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CHAPTER-I

1.0 INTRODUCTION

1.1 Agriculture continues to be mainstay for livelihood of rural people. Fertilizers have been considered as an essential input to Indian agriculture for meeting the food grain requirements of the growing population of the country. Chemical fertilizers bear a direct relationship with food grain production along with a number of supporting factors like High Yielding Varieties (HYVs), irrigation, access to credit, enhanced total factors of productivity, the tenurial conditions, size of the product market and prices they face both for inputs and the outputs etc. Studies have shown that around 50 to 60% of the enhanced food production during 1960-77 could be attributed to fertilizers.

1.2 In the context of the Eleventh Five Year Plan (2007-2012), Planning Commission set up a Working Group on Fertilizers Industry under the Chairmanship of Secretary (fertilizers) with its Terms of Reference and composition indicated below:

1.3 TERMS OF REFERENCE

1.3.1 To review the status of the industry up to and during the Tenth Plan period along with an analysis of growth in demand, demand-supply gap, raw materials and infrastructural limitations, level of energy efficiency in production compared to best units in the international level and impact of policy changes made during the period.

1.3.2 To review and suggest measures on the following issues :

i) Efficient use of fertilizers;

ii) Agronomical importance of low analysis fertilizers; specially SSP

iii) Deficiencies of soil in nutrients other than NPK;

iv) Production and use of bio-fertilizers;

v) Production of slow-release fertilizers; and

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

1.3.3 To assess the region-wise/state-wise fertilizer demand-supply for the Eleventh Plan and beyond (in the perspective of 15 years);

1.3.4 To suggest the manner in which to meet the fertilizers 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.

1.3.5 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 weakness of our domestic industry that need strengthening;

1.3.6 Feedstock limitations in general and measures to sustain the pace of growth in domestic production of fertilizers;

1.3.7 To assess the health of the fertilizer industry particularly PSEs and to suggest measures for improvements and mobilize the required investment.

1.3.8 To assess the need for revival of closed PSUs, particularly with reference to the need for having production capacities in the eastern part of the country. To assess the year-wise investment required to be 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/FO (Fuel Oil)/Low Sulphur Heavy Stock (LSHS) units into gas based production.

1.3.9 (i) 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;

(ii) To quantify fund requirement for R&D and means to source them and

(iii) Also suggest measures for improving the industry-institutional linkage for R&D.

1.3.10 To assess the need for a regulatory body under FCO for fast track approval of new products.

1.3.11 To review the present status of various taxes/duties, state-wise, on fertilizers/raw materials and suggest measures for their rationalization.

1.3.12 To make any other recommendations that may be considered appropriate for increasing efficiency, reducing cost and import, etc.

1.4 COMPOSITION OF THE WORKING GROUP

1.	Secretary, Department of Fertilizers	Chairman
2.	Dr. Arvind Virmani, Principal Adviser, Planning Commission	Member
3.	Joint Secretary (Fertilizers), Deptt. of Agriculture & Cooperation	Member
4.	Executive Director, Member Fertilizer Industry Coordination Committee	Member
5.	Joint Secretary, Ministry of Petroleum & Natural Gas	Member
6.	Representative of Ministry of Railway	Member
7.	Representative of Ministry of Shipping & Road & Highways	Member

8.	Joint Secretary, (A&M), DoF	Member
9.	Joint Secretary, Plan Finance – II	Member
10.	Adviser (I&VSE), Planning Commission	Member
11.	Representative of Planning Commission (Agriculture Division)	Member
12.	Representative of Planning Commission (PPD)	Member
13.	Representative of Planning Commission (PAMD)	Member
14.	Director-General, Fertilizer Association of India	Member
15.	Chairman & Managing Director, PDIL	Member
16.	Managing Director, IFFCO	Member
17.	Managing Director, KRIBHCO	Member
18.	Managing Director, Indo-Gulf Fertilizer Complex, Jagdishpur	Member
19.	Representative Of ONGC, Dehradun	Member
20.	Representative Of GAIL, New Delhi	Member
21.	Chairman & Managing Director, NFL	Member
22.	Chairman & Managing Director. RCF	Member
23.	Chairman & Managing Director, GSFC, Baroda	Member
24.	Executive Director, FICC, DoF	Member
25.	Shri Suman Bery, DG, National Council of Applied Research, New Delhi	Member
26.	Dr. Ahmad Masood, former Adviser PAMD	Member
27.	Shri B.K. Tiwari, FB-25, Lajapatnagar, Sahibabad	Member
28.	Joint Secretary (Fertilizers), DoF	Member-Secretary

Subsequently, to give a proper representation of private sector in the above Working Group, it was decided to co-opt the followings as member in the Working Group:

1. Shri Ajay S. Shriram,
   Chairman & Sr. Managing Director
   Shriram Fertilizers & Chemicals
   New Delhi

2. Shri P.R. Menon,
   Managing Director
   Tata chemicals Limited,
   Mumbai.

3. Shri V.K. Punshi,
   Managing Director,
   DMCC

1.5 To have expert opinion on specific emerging issues with regard to formulation of Eleventh Five Year Plan, the Working Group constituted the following Sub-Groups:

Sub-Group – I - Demand Projections and movement of fertilizers to end users and the use of new fertilizer practices under the Chairmanship of the Shri Vijay Chhibber, Joint Secretary (A&M)), Department of Fertilizers

Sub Group – II - Assessing the demand of raw materials to meet the projected demand requirements of Urea and to suggest technological up-gradation of current industry to international level with the end objective of reducing subsidy levels also under the Chairmanship of Shri Deepak Singhal, Joint Secretary (Fertilizers), Department of Fertilizers.

Sub Group – III -Assessing the demand of raw materials to meet the projected demand requirements of Phosphatic and Potassic fertilizers and to suggest technological upgradation of current industry to international level with the end objective of reducing concession levels also under the Chairmanship of Shri Vijay Chhibber, Joint Secretary (A&M)), Department of Fertilizers.

Sub Group – IV -Technological and R & D Issues relating to Fertilizer industry under the Chairmanship of Shri B.D. Sinha, Managing Director, KRIBHCO.

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

1.6 FERTILIZER SECTOR: ELEVENTH PLAN PERSPECTIVE

1.6.1 The importance of the fertilizer sector in India need hardly be emphasized as it provides a very vital input for the growth of Indian agriculture and is an inevitable factor that has to be reckoned within the attainment of the goal of self-sufficiency in food grains. The fertilizer sector would cover not merely the fertilizer industry but also certain activities in the agricultural sector, which are very intimately linked with the production and distribution of fertilizers. The fertilizer industry has to cater to the needs of the farmers who are the most important consumers of the fertilizer industry.

1.6.2 Accurate forecasting of fertilizer demand is essential, both for companies producing, importing and marketing fertilizer and for governments in their efforts to monitor the development of agriculture. Because fertilizer demand depends on a variety of agro-economic factors it is not stable nor is it amenable to accurate prediction. The choice of forecasting methodologies is thus particularly important, both for successful operation of fertilizer companies and for the formulation of appropriate policies by governments. To arrange timely supplies of the right fertilizer types in thousands of villages, it is necessary to have an assessment of the likely demand for each fertilizer type at numerous locations at different times in both the short and medium terms. Effective demand forecasting can enable importers to take full advantage of world market price fluctuations. Required storage, transport, staffing, credit, financial and foreign exchange arrangements are dependent on demand. If actual fertilizer demand is less than the fertilizer produced in or imported into a country, heavy financing costs and product losses will be the result. Considering that fertilizer procured but not sold may have to be kept for a year before it finds a buyer and that a storage duration of a year can cause high quantity and quality losses, the importance of demand forecasting can be readily appreciated. If the actual demand is larger than forecast, this leads to shortages, lower agricultural production and, often, political implications. Demand forecasts have special significance for developing countries like India which are substantially dependent on fertilizer/raw material imports. The forecast can permit a reduction of the time between vessel arrival and fertilizer application. If vessels arrive during or just before the season, it is possible to move fertilizer direct from the port to field stores in the consuming areas. This avoids the costs of extra handling and storage in moving stocks to primary points for onward sale to wholesalers. In countries where the private sector dominates the marketing system this procedure is practised with a high degree of success.

1.6.3 There was a slow increase in fertilizer production in absolute terms during Tenth Five Year Plan. There was a shortfall in actual production vis-à-vis the target projected in the Working Group on Fertilizers for the Tenth Plan. The shortfall was on account of non-implementation of a number of projects, which were envisaged / expected to be implemented during the Tenth Plan. This included IFFCO-Nellore, KRIBHCO-Hazira third stream, KRIBHCO-Gorakhpur, RCF-Thal third stream and revamp of FCI-Sindri. The joint venture project, Oman-India Fertilizer Co (OMIFCO), which was expected to start production by 1999-2000, was delayed and was completed only during the course of Tenth Plan. In view of the growing demand of fertilizers, all efforts need to be made to achieve self-sufficiency through incentives for additional production of urea, Brownfield /

Greenfield projects and revival of closed units of FCIL/HFCL. However, keeping in view the expected surplus availability of urea at global level, 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. Option for setting up of Joint venture projects in the countries abroad with cheaper sources of natural gas needs to be explored. 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 provided some control over the world resources, which are so vital to our agriculture, but will also help in stablising the international prices in what is primarily a seller's market.

