&D centers in the industry need to be encouraged, especially in the area of catalyst efficiency, retrieval of elements from used catalysts, new fertilizer development, enhancing soil health, enhancing the variety and quality of seeds, process of improving fertilizer use efficiency etc. There is need to establish a coordination group in the DOF to encourage and coordinate R&D activities nationwide retailed to fertilizer production. Possibility of establishing fertilizer R&D institute should also be explored to strengthen efforts for R&D activities.

16.21 BALANCED FERTILISATION & NEW FERTILIZER PRACTICES

To meet the increasing food requirement of the nation, it is necessary to aim for sustained increase in productivity in agriculture through balanced use of fertilizers. For balanced fertilization can be ensured through the following measures:

- There is a need to establish a National Level Centre of Soil Health Monitoring and Training under DAC, Ministry of Agriculture, Government of India.

- Use of water soluble fertilizers through micro-irrigation systems like drip irrigation should be promoted for increasing water and fertilizer use efficiency.

- Micronutrients should be the part of any soil fertility or Integrated Plant Nutrient Supply (IPNS) programme.

- Use of organic manures and recycling of biomass/crop residues to be made mandatory through policy support and incentivization.

- Encourage mixed/ intercrops of pulses in all major cropping systems. At least one pulse crop to be brought in rotation every year in intensively cultivated areas

- Encourage N_2-fixing and other useful trees/ bushes as hedges on bunds for in-situ production of biomass. Wherever possible green manure crops to be promoted and farmers need to be compensated appropriately

- Chemical nutrients need to be used only on soil test based recommendations in optimum quantities along with adequate quantity of composts/ biomass

- Biofertilizers need to be promoted on massive scale similar to chemical fertilizers

- Encourage use of mineral nutrient resources such as rock phosphate along with composts.

- In case of micronutrient deficient soils use of micronutrients be encouraged through composts for their better use efficiency and long lasting impact.

- Encouragement for integration of trees and cattle in farming system mode

- Use of lime, gypsum, basic slag and other soil amendments in problem soils also need support similar to chemical fertilizers

- Promotion of organic farming in low fertilizer use areas, rain-fed tracts.

- Farmers' knowledge regarding the right product, dosage, time and method of application is very limited, leading to inefficient use of fertilizers. Extension agencies should ensure that farmers use the fertilizers in accordance with soil fertility status and crop needs. It will require strengthening of the existing soil testing laboratories by providing facilities for analyzing secondary and micro-nutrients.

16.22 Budget Estimate for the 12th Plan period

Fertilizer Industry is a deregulated industry in terms of investment. Bulk of production of fertilizers come from Private Sector, therefore investment in the sector should be attractive enough to attract investment from private sector. However, an assessment is made of public sector requirement of investment during 12th Plan. The total investment is estimated at Rs. 25701 crore consisting of Rs. 15437 core of IEBR and Rs. 10264 crore of GBS. This is in addition to Rs. 1 billion corpus for acquisition of assets abroad.

Investment on developing infrastructure etc. will be reflected in plans of concerned Ministries/Departments. Proposed investment of Public Sector during 12th Plan is as follows:-

Twelfth Plan (2012-17) proposed investment of Public Sector

(Rs. in crore)

PSU	Particulars	12th Plan (2012-17) Proposed ture
1	2	3
RCF	IEBR	6013.70
FAGMIL	IEBR	120.23
PDIL	IEBR	36.50
NFL	IEBR	3121.27
KRIBHCO	IEBR	6145.00
Total IEBR		15436.70
Revial of Sick CPSEs	GBS	
BVFCL	GBS	3311.09
FACT	GBS	6537.00
MFL	GBS	383.91
FCI		
HFC		
PPCL		
Misc Schemes(MIS/IT and R&D)		32.00
Total GBS		10264.00
GRAND TOTAL(IEBR+GBS)		25700.70