1.6.4 The consumption of fertilizers is as important a factor as their production. There should be appropriate balance in the consumption of different fertilizer nutrients. The appropriate NPK ratio under Indian soil conditions is stated to be 4:2:1. In 1991-92, the year immediately preceding the decontrol of phosphatic and potassic fertilizers, the NPK ratio was 5.9:2.4:1. Consequent on decontrol of phosphatic and potassic fertilizers, the NPK ratio got distorted to 9.68:2.94:1 in 1993-94. The same has considerably improved to 5.3:2.2:1 in 2005-06. The farmers have to be educated in the matter of nutrient balance which is of great long term significance for the Indian agricultural economy and policy measures on balanced use of fertilizers have to be initiated. Apart from the need for increase in the consumption of fertilizers in appropriate ratio, there is a need to evenly spread the consumption of fertilizers all over the country. The studies have shown that lack of irrigation and lack of credit were the two main stumbling blocks that came in the way of maximizing the consumption of fertilizers. Further, the emphasis is shifting in favour of water-shed concept. In order to encourage consumption of fertilizers in rainfed areas, it would be useful to have a national project for fertilizer use.

1.6.5 Bio-fertilizers are cheap, renewable and eco-friendly, with great potential to supplement plant nutrients if applied properly; however, they are not a substitute to chemical fertilizers. They improve health of the soil. Since it provides nutrients to soil in a small and steady manner, its immediate effects are not very visible. Sales of bio fertilizers in the country has not picked up because of lack of knowledge and its slow impact on the productivity of the soil. Use of bio fertilizers is necessary to maintain the soil health as more and more use of chemical fertilizers kills all the micro organisms available in the soil, which are so essential for maintain the soil health. Supplementary use of bio fertilizers with chemical fertilizers can help maintain the soil fertility over a long period.

1.6.6 Concerns also are growing about the long-term sustainability of agriculture. Both the over and under-application of fertilizer and poor management of resources have damaged the environment. The overall strategy for increasing crop yields and sustaining them at a high level must include an integrated approach to the management of soil nutrients, along with other complementary measures. An integrated approach recognizes that soils are the storehouse of most of the plant nutrients essential for plant growth and that the way in which nutrients are managed will have a major impact on plant growth, soil fertility, and agricultural sustainability. Farmers, researchers, institutions, and Government all have an important role to play in sustaining agricultural productivity.

CHAPTER-II

EXECUTIVE SUMMARY

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

2.1.1 During the terminal year of the Eighth Five Year Plan (1996-97), the installed capacity of fertilizer the domestic fertilizer industry was 94.68 lakh metric tonnes (LMT) of nitrogen and 30.27 LMT of P_2O_5 (phosphate) per annum. This increased during the terminal year of the Ninth Five Year Plan to 121.66 LMT of nitrogen and 51.12 LMT of P_2O_5 (an increase of 26.98 and 20.85 LMT, respectively). *The capacity of the fertilizer industry remained by and large stagnant during the Tenth Five Year Plan period*.

2.1.2 As far as urea is concerned, the report of the Working Group on Fertilizers for the Tenth Plan had envisaged a demand of 242.14 LMTPA by the terminal year (2006-07). It had envisaged that *inter alia*, RCF-Thal Expansion Project, KRIBHCO-Hazira Expansion Project, revamp of the Namrup palnt of HFC and the Sindri Plant of FCIL would materialize during the Tenth Five Year Plan. The joint venture Indo-Oman Project in Oman was also targeted to be commissioned during the Tenth Plan.

2.1.3 However, the actual domestic production of urea in 2005-06 was 201 LMT. Besides, the OMIFCO plant was commissioned in July 2005. Consequently, at present the indigenous capacity for urea of the 28 functional units is 197 LMT besides 16.52 LMT in the joint venture OMIFCO plant. Therefore, the target envisaged in the Tenth Plan period have not been fully achieved. While BVFCL revamp project was commissioned in November 2005, FCI- Sindri has not been revamped consequent upon the closure of FCIL by the Government in September 2002. As far as RCF-Thal (11.55 LMT) and KRIBHCO-Hazira expansion

Projects (10.56 LMT) are concerned, the projects have not made any progress due to lack of availability of NG/LNG for new projects.

2.2 REVIEW OF THE PRICING POLICY

2.2.1 INTRODUCTION OF THE NEW PRICING SCHEME (NPS)

Until 31.3.2003, the subsidy on urea was being regulated in terms of the provisions of the unit specific pricing system under the Retention Price Scheme (RPS). This was replaced by the group based New Pricing Scheme (NPS) for urea manufacturing units with effect from 1.4.2003. It aims at inducing the units to achieve internationally competitive levels of efficiency, besides bringing in greater transparency and simplification in the administration of subsidy.

The NPS is being implemented in stages. Stage I was of one year duration, from 1.4.2003 to 31.3.2004. Stage II was of two year duration, from 1.4.2004 to 31.3.2006. The modalities of Stage III were to be determined after reviewing the implementation of Stage I and Stage II.

Under the NPS, pre-set energy norms for urea units during Stage II were notified with a view to fix norms for specific energy consumption and encourage efficiency and discourage inefficiency. Similarly, reduction in the rates of concession during Stage II of the NPS for urea units on account of reduction in capital related charges were also notified.

Phased decontrol of the distribution/movement of urea was also initiated during the NPS. Until 31.3.2003, urea was under total distribution and movement control. During Stage I of NPS, while 25% of the production was outside allocations under the Essential Commodities Act, 1955 (ECA) during Kharif 2003 it was increased to 50% during Rabi 2003-04. During Stage II, the distribution of urea was to be totally decontrolled after having evaluated Stage I and with the concurrence of the Ministry of Agriculture. After evaluation of Stage I in consultation with the Ministry of Agriculture, it was decided to defer the total decontrol of distribution of urea by six months initially which was later deferred upto 31.3.2006.

2.2.2 CONSTITUTION OF A WORKING GROUP FOR FORMULATION OF THE POLICY FOR STAGE III OF THE NPS

Stage III was to commence from 1.4.2006 after review of Stages I and II. A Working Group was constituted under the chairmanship of Dr. Y. K. Alagh for reviewing the effectiveness of Stages I and II of NPS and for formulating a policy for urea units beyond Stage II, i.e., from 1.4.2006 onwards. The Working Group submitted its report on 26.12.2005. The Working Group has given its recommendations on various issues such as pricing policy for Stage III commencing from 1.4.2006, future demand and supply of urea, joint venture projects abroad, maximum retail price of urea, feedstock,, taxation, distribution and movement of urea, subsidy and policy for fertilizer use. The Working Group considered the possibility of total decontrol of pricing of urea and found that this would have a significant negative impact on farmers' interests. Hence, the Working Group has ruled out decontrol of the pricing of urea in the near future. The Working Group felt that the logical progression would be to move over to a single producer price with a provision for a pass through of energy cost and for granting a capital subsidy to existing fertilizer units to convert to gas as the feedstock. However, considering the risks involved at the present stage, the sensitiveness of the agrarian question and the heterogeneity of the fertilizer industry, the Working Group has also recommended what it has called a second best strategy (SBS), in which there would be one group for gas based units and one for FO/LSHS based units. The first group of units would include units which have been designed for and are working on gas as a feed stock. It will also include two other groups, viz., units which have already converted to gas in the recent past but had yet to complete the initial period of servicing a large debt in terms of repayment of loan and interest payments and units which have plans or possibility of conversion to gas. The SBS also provides for granting a capital subsidy to the Naphtha/FO/LSHS and Mixed Feed units which have made significant investments in revamping and for units converting to gas.

The Working Group has further stated that if SBS is not acceptable to the Government for fiscal or any other reasons, then the NPS may be continued into the next pricing period with some updating and corrections of anomalies. This recommendation is based on the premise that any policy needs time and continuity to bear fruition.

The Department has favoured the third option recommended by the Working Group for continuation of NPS, which aims to carry forward the trends in efficiency, transparency and uniformity introduced during Stages I & II of NPS without any sudden changes of a basic nature. The Department has formulated a policy for urea unit for Stage-III of New Pricing Policy (NPS) commencing from 1.10.2006. The policy provides for conversion of non gas based units to gas, incentives for additional production of urea, rationalizing freight reimbursement, distribution and movement of urea in all parts of the country and encouraging joint venture fertilizer projects abroad.

2.2.3 POLICY FOR NEW AND EXPANSION PROJECTS FOR UREA

The policy for new and expansion projects for urea was announced in January 2004, which provided that the new/expansion projects will be based only on natural gas/LNG as feedstock. KRIBHCO-Hazira, Indo Gulf-Jagdishpur, IFFCO-Nellore and RCF-Thal have submitted proposals for setting up expansion projects, which if approved, would result in creating an additional capacity of 45.05 LMT per annum. The LRAC Policy needs a re-look to attract investment in the fertilizer sector.

2.2.4 POLICY FOR INCENTIVES FOR ADDITIONAL UREA PRODUCTION

The policy for de-bottlenecking/revamp/modernization was also notified in January, 2004 for creating additional capacity in the existing urea units. The policy of debottlenecking has been reformulated as "Incentives for additional Urea Production". All production between 100% and 110% of the existing reassessed capacity if so required by the Government as per approved production, plan will be incentivized on the existing net gain sharing formula between the Government and the Units in the ratio of 65:35 respectively with the provisio that the total amount paid to the units after including the component of variable cost will be capped at the units own concession rates. No permission of the Government is required for urea production above 100 percent plant capacity.

2.2.5 POLICY FOR CONVERSION OF NON-GAS BASED UNITS TO NG/LNG

The policy for conversion of non-gas based units to natural gas/LNG was announced in January, 2004 with a view to encouraging an early conversion of naphtha and FO/LSHS based units to natural gas/LNG so that they acquire a competitive edge in the deregulated and liberalized economic scenario. The policy for conversion of the non gas based units to NG/LNG has been formulated with definite plan for conversion of all non-gas based urea units to gas under Stage-III.

Consequent to the policy announcement, naphtha based urea units situated in the vicinity of the HBJ pipeline have already taken steps for conversion to natural gas/R-LNG. Gadepan-II unit of Chambal Chemicals & Fertilizers Limited (CFCL) and Phulpur-I & Phulpur-II units of IFFCO have already converted to NG/LNG. Shriram Fertilizer's naphtha based urea unit at Kota is expected to switchover by the end of the financial year 2006-07.

2.3 TAXES AND DUTIES ON FERTILIZERS/RAW MATERIALS

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 in the alternative, 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.

2.4 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 12.3 million tonnes (5.7 million tonnes N), from a total quantum of 131.3 million tonnes (60.4 million tonnes N) in 2006 to 143.6 million tonnes (66.1 million tonnes N) by 2010. As against this, the total supply is expected to increase by 29.8 million tonnes (13.7 million tonnes N), from a total quantum of 134.4 million tonnes (61.8 million tonnes N) in 2006 to 164.1 million tonnes (75.5 million tonnes N) by 2010. The global supply situation in respect of ‘N’, ‘P’ and ‘K’ is expected to be comfortable in comparison to the demand for them during the period 2005-06 to 2009-10.

2.5 DEMAND PROJECTION

The projections of fertilizer nutrients based on various approaches show a range of demand figures of total nutrients between 25 and 29 million tonnes for the terminal year of 11th Plan. The total nutrient consumption for 2011-12 is envisaged at 269 LMT.

The demand forecasts for ‘N’, ‘P’ and ‘K’ are estimated at 163.10 LMT, 72.90 LMT and 33 LMT respectively in the terminal year of the Eleventh Five Year Plan. This corresponds to a demand of 287.55 LMT for urea, 95.10 LMT for DAP, 37.40 LMT for MOP, 93.30 LMT for complex fertilizers and 36.45 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 ELEVENTH FIVE YEAR PLAN

2.6.1 In the context of rapidly increasing food-grain production in the country to 244 million tones by the year 2011-12, availability of 300 LMTPA of urea or more is to be planned for. It is expected that over and above the present installed capacity of 213.52 LMTPA of urea (197 LMT from 28 domestic units plus 16.52 LMT from OMIFCO), additional capacity is expected to come in the next Plan period as follows:

a) 25.186 LMT from capacity addition in the existing units

b) 33.50 LMT from 3 brown field expansion projects and 11.55 LMT from one green field project (total 45.05 LMT).

c) About 50 LMT from revival of seven urea units of HFC and FCI in Eastern India based on natural gas/LNG/CBM/Coal Gas as feedstock.

d) About 20 LMT from JV projects abroad based on cheap gas/ LNG, which may come up in the countries which have abundant reserves of gas with a buy back arrangement for urea produced by these projects.

The capacity has to be planned 15% above the projected demand keeping in view pipeline and buffer stock.

2.6.2 INVESTMENT IN THE FERTILIZER SECTOR

The fertilizer sector attracted huge investment in the past, particularly between mid 70's and 90's. However, there was hardly any investment during the 10th Plan. The total investment in the fertilizer sector by the end of 2005-06 was Rs.25,923 crore. With the accelerated growth in the Indian economy, other sectors have 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 31.5 million tonnes by 2011-12, India will need to invest at least Rs.36,000 crore in the sector at current capital costs.

2.6.3 MEASURES FOR ATTRACTING INVESTMENT IN THE SECTOR

Since all urea plants will ultimately shift to NG as feedstock/fuel in accordance with the policies of the government, subsidizing feedstock should be explored as a logical step rather than subsidizing urea. This will enable the government to bring the industry under an import parity based pricing (IPP) regime, with adequate pricing safeguards in the form of a collar and a cap, in the event that the selling prices to farmers continue to be fixed by the government.

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,

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

Other incentives could include:

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.
d) A new look has to be given on LRAC Policy declared in 2004

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. 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. A separate policy for providing one time capital assistance for conversion of FO/LSHS to gas is under consideration.

2.7.2 However, due to the dwindling supplies of natural gas, even the existing gas based units have been facing shortage of natural gas. Against the total requirement of 33.01 million standard cubic metres per day (MMSCMD) of gas for the existing gas based units, the actual average supply during 2004-05 was only 23.79 MMSCMD. With the commissioning of the 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 of gas to urea units along the HBJ pipeline has improved and the extent of use of costlier substitute has come down, but the shortfall in the case of gas based units in Kakinada and Uran region continues to be acute.

2.7.3 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, de-bottlenecking of existing urea units, setting up of new and expansion units and revival of closed urea units of

HFC and FCI. Based on the proposals received for de-bottlenecking and expansion projects and if all the proposals for revival of closed urea manufacturing 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 the Eleventh Plan Period would be 76.269 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 all the urea plants in the country barring three plants in South India will have connectivity by the year 2009-10.

2.7.4 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; while Director General of Hydrocarbons (DGH) has certified gas availability of 57.22 MMSCMD by 2011-12, additional gas of 94 MMSCMD is also anticipated by then though it is as yet uncertified by DGH. So the confirmed availability of gas during 2011-12 is expected to be 108.30 MMSCMD, up from 80.54 MMSCMD in 2007-08. Further, some additional discoveries have also been reported, which have yet to be certified by DGH. The additional availability of gas from these, as yet uncertified, discoveries is expected to reach 94 MMSCMD by 2011-12. As such, the total availability of gas from domestic production by 2011-12 in the more optimistic scenario could be as high as 202.30 MMSCMD. In addition, the availability of LNG from various sources, including Qatar, Shell and Iran, is expected to increase from the current level of 18 MMSCMD to 83.12 MMSCMD during 2011-12. As brought out below, the total availability of natural gas including RLNG, during the terminal year of XIth Plan, i.e. 2011-12, in the conservative and optimistic scenario is expected to be 191.42 MMSCMD and 285.42 MMSCMD respectively.

Gas supply projections during XIth Plan (MMSCMD)		
Sources	**’07-08**	**’11-12**
ONGC + OIL (A)	57.28	51.08
Pvt./JVs (certified by DGH) (B)	23.26	57.22

Additional gas anticipated (not certified by DGH yet) (C)		94
Total LNG supply (D)	30.45	83.12
Total Projected Supply Conservative scenario (A+B+D) Optimistic Scenario 2 (A+B+C+D)	 110.99 110.99	 191.42 285.42

2.7.5 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. The only means by which increasing fertilizer production and containing the subsidy burden can be achieved is by ensuring availability of gas for the existing and future requirements of the fertilizer (urea) sector. Besides, the production of fertilizers (urea) involves the most efficient use of gas since it uses both its heat value and the chemical components.

2.8 SICKNESS IN THE FERTILIZER INDUSTRY

2.8.1 Keeping in view the need for generating various options for revival of closed units of HFC, FCI and PPCL in keeping with the commitment of the UPA Government and the need for higher fertilizer production in the Eastern Region of the country, which does not have any urea production capacity at present, the Department is examining the possibility of revival of closed urea units of HFC and FCI based on natural gas/LNG/coal bed methane/coal gas. There is the likelihood of a new gas grid coming up with a potential source of gas by the year 2009-10. Most of the units of these companies have excellent existing infrastructure in the shape of residential colonies, coal and electricity tie-ups, railway sidings and a very sizable area of land. This infrastructure is ideal for brown field projects. Some of these units are located near coal pit-heads, which ensure availability of cheap coal for feedstock and fuel. Furthermore, revival of closed urea units, which are located in the Eastern Region of the country will result in some parity in creation of production capacity of urea in the states of

Bihar, West Bengal, Chhattisgarh, Jharkhand and Orissa, which do not have any urea plant at present. It is envisaged that revival of these closed urea units in Eastern India will add an additional urea capacity of 50 LMTPA.

2.8.2 As regards MFL and FACT, which have been declared sick, the Department has or is contemplating various measures for their financial revival and restructuring. The reasons for sickness of FACT are mainly on account of outdated technology of the plant, high energy consumption norms, large manpower and high fixed costs of the new ammonia plant (900 MTPD). The phosphoric acid plant suffers from low production and low efficiency.

2.8.3 The reasons for losses of MFL are due to the fact that the ammonia plant is not operating at full capacity due to non-matching capacity of urea plans and the NPK plant is operating at low capacity due to high cost and inadequate availability of phosphoric acid. The cost of production is higher than the amount received by the company through MRP and concession. The energy consumption for urea is higher than the modern ammonia plants mainly due to low capacity utilization of ammonia and inferior plant process features. Its depreciation charges are high compared to the norms of the group in which it has been placed under the NPS. A package for restructuring of MFL and to sort out the problems of FACT is under active consideration of Department of Fertilizers.

2.9 INFRASTRUCTURAL REQUIREMENTS OF THE FERTILIZER SECTOR

2.9.1 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.

2.9.2 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.

2.9.3 To supplement the efforts of major ports that handle 60-70% of the finished fertilizers, improvements in the existing minor ports will be more economical than creating new ports. The existing minor ports are well connected with the rail and road infrastructure and can be upgraded with relatively small investments.

2.9.4 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.

2.9.5 Railway facilities and port-rail connectivity need to be strengthened significantly during the Plan period if timely availability of fertilizers is to be ensured.

2.9.6 There is a need to provide a thrust to the development of inland waterways and costal shipping for movement of fertilizers.

2.9.7 In view of the competing demands for a number of agro-products, it will be desirable to strengthen the warehousing infrastructure to meet the changing needs of the country during the Eleventh Five Year Plan. This is more so because fertilizer demand has a definite peak and non peak distribution of demand and is not amenable to 'just in time' inventory planning.

2.10 INTEGRATED NUTRIENT MANAGEMENT AND BALANCED FERTILISATION

2.10.1 The increase in consumption of fertilizers during the 10^{th} plan period has not led to a corresponding increase in agricultural productivity and production. The stagnation in production and productivity of food grains for the past few years has become a source of concern and is posing a serious threat to our national food security. The depletion in soil fertility due to imbalanced and unscientific use of fertilizer is one of the major constraints in improving crop productivity. It is now high time that due attention is paid to the problem of degradation of soil health due to nutrient mining.

2.10.2 Nitrogen use efficiency in rice is hardly 40 %, even under well managed conditions. Fertilizer materials that are better than prilled urea should be promoted to get a higher fertilizer use efficiency. There is a considerable potential to improve the N use efficiency by promoting neem coated urea. However, the major barrier in large scale production of neem coated urea is the somewhat higher cost and that the present MRP does not cover the additional cost of coating urea with neem oil.

2.10.3 The present fertilizer product pattern which is dominated by urea, DAP and MOP is not conducive for solving the problem of multinutrient deficiency. New fertilizer materials with value addition/ fortification with secondary and micronutrients would be required to ensure balanced fertilizer use involving all or most of the nutrients required by crops.

2.10.4 Customised fertilizers facilitate the application of the complete range of plant nutrients in the right proportion and to suit the specific requirements of a crop during its stages of growth. 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.

2.10.5 Adoption of an appropriate pricing policy is a prerequisite for ensuring the integrated and balanced use of fertilizers. Current pricing and subsidy schemes do not include secondary and micronutrients. The pricing policy should encourage the use of all plant nutrients in a balanced manner. The subsidies on fertilizer should be rationalised so that there is parity in nutrient pricing to promote balanced fertilisation.

2.10.6 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.

2.11 RESEARCH & DEVELOPMENT AND TECHNICAL ISSUES

2.11.1 Fertilizer policy in the past 20 years has been mainly focused on pricing and distribution issues. Technology related issues have been neglected. Because of the linkage of the industry with agriculture and the need for food security, subsidy on fertilizers is likely to continue in some form or the other. Consequently, some kind of control will also remain on the industry. Though India is among the top three producers and consumers of fertilizers, there is practically no research on production technology carried out in the country. It is recommended that there should be well-defined policy for R&D and the mechanism for its implementation as part of the general policy for the fertilizer sector.

2.11.2 The Department of Fertilizers should be strengthened technically as it can play an important role in promoting productivity in the new economic environment through R&D efforts.

2.11.3 A research institute with state of the art facilities should be set up which shall take up R&D projects of interest to the fertilizer industry. The Govt. of India would give budgetary support and other sources of funding could also be explored in consultation with the industry.

2.11.4 A well conceived recognition and reward policy should be adopted to encourage young talented persons to opt for a career in industrial research and development.

2.11.5 Incentives like exemption from customs duty, free imports for pollution related technology and machinery may be allowed till such time that indigenous capabilities catch up with world standards.

2.11.6 The Indian fertilizer industry has reached a stage where it is necessary to have a long-term vision. It is recommended that the country should develop a world-class indigenous process technology for producing ammonia and urea (which accounts for 85% of the nutrients produced in the country) in the next 10 years. The target should be to achieve a specific energy consumption level of 5.0-6.0 Gcal/MT from the current level of 6.7-7.0 Gcal/MT for manufacturing ammonia.

2.11.7 The industry must prepare itself for using indigenously available raw materials. Technology/methods need to be developed so as to enable the use of indigenous rock-phosphate and coal to reduce dependence on imports of raw materials and feedstock.

2.11.8 New and cost effective alternative products like bio-fertilizers, slow release fertilizers should be developed which can replace conventional products with ease.

2.11.9 Pollution standards may also indicate the methods of measurement to be adopted. Unrealistic and unachievable standards should not be set.

2.11.10 R&D efforts in all pollution related areas are required to develop indigenous technologies taking care of not only the current needs but also the likely and emerging needs of the next 10 years.

2.11.11 Need for regulation for the sale of new products like plant growth is recommended.

2.11.12 **I**ndustry may contribute 1% of its profits to nodal agency which shall take up R&D projects of interest to fertilizer industry. Govt. of India may also give matching funds for R&D from the subsidy funds.

2.12 PROFESSIONALISATION OF MANPOWER FOR FERTILIZER SECTOR

2.12.1 The fertilizer industry employs sophisticated technologies in production of fertilizers. The operating conditions are hazardous both in terms of the chemical environment, high pressure and temperature. The operation and maintenance of fertilizer plants require skills of the highest order. Further, farmers being consumers of the fertilizers should be adequately informed about the appropriate use of fertilizers and other farm inputs for optimum farm productivity and net incomes.

2.12.2 With a GDP growth of more than 8%, there is a competing demand for trained manpower from all sectors of the economy. Fertilizer companies are already having difficulty in retaining the trained manpower. In view of high turn over of employees, the need for training becomes even more important. There is a strong felt need for setting up an institute at the national level for training of new entrants as well as for conducting refresher courses/retraining of existing employees. A training and manpower development institute should be established for the purpose. The institute may be established under the aegis of FAI. Funds should be allocated from the overall outlay for the Eleventh Five Year Plan for setting up such an institute.

CHAPTER –III

PERFORMANCE OF FERTILIZER INDUSTRY DURING TENTH FIVE YEAR PLAN

3.1 INTRODUCTION

Optimal use of fertilizers plays a key role in improving the productivity of various crops. Successive Five-Year Plans have laid stress on self-sufficiency in food grains and concerted efforts in this direction have resulted in substantial increase in agricultural production and productivity. Self-sufficiency in food grains and improved agri-outputs are the key determinants of the degree of success of Indian economy.

Fertilizers have played a vital role in raising the agricultural productivity in the country over a period of time. There has been significant improvement in fertilizer consumption over the years. From a very modest level of 52 million tones in 1951-52, the food grain production rose to above 208 million tonnes in 2005-06. Per hectare consumption of NPK (nutrients) increased from less than 1 kg in 1951-52 to 106.7 kg in 2005-06. The increase in fertilizer consumption over the years has been mainly due to increase in area under High Yielding Variety seeds (HYV), gross irrigated area and gross cropped area.

It is felt that increase in consumption of fertilizers would largely be responsible for bringing about progressive improvement in the production of food grains and other agriculture out-puts in the country.

3.2 CONSUMPTION OF FERTILIZER NUTRIENTS IN THE COUNTRY

3.2.1 As against the projected consumption of 222.64 lakh MTs of fertilizer nutrients by the end of 2005-06, the estimated consumption is 203.40 lakh MTs which is lower by about 8.6%. due to stretched supplies. While macro-level availability of fertilizers has been satisfactory during the Tenth Plan period shortages have been experienced in pockets due to inadequacy of some of the states to ensure proper distribution within the states.

3.2.2 Average annual growth of 13.2% of fertilizer consumption achieved at the end of V Plan period for all fertilizer nutrients has gradually declined to 2.1% at the end of VIII plan and stood at 4% at the end of the of IX plan period. Average annual growth in the X plan (up to the penultimate year) had been about 4%, which indicates a significantly buoyant state.

3.2.3 The country had been almost self-sufficient in urea production up to 2004-05. However, a steep growth in consumption of urea thereafter has exposed a huge gap between the indigenous capacity and demand. While the installed capacity of DAP in the country matches the requirement, actual production has been lagging behind significantly

3.2.4 Trends in production, consumption and imports of Urea and DAP are presented in **Annexures 3.1, 3.2**. Trends in the consumption of complex fertilizers, SSP and MOP may be seen in **Annexure 3.3.**

3.2.5 Increasing trend in the consumption of phosphatic and potassic fertilizers has led to the improvement of N:P:K ratio which had deteriorated consequent to decontrol. This ratio which stood at 6.0:2.4:1 in 1991 deteriorated to 9.5:3.2:1 in 1992-93 which coincided with decontrol of fertilizers other than urea. The ratio had been 6.8:2.6:1 at the end of IX Plan in 2001-02 which further improved to 5.3:2.2:1 in 2005-06, during the X Plan. The year-wise trend is indicated in **Annexure 3.4.**

3.3 STATEWISE/ZONEWISE CONSUMPTION

3.3.1 The 10th Plan began with a countrywide drought during 2002-03, causing a fall in All-India consumption of total fertilizer nutrients by about 7.3 per cent over the previous year. This was followed by a modest growth in consumption of 4.4 per cent during 2003-04. During the successive two years, the growth in the consumption of total nutrients was 9.5 per cent and 10.6 per cent, respectively.

The per annum growth during the Tenth Plan was only 4% over the terminal year of the Ninth Plan.

3.3.2 At the zonal level, during 2002-03, as a result of countrywide drought, the consumption of fertilizers recorded negative growth in all the zones except north-east, which witnessed positive growth during the period.

3.3.3 Generally, the growth in consumption of fertilizer takes time in picking up immediately following the drought year as the farmers are left with limited resources for the purchase of inputs after facing the drought in the previous year. During 2003-04, east and south zones registered marginal negative growth over the previous year. The states which recorded negative growth during 2003-04 include, Kerala, Tamil Nadu, West Bengal, Bihar, Karnataka, Chhattisgarh, and Maharashtra. Other major states witnessed positive growth during the period.

3.3.4 During 2004-05, the consumption of fertilizers recorded an impressive growth over the previous year. All the zones recorded positive growth in consumption except north-east. Most of the major states recorded positive growth in consumption except Assam, HP, J&K, Uttaranchal and Rajasthan.

3.3.5 During 2005-06, all the zones recorded robust growth in consumption of fertilizers over the previous year as a result of good weather. At the state level, only W. Bengal and Madhya Pradesh recorded negative growth during 2005-06 over 2004-05.

3.3.6 North zone is comprised of high fertilizer consuming states. Uttar Pradesh, in north zone is the highest fertilizer consuming state in the country. The total nutrient consumption was 34.64 lakh tonnes in Uttar Pradesh during 2005-06. Punjab showed an increasing trend in the consumption of fertilizer nutrients throughout the first four years of the Tenth Plan. Per hectare consumption of total fertilizer nutrients in Punjab during 2005-06 was 212.7 kg, about 99.3% higher than the National Average. This was followed by Haryana 176.7 kg, nearly 65.6% higher than all-India average. Per hectare consumption in Uttar Pradesh was 134.4 kg, 26% higher than the all-India average. North zone as a whole witnessed a steady growth during the period 2003-04 to 2005-06

3.3.7 In the Eastern Zone, Orissa recorded high increase in consumption consistently during the period 2003-04 to 2005-06. Similar was the situation in Jharkhand. While Bihar showed an increase in consumption during 2002-03, 2004-05 and 2005-06, W. Bengal recorded increase in consumption only in one year, i.e. 2004-05 and in the other years, of the 10^{th} Plan, the state showed marginal negative growth. Per hectare consumption of total nutrients in West Bengal during 2005-06 was 126.8 kg, about 18.7% higher than the National Average. In Bihar, the per hectare consumption of total nutrients was 116.4 kg, nearly 9% higher than the National Average.

3.3.8 In the Eastern Zone, Orissa recorded high increase in consumption consistently during the period 2003-04 to 2005-06. Similar was the situation in Jharkhand. While Bihar showed an increase in consumption during 2002-03, 2004-05 and 2005-06, W. Bengal recorded increase in consumption only in one year, i.e. 2004-05 and in the other years, of the 10^{th} Plan, the state showed marginal negative growth. Per hectare consumption of total nutrients in West Bengal during 2005-06 was 127.7 kg, about 19.7% higher than the National Average. In Bihar, the per hectare consumption of total nutrients was 116.6 kg, nearly 9.3% higher than the National Average.

3.3.9 In the North Eastern Zone, Tripura have shown the fastest growth in fertilizer consumption during the major part of Tenth Plan. During 2005-06, the states which showed positive growth in fertilizer consumption were Assam, Tripura, Nagaland and Mizoram. Per hectare consumption of all the states in the zone are below the National average.

3.3.10 In the South zone, Andhra Pradesh recorded sizeable increase during 2003-04 to 2005-06. Karnataka and Tamil Nadu recorded robust growth during 2004-05 and 2005-06. On the other hand, Kerala recorded positive growth in 2002-03 with marginal increase in 2004-05 and 2005-06. Per hectare consumption of total fertilizer nutrients was 206.4 kg in Andhra Pradesh during 2005-06. This was 93.4% higher than All-India average. The per hectare consumption in Karnataka and Tamil Nadu was 133.2 kg and 206.8 kg , respectively during 2005-06 which were higher than the All-India average. On the other hand, the per hectare consumption in Kerala at 68.5 kg during 2005-06 was lower than the All-India average.

3.3.11 In the West zone, Gujarat recorded high growth in consumption consistently between 2003-04 and 2005-06. Chhattisgarh and Maharashtra recorded positive growth in the consumption of fertilizer during 2004-05 and 2005-06. Other states in the zone registered pattern of growth, somewhat different from the general trend in the country. MP recorded positive growth in 2003-04 and 2004-05 and Rajasthan during 2003-04 and 2005-06. Except Gujarat, the per hectare consumption of total nutrients is lower than All-India average in other states of the zone. The consumption of total nutrients per hectare in Gujarat during 2005-06 was 113.2 kg, about 6.1%higher than the All-India average.

3.4 RAW MATERIAL LIMITATIONS

3.4.1 Of the three main soil nutrients, namely nitrogen, phosphate and potash, required for various crops, indigenous raw material is available mainly for nitrogen. The

Government's policy has been aimed at achieving the maximum possible degree of self-sufficiency in the production of nitrogenous fertilizers based on utilization of indigenous feedstock. This is desirable in view of strategic considerations as the international urea market is highly sensitive to demand-supply ratio.

3.4.2 In case of phosphates, the paucity of domestic raw material constrains the attainment of self-sufficiency. Limited availability of rock phosphate and sulphur in the international market is also a major impediment in this regard.

Domestic demand is serviced by 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 fertilizer

3.4.3 It was estimated by the working group that during terminal year of IX Plan 2001-2002 the country may not import any large quantity of this fertilizer. However, low capacity utilisation of the indigenous plants had necessitated substantial imports of DAP of about 24.38 lakh MT during 2005-06. The same trend is expected during the terminal year of the X Plan.

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

3.4.5 During 1960s and 1970s, naphtha dominated as feedstock for the urea industry. During the period of 1980s and the first half of 1990s, there was a definite move towards using gas as feedstock facilitated by the discovery and exploitation of gas reserves in Bombay High and by the technological advantages of gas as feedstock. The energy consumption in gas based plants is less than naphtha based plants and much less than fuel oil based plants. The capital investment for a gas based plant is also less than for naphtha based and fuel oil based plants.

3.4.6 At present, the total installed capacity of urea based on natural gas feedstock is 67%, followed by naphtha 23% and fuel oil 10%. Keeping in view the energy consumption and capital cost of new fertilizer plant, it seems appropriate to put up plants based on natural gas instead of naphtha and fuel oil. However, there is huge gap between projected demand and supply of gas. Sector-wise daily average supply of gas is at **Annexure- 3.5.**

3.4.7 During the terminal year of 8th Five-Year Plan i.e. 1996-97, the installed capacity of fertilizer was 94.68 lakh MTs of nitrogen and 30.27 lakh MTs of phosphate. This improved during the terminal year of 9th Five Year Plan, to 121.66 lakh MTs of nitrogen and 51.12 lakh MTs to phosphate. The growth in fertilizer industry remained stagnant by and large during X Five-Year Plan period. Presently, there are 56 major fertilizer plants in the country manufacturing a wide range of nitrogenous, phosphatic and complex fertilizers. Of these, 29 units produce urea. 9 units produce ammonium sulphate as a by-product. Calcium Ammonium Nitrate and Ammonium chloride are being produced by one plant each. Besides, there are about 72 medium and small scale units, which produce single super phosphate (SSP). There are about 4 urea plants and 2 Calcium Ammonium Nitrate plants, in which production had been suspended for reasons of feedstock limitation, financial non-viability etc.

3.4.8 The details of the projects implemented/commissioned during the course of X Five-Year Plan are in **Annexure 3.6.**

3.5 PERFORMANCE OF UREA UNITS UNDER NEW PRICING SCHEME FOR UREA UNITS

3.5.1 In order to arrive at a fair assessment of NPS, it is necessary to make an evaluation of the performance of the units in terms of parameters such as, capacity utilization, energy efficiency, etc, some of which are discussed below.

(A) Capacity Utilisation

3.5.2 Utilisation of capacity by plants is the first and the foremost parameter for judging the efficiency and effectiveness of the policy. The re-assessed capacity and the percentage of capacity utilisation group wise during the period 2001-02, 2002-03, 2003-04 and 2004-05 are given in the table below:

Group-wise Average Capacity Utilisation

Sl No.	Capacity (MT)	Capacity Utilisation %			
		2001-02	2002-03	2003-04	2004-05
Pre-1992 Gas	4638000	89.86%	94.55%	99.70%	103.17%
Post 1992 Gas	5517600	99.53%	99.01%	100.67%	108.63%
Total- Gas	10155600	95.11%	96.97%	100.22%	106.14%
Pre-1992 Naphtha	2816550	88.30%	95.51%	94.01%	102.29%
Post-1992 Naphtha	1729200	99.16%	100.02%	98.63%	101.70%
Total- Naphtha	4545750	92.43%	97.22%	95.77%	102.07%
FO/LSHS	2138400	99.38%	99.06%	100.01%	102.72%
Mixed Feed	2621987	87.09%	86.78%	94.10%	100.96%
Grand Total	19461737	93.88%	95.89%	98.33%	104.11%

3.5.3 It would be seen from the above that the capacity utilisation of all the groups has risen substantially from the level in the year 2001-02. Talking of the industry as a whole the capacity utilisation was 93.88% in 2001-02, 95.89% in 2002-03, 98.33% in 2003-04 and 104.11% in 2004-05. These figures denote significantly improved performance during the two years of NPS as compared to the preceding two years under RPS.

(B) ENERGY PERFORMANCE

3.5.4 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% of the total cost of production. NPS had set store on reducing energy consumption and bringing it up to the international standards. There are in-built incentives for improvement of energy consumption. Essentially, units have been permitted to make investments for improvement in energy efficiency and have been allowed to retain the gains arising from such investments. The table below indicates the energy consumption norms for the 8th Pricing Period, actual energy consumption in the years 2002-03 and 2003-04 and the pre-set norms for Stage-II effective from 1.4.2004 and the actual energy consumption during the year 2004-05 .

Sl. No	Group-Unit	Existing 8th Pricing Norms as per FICC	Energy consumption achieved during 2002-03	Energy consumption achieved during 2003-04	Stage-II Norms as announced by DOF w.e.f. 01.04.04	Energy consumption achieved during 2004-05
		(Est. Gcal)	(Gcal)	(Gcal)	(Gcal)	(Gcal)
1	2	5	5	7	3	9
Group-I : Gas (Pre 1992)						
1	BVFCL-Namrup	9.264	16.293	12.756	9.264	14.163
2	IFFCO-Aonla	5.938	5.694	5.688	5.938	5.715
3	INDOGULF-Jagdishpur	5.874	5.533	5.345	5.874	5.415
4	KRIBHCO-Hazira	6.193	6.112	5.856	5.952	5.838
5	NFL-Vijaipur	6.241	6.165	6.030	5.952	5.802

Group-II : Gas (Post 1992)						
6	NFCL-Kakinada	5.782	5.776	5.759	5.712	5.667
7	CFCL-Kota	5.988	5.593	5.613	5.712	5.647
8	TATA	5.507	5.413	5.280	5.507	5.201
9	OCFL	5.731	5.874	5.866	5.712	5.982
10	NFCL-Kakinada Exp	6.217	5.846	5.686	5.712	5.702
11	IFFCO-Aonla exp.	5.660	5.523	5.561	5.660	5.536
12	NFL-Vijaipur Exp.	5.762	5.728	5.618	5.712	5.458
Group-IIIA-I : Naphtha & Coal (Pre 1992)- Sub Group I						
13	SFC-Kota	8.073	7.946	7.778	7.847	7.822
14	IFFCO-Phulpur	8.026	7.604	7.458	7.847	7.598
Group-IIIA-II : Naphtha (Pre 1992)-Sub-Group II						
1	FACT-Cochin				9.529	
15	MCFL-Mangalore	7.356	7.477	7.360	7.356	6.896
16	MFL-Madras	8.398	8.352	8.014	8.337	7.760
17	SPIC-Tuticorin	7.475	7.372	7.103	7.475	7.047
18	ZIL-Goa	7.590	7.322	7.134	7.585	7.206
Group-IV : Naphtha (Post 1992)						
19	IFFCO-Phulpur Exp.	6.367	5.973	5.996	5.883	6.024
20	CFCL-II	5.678	5.679	5.681	5.678	5.596
Group-V : FO/LSHS						
21	GNVFC-Bharuch	7.989	7.985	8.213	7.989	7.808
22	NFL-Nangal	9.517	9.816	9.592	9.517	9.532
23	NFL-Bhatinda	10.235	10.221	9.693	10.221	9.731
24	NFL-Panipat	9.830	10.293	9.932	9.654	9.681
Group-VI: Mixed Feedstock						
25	GSFC-Baroda	6.935	7.256	6.619	6.935	6.304
26	IFFCO-Kalol	6.836	6.615	6.585	6.836	6.332
27	RCF-Thal	7.061	6.922	6.550	7.004	6.451

3.5.5 It would be seen from the above that the actual energy consumption was better in respect of 17 urea units during 2003-04 (Stage-I of NPS) as compared to energy norms allowed to urea units during 8^{th} pricing period of erstwhile RPS. Tighter pre-set energy norms were prescribed for 15 urea units during Stage-II of NPS as compared to energy norms of the 8^{th} pricing period. 22 urea units improved their actual energy consumption during 2004-05 as compared to pre-set norms of Stage-II of NPS.

Annexure 3.1

Trends in Production, Consumption and Import of Urea				
Year	**Production**	**Consumption**	**Import**	**Import % of Consumption**
	<------------ **(lakh tonnes)** ---------------->			
2000-01	196.24	191.87	0	-
2001-02	190.03	199.17	2.20	1.1
2002-03	186.21	184.93	1.19	0.6
2003-04	190.38	197.67	1.43	0.7
2004-05	202.39	206.65	6.41	3.1
2005-06	200.85	222.98	20.57	9.2

Annexure 3.2

Trends in Production, Consumption and Import of DAP				
Year	**Production**	**Consumption**	**Import**	**Import % of Consumption**
	<------------ **(lakh tonnes)** ---------------->			
2000-01	48.82	58.85	8.61	14.6
2001-02	50.91	61.81	9.33	15.1
2002-03	52.36	54.73	3.83	7.0
2003-04	47.09	56.25	7.34	13.0
2004-05	51.72	62.56	6.44	10.3
2005-06	45.54	67.64	24.38	36.0

Annexure 3.3

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

(lakh tones)

Year	**NP/NPK complex Fert**	**SSP**	**MOP**
2000-01	47.81	28.60	18.29
2001-02	49.66	26.05	19.92
2002-03	48.16	24.99	19.12
2003-04	47.59	25.44	18.41
2004-05	55.08	25.49	24.06
2005-06	66.94	27.56	27.31

Annexure 3.4

NPK Consumption Ratio since 1990-91		
Sl. No.	Year	NPK Ratio
1	1985-86	7.0 : 2.2 : 1
2	1986-87	6.7 : 2.4 : 1
3	1987-88	6.5 : 2.5 : 1
4	1988-89	6.8 :2.5 : 1
5	1989-90	6.3 :2.6 : 1
1	1990-91	6.0 : 2.4 : 1
2	1991-92	5.9 : 2.4 : 1
3	1992-93	9.5 : 3.2 : 1
4	1993-94	9.7 : 2.9 : 1
5	1994-95	8.4 : 2.6 : 1
6	1995-96	8.5 : 2.5 : 1
7	1996-97	10.0 : 2.9 : 1
8	1997-98	7.9 : 2.8 : 1
9	1998-99	8.5 : 3.1 : 1
10	1999-2000	6.9 : 2.9 : 1
11	2000-2001	7.0 : 2.7 : 1
12	2001-02	6.8 : 2.6 : 1
13	2002-03	6.5 : 2.5 : 1
14	2003-04	6.9 : 2.6 : 1
15	2004-05	5.7 : 2.2 : 1
16	2005-06	5.3 : 2.2: 1
Note: Optimum consumption Ratio is 4.0 : 2.0 : 1.0		

Annexure 3.5

Gas supply position to fertilizer units during 2005-06													
													Quantity in MMSCMD
Sl. No.	**Name of the Company**	**Existing requirement of Gas**	**Contracted quantity for APM gas**	**Contracted quantity for JV Gas**	**Contracted quantity for RLNG**	**Contracted quantity from other sources**	**Actual average supply during 2005-06**					**Shortfall in gas supply with reference to requirement**	**% of shortfall with reference to requirement**
							APM Gas	**JV gas**	**R-LNG**	**Other sources**	**Total**		
	Units along HBJ pipeline												
1	GSFC, Vadodara	1.886	0.626	0.150	0.700	0.410	0.597	0.107	0.542	0.346	1.591	0.2950	15.64
2	GNVFC, Bharuch	1.427	0.900	0.000	0.428	0.098	0.368	0.000	0.355	0.092	0.815	0.6120	42.89
3	IFFCO, Kalol	1.390	0.840	0.000	0.550	0.000	0.284	0.000	0.819	0.000	1.103	0.2870	20.65
4	IFFCO Aonla(I+II)	3.600	3.600	0.860	0.840	0.000	1.574	0.627	0.739	0.058	2.998	0.6020	16.72
5	KSFL, Shahjahanpur	1.929	0.780	0.340	0.809	0.000	0.770	0.310	0.780	0.000	1.868	0.0610	3.16
6	IGFL, Jagdishpur	1.850	0.780	0.340	0.730	0.000	0.710	0.313	0.686	0.000	1.709	0.1410	7.62
7	NFL, Vijaipur (I+II)	3.580	2.250	0.610	0.720	0.000	1.989	0.521	0.695	0.000	3.205	0.3750	10.47
8	TCL, Babrala	1.759	0.780	0.340	0.639	0.000	0.717	0.323	0.575	0.048	1.663	0.0960	5.46
9	KRIBHCO, Hazira	4.314	3.000	0.000	0.714	0.600	2.009	0.394	0.670	0.643	3.716	0.5980	13.86
10	CFCL, Gadepan I	1.969	0.780	0.340	0.849	0.000	0.744	0.337	0.736	0.000	1.817	0.1520	7.72
11	CFCL, Gadepan II	1.162	0.000	0.000	1.162	0.000	0.000	0.000	1.178	0.000	1.178	-0.0160	-1.38
	Sub Total	**24.866**	**14.336**	**2.980**	**8.141**	**1.108**	**9.762**	**2.932**	**7.775**	**1.187**	**21.663**	**3.2030**	**12.88**
	Units in the Uran region												
12	RCF, Trombay	1.800	1.800	0.000	0.000	0.000	1.069	0.000	0.000	0.000	1.069	0.7310	40.61
13	RCF, Thal	3.150	3.150	0.000	0.000	0.000	2.068	0.000	0.000	0.000	2.068	1.0820	34.35
14	DFPCL, Taloja	0.920	0.640	0.000	0.000	0.000	0.400	0.000	0.000	0.000	0.400	0.5200	56.52
	Sub Total	**5.870**	**5.590**	**0.000**	**0.000**	**0.000**	**3.537**	**0.000**	**0.000**	**0.000**	**3.537**	**2.3330**	**39.74**
	Units in the KG Basin												
15	NFCL, Kakinada (I+II)	2.266	2.266	0.000	0.000	0.000	1.552	0.346	0.000	0.000	1.898	0.3680	16.24
	Units In North East												
16	BVFCL, Namrup	1.720	1.720	0.000	0.000	0.000	1.385	0.000	0.000	0.000	1.385	0.3350	19.48
	TOTAL	**34.722**	**23.912**	**2.980**	**8.141**	**1.108**	**16.236**	**3.278**	**7.775**	**1.187**	**28.483**	**6.2390**	**17.97**

Annexure 3.6

Major Fertilizer Projects Commissioned during the Tenth Plan Period						
S. No.	Name	Location	Sector	Product	Additional capacity (lakh tonnes per annum)	Year of commissioning
1	Brahmaputra Valley Fertilizer Corpn. Ltd. Revamp project	Namrup, Assam	Public	Urea	4.00	November, 2005
2	Deepak Fertilizers & Petrochemical Corpn., Expansion project	Taloja, Maharashtra	Private	NP 23-23-0	0.70	April, 2003
3	Gujarat State Fertilizers & Chemicals Ltd. (Phase II)	Sikka, Gujarat	Private	DAP NP/NPK	3.96	October 2002

CHAPTER – IV

REVIEW OF FERTIIZER POLICIES

4.1 PRICING POLICY FOR UREA

4.1.1 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 bought under control several times in the past. These fertilizers were last decontrolled w.e.f 10.6.1994.

4.1.2 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.

4.1.3 Given the importance of fertilizer pricing and subsidisation 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.

4.1.4 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.

4.1.5 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.

4.1.6 NPS is being implemented in stages. Stage-I was of one year duration, from 1.4.2003 to 31.3.2004. Stage-II was of two years duration, from 1.4.2004 to 31.3.2006. The modalities of subsequent stages were to be after review of implementation of Stage-I and Stage-II. 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.

4.1.7 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 / modernisation and brown field expansions of existing Urea Units

(v) Conversion of non-gas based Urea Units to gas through incentives

4.1.8 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.

4.1.9 Phased decontrol of urea distribution/movement was also undertaken under the NPS. Until 31.3.2003, urea was under total distribution and movement control. During Stage-I of NPS, while 25% of production capacity was outside ECA allocation during Kharif 2003 and it was increased to 50% during Rabi 2003-04. During Stage-II, urea distribution was to be totally decontrolled after having evaluated the Stage-I and with the concurrence of the Ministry of Agriculture.

After evaluation of Stage-I in consultation with the Ministry of Agriculture, it was decided to defer the total decontrol of distribution of urea by six months initially which was later deferred upto 31.3.2006.

4.2 CONSTITUTION OF WORKING GROUP FOR FORMULATION OF POLICY FOR STAGE-III OF NPS

4.2.1 Stage-III was to commence from 1.4.2006 after review of Stage-I and II. The Department of Fertilizers (DOF) constituted a Working Group 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 i.e. from 1.4.2006 onwards. The Working Group submitted its report on 26.12.2005.

4.2.2 The Working Group adopted a composite methodology of meetings and discussions. It constituted 6 Sub-Committees comprising of subject matter specialists, scholars of eminence, representatives of the industry, and Government officials, to go in depth into the selected issues assigned to them and make recommendations in respect thereof. The urea companies and Fertilizer Association of India (FAI) made presentations before the Working Group giving their views on the impact of Stage-I & II of NPS on performance of urea units and their suggestions for the policy in Stage-III.

4.2.3 The Working Group has given its recommendations on various issues such as pricing policy for Stage-III commencing from 1.4.2006, future demand and supply of urea, joint venture projects abroad, maximum retail price of urea, feedstock related issues, taxation related issues, distribution and movement of urea, subsidy related issues and policy for fertilizer usage.

4.2.4 The Working Group has considered the possibility of total decontrol of the urea pricing and has found that this would affect the interest of the farmers in a significant negative manner. Hence, the Working Group has ruled out decontrol of urea pricing in the near future.

4.2.5 The Working Group has considered the positive consequences to the economy of moving away from unit level administered pricing strategies and observed that reforms under the NPS have led to cost reduction and energy savings from the levels achieved earlier. Based on this, the Working Group has felt that the logical progression would be to move over to a single producer price with a provision for energy pass through and grant of capital subsidy to existing fertilizer units to convert to gas as the feedstock.

4.2.6 However, considering the risks involved at the present stage, the sensitiveness of the agrarian question and the heterogeneity of the fertilizer industry, the Working Group has also recommended what it has called a second best strategy (SBS), in which there would be one group for gas based units and one for FO/LSHS based units. The first group of units would include units which have been designed and are working on gas as a feed stock. It will also include two other groups viz. units which have already converted to gas in the recent phase and had yet to complete the initial period of large debt servicing in terms of repayment of loan and interest payments and units which have plans or possibilities of conversion to gas based units. The latter group comprises naphtha based units and Gujarat Narmada Valley Fertilizer Corporation (GNVFC), Bharuch which will convert from FO to gas and have tied up gas supplies. SBS also provides for grant of capital subsidy for the Naphtha/FO/LSHS and Mixed Feed units which have made significant investments in revamp and for units converting to gas

4.2.7 The Working Group has further stated that if SBS is not acceptable to the Government for fiscal or any other reasons, then the NPS may be continued into the next pricing period with some updating and corrections of anomalies. This recommendation is based on the premise that any policy needs time and continuity to bear fruition. The NPS is hardly three years' old and some of the positives such as increased energy efficiency and emphasis on conversion to gas based feedstock are already in evidence, though these processes have not reached their logical conclusion as envisaged earlier. Seen in this light it could be said that more time is needed if all the objectives of NPS are to be realized in a meaningful and lasting manner. It is in this context that the Working Group has suggested under this option that the policy based on feedstock and vintage may be continued in Stage-III of NPS. 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. Having said this, it has also been stated that the issue of NG/LNG would, however, have to be appropriately addressed.

4.2.8 The recommendations under the first two options appear to stem from the strategy envisaged in the report of the Expenditure Reforms Commission (ERC) on which the policies adopted for Stage-I & II of the NPS were substantially based. ERC had envisaged the New Policy in stages. The Third Phase of the policy was to commence w.e.f 1.4.2005 wherein all plants were expected to convert to NG/LNG, and the units which failed to do so would only be entitled to concession as if they had switched over to LNG. For the Fourth Phase beginning from 1.4.2006, it was envisaged that the industry would be decontrolled. Simultaneously, it was also envisaged that maximum retail price (MRP) would be increased by 7% per annum from 1.4.2001 onwards and would reach a level of Rs. 6903/Metric Tonne (MT) by 1.4.2006. Based on these assumptions, it was felt that there would be a reasonable convergence between the cost of production, MRP and the price of imported urea which, it had been envisioned would be around Rs. 7000/MT. Thus, no concessions would be necessary for the units except the naphtha based units converting to NG/LNG. These units would be entitled to the feedstock differential between Administered Price Mechanism (APM) NG and LNG at a rate of Rs. 1900/MT. This policy projection is based on a set of assumptions – APM gas will be available at the levels of supply obtaining in 2000-01; the shortfalls in APM will be made up by LNG which will be available on demand at stable prices; the price of naphtha will remain stable; the international prices of urea will continue to be stable around Rs. 7000/MT; and annual increase in the MRP of urea by 7% is socio-economically acceptable. However, in practice, none of these assumptions have stood the test of time. The supplies of APM gas have dwindled and are likely to decline further, and there are uncertainties about the availability and supply and pricing of both Joint Venture (JV) gas and LNG in the medium term. The hydrocarbon market is still in the midst of an upheaval as a consequence of which the procurement companies find it difficult to arrange supplies on a sustainable basis. Hence, the units have found it difficult to convert due to unavailability of NG/LNG. The prices of naphtha have skyrocketed from Rs. 12000/MT to Rs. 30000/MT. The total internationally traded quantity of urea is limited and any presence of India in the market signals a rise in prices disproportionate to the demand. The average import parity price (IPP) of urea during 2005 was Rs. 11533/MT. This situation and environment would need to be taken note of for any realistic policy formulation exercise.

4.2.9 In view of above, the Department has favoured the third 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.

4.2.10 As the introduction of group based NPS in place of unit-specific Retention Price Scheme has encouraged the efficiency and cost competitiveness in manufacture of urea during Stage-I & II of NPS, it is recommended that trends of efficiency, transparency and uniformity introduced during Stage I & II of NPS needed to be carried forward during Stage-III of NPS with the following objectives:

(i) Achieve self sufficiency in urea at the end of 11^{th} Five Year Plan

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

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

(iv) Incentivise additional urea production

(v) Encourage investment in Joint Venture Projects abroad

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

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

4.2.11 Policy for Stage-III of New Pricing Scheme for urea manufacturing units is effective from 1.10.2006. The salient features of the proposed Stage – III Policy which is aimed at promoting further investment in the urea sector, are to maximize urea production from the indigenous urea units including through conversion of non-gas based Units to gas, incentivising additional urea production and encourage investment in Joint Venture (JV) projects abroad. It is also aimed at establishing a more efficient urea distribution and movement system in order to ensure availability of urea in the remotest corners of the country.

4.3 POLICY FOR NEW AND EXPANSION PROJECTS OF UREA

4.3.1 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 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. Policy for new and expansion projects is under review.

4.3.2 The following companies are considering for setting up of expansion projects:

S. No.	**Name of the Unit**	**Proposed capacity (LMTPA)**
1.	KRIBHCO- Hazira	10.56
2.	Indo Gulf- Jagdishpur	11.385
3.	RCF, Thal	11.55
4.	IFFCO,Nellore	11.55
		45.05

4.4 NEW POLICY FOR INCENTIVISING ADDITIONAL PRODUCTION OF UREA/REVAMP/MODERNIZATION

4.4.1 Further, recognizing the need for policy for treatment of additional urea capacity arising from de-bottlenecking/revamp/modernization of existing urea units, the Government has announced a policy for this purpose in January 2004. Realising the efficiency and environment friendliness of natural gas, de-bottlenecking/revamp/modernization would be allowed only if the additional production comes from using the natural gas/LNG as feedstock. The policy under NPS II for de-bottlenecking requires urea Units to obtain prior permission for the de-bottlenecking/revamp/modernization proposals. However, if a Unit produces urea more than 100% of its re-assessed capacity without de-bottlenecking, the net gain accruing on such sale after reimbursing the feed stock cost is shared between the Government and the Unit in the ratio of 65: 35 NPS. Stage-III policy seeks to maximize urea production from the efficient indigenous urea units and to promote further investment in the urea sector including technological up-gradation. No permission will be required from the Government for production beyond 100% of re-assessed urea capacity of the unit. All production between 100% and 110% of the existing reassessed capacity, if so required by the government as per the approved production plan will be incentivized on the existing net gain sharing formula between the Government and the unit in the ratio of 65:35 respectively with the proviso 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. For production beyond 110% units may be compensated at their concession rate, subject to the overall cap of IPP. While procuring additional urea beyond 100% of the reassessed capacity of urea units, a merit order system of procurement will be followed. Government will not subsidize the additional production, if not required by it for agricultural consumption.

4.4.2 The following companies are considering creation of additional capacity by way of de-bottlenecking/revamp/modernization of their existing urea units:

S. No.	Name of the Unit	Proposed capacity (LMTPA)
1.	Indo Gulf- Jagdishpur	2.442
2.	CFCL-Gadepan-I	2.90
3.	CFCL-Gadepan-II	2.244
4.	TCL-Babrala	2.90
5.	NFCL-Kakinada-I	2.60
6.	NFCL-Kakinada-II	2.60
7.	IFFCO-Aonla-I	1.353
8.	Aonla-II	1.353
9.	IFFCO-Phulpur-I	1.468
10.	IFFCO-Phulpur-II	1.353
11.	SFC-Kota	0.415
12.	RCF-Thal I & II	3.97
	Total	**25.598**

4.5 POLICY FOR CONVERSION OF NON-GAS BASED UNITS TO NG/LNG

4.5.1 Some of the fertilizer companies have been using costlier feedstock and have been rendered un-remunerative in the changed scenario. The plants based on naphtha/FO/LSHS are less energy efficient and have a higher production cost. Realising this, a policy for switchover of the existing naphtha/FO/LSHS based urea units to natural gas/LNG as feedstock was formulated in January 2004. The policy encourages an early conversion to natural gas/LNG so that they acquire a competitive edge in the deregulated and liberalized economic scenario. In the Stage-III of NPS adequate provisions are made for conversion of the non-gas based units to NG/LNG. 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, adequate gas supply would be available to all the functional units by 2008-09. Pipeline connectivity already exists in respect of 22 urea units and it is likely to be available in the next 3 to 4 years, in respect of other units too, except in respect of units at Goa, Mangalore and Tuticorin. Units not able to tie up gas will have to explore alternative feedstock like Coal Bed Methane (CBM) and Coal Gas. All functional

Naphtha and FO/LSHS based units would be converted within a period of 3 years (of these, Shriram Fertilizers & Chemicals Ltd (SFC) Kota is expected to convert by the end of the current financial year). On the expiry of the aforementioned period, the Government will not subsidize the high cost urea produced by the non-gas based urea units and rate of concession of such units will be restricted to the lower of the prevalent import parity price (IPP) or their own rate. In order to provide incentives for conversion to gas, there will be no recognition of investment made by units for conversion, there will be no mopping up of energy efficiency for a fixed period of 5 years for Naphtha based as well as for FO/LSHS based units.

4.5.2 Consequent to the policy announcement, naphtha based urea units situated in the vicinity of HBJ pipeline have already started taking steps for conversion to natural gas/R-LNG. Gadepan-II unit of Chambal Chemicals & Fertilizers Limited (CFCL) and Phulpur-I & Phulpur-II units of IFFCO have already converted to NG/LNG. Shriram Fertilizer's naphtha based urea unit at Kota is expected to switchover by the end of the current financial year.

4.5.3 The progress of conversion of non-gas based urea units to natural gas/R-LNG is to a large extent dependent on the availability and pricing of natural gas/R-LNG and creation of spur lines etc. In this context, meetings have been held between the officials of DOF and M/P&NG including between Secretary (Fertilizers) and Secretary (P&NG) for preparation of a credible plan of action for connectivity and availability of gas to urea units and it is agreed that adequate gas supply to these plants would be available by 2008-09. For the three FO/LSHS based NFL plants in North India also the pipeline connectivity and availability is expected by 2008-09. For FACT-Cochin and MFL-Chennai, gas is expected to be available by 2008-09 0r 2009-10 but for ZIL-Goa, SPIC-Tuticorin and MCFL-Mangalore, there is no definite gas connectivity and supply plan in sight. For these units, it is suggested to explore the possibility of using alternative feedstock like CBM and coal gas.

4.6 POLICY FOR PHOSPHATIC & POTASSIC FERTILIZERS

4.6.1 All the major fertilizers were covered under Retention Price Scheme till 24.8.1992. These fertilizers were under statutory price, movement and distribution control with Fertilizer Industry Coordination Committee determining the product wise & unit wise retention price. Government of India decontrolled all phosphatic & Potassic fertilizers w.e.f. 25.8.1992 on the recommendations of the Joint Parliamentary Committee. Presently, Urea is the only fertilizer under statutory price & partial movement control of the Government.

4.6.2 After decontrol of P&K fertilizers, Government announced the ad-hoc Concession Scheme from Rabi 1992-93 to cushion the impact of steep hike in the farmgate prices of these fertilizers as well as to promote balance nutrient application of fertilizers. The fertilizers covered under the Concession Scheme are DAP (Both indigenous & imported), MOP, SSP and 11 grades of Complex fertilizers. The concession for these fertilizers was announced and paid on ad-hoc basis to the manufacturers/ importers on the sales of these fertilizers made by them, after verification of the sales by State Governments. Maximum Retail Prices (MRP's) of P&K fertilizers under the Scheme were announced by the respective State Governments for sale within their States, till 1996-97.

4.6.3 To ensure uniform price of these fertilizers throughout the country, Government of India started announcement of indicative MRP's of these fertilizers under the Concession Scheme (except for SSP) from 1.4.1997 onwards. The MRP of SSP is still being announced by the State Governments and varies from State to State.

4.6.4 At present Government is working out normative delivered price of each fertilizer covered under the scheme (except SSP) as per the recommendations of Tariff Commission. The difference between normative delivered price & the indicative MRP is paid as concession. The movement and sale of these fertilizers, however, continue to be completely decontrolled. The present MRP of DAP, MOP & 11 grades of complex fertilizers can be seen at Annexure-1.

4.6.5 Freight support for transportation of fertilizers to hilly and difficult areas of Jammu & Kashmir, Himachal Pradesh, North Eastern States is also being provided under the scheme from 1.4.1997 onwards. These special arrangements have helped ensure availability of fertilizers in these remote areas and may be continued for the 11th Plan period also.

4.6.6 To ensure adequate availability of phosphatic & potassic fertilizers in all parts of the country during the peak demand period, the Government has pursued the policy of buffer stocking of DAP/MOP on Government account, in most of the states. This has minimised shortage of the main phosphatic fertilizer, i.e., DAP from any part of the country. Due to the uncertainty of imports by private players, this special arrangement has helped to cushion the impact of sudden spurt in demand of these fertilizers in any part of the country and may be continued for the 11th Plan period also. Till such time as private enterprise is able to fully meet the demand of phosphatic fertilizers all over the country, the buffer stocking operations should be continued. The state institutional agencies need to be involved in this operation and state governments should be encouraged to pro-actively participate in the gap-filling effort between assessed demand and availability in each season

4.6.7 The main thrust of the Concession Scheme has been to provide an environment of price stability for phosphatic and potassic fertilizers generally to low-income or resource-poor farmers by cushioning them against the full impact of the increases in costs of fertilizers. This has definitely contributed to increase in the consumption of P&K fertilizers, which had witnessed a slump immediately after decontrol.

4.7 POLICY ISSUES OF FERTILIZER MIXTURES

4.7.1 Fertilizer mixtures vis-à-vis complexes: The power has been delegated to State Governments for approving the grades of fertilizer mixtures based on the recommendation of the State Fertilizer Committee for specific soil/crops. Accordingly, most of the State Govts. have prescribed various grades of mixtures (of NPK mixtures and also Micronutrient mixtures) but few NPK + Micronutrient mixtures. Presently, there are about 100 grades of NPK mixtures and 60 grades of micronutrient mixtures notified by the State Governments under the FCO. They are mostly available in the solid form and very few in liquid form.

4.7.2 Both Granular and Physical mixtures have been allowed under FCO. Customarily the Granular mixtures are being used in the Northern, Eastern and Western states while the Southern states more specifically in the states of Kerala, Karnataka and Tamil Nadu, physical mixtures are more popular. There is no exact statistics available about the actual quantity of such mixtures, however, as a rough estimate about 0.5-0.7 MT of mixtures is being used in the country.

4.7.3 Fertilizer Mixtures while they have the advantage for specialized crops for identified soil and agro climatic conditions being tailored as per the nutritional need of the soil/crops vis-à-vis complexes, which have the fixed composition who are as a general prescription and cannot cater to the specific need. However, mixtures have a draw back due to heterogeneity, segregation and some times chemical degradation due to use of incompatible raw materials. This affects the efficiency of use of the product. Another draw back of mixtures is the quality of the product. On All India basis, around 25% of fertilizer mixtures are found non standard varying from 0% in J&K to 13.9% in Kerala, 17.3% in Tamil Nadu and 40.2% in Maharashtra during 2005-06 mainly failing in nutrient content primarily due to two reasons, First, the non compatibility of some of the ingredient and the resultant loss, and secondly, as they have to compete with the comparable grades of complexes in market, which are highly subsidized compared to mixtures. Many mixture manufacturers adopt the tactics of using lower quality of ingredients with the resultant lower quality of the material.

4.7.4 The DAC has accordingly issued guidelines to the State Governments in July, 2002 to:-

i) To denotify the lower grades of mixtures (below 25% in case of 2 nutrients N&P and 35% in case of 3 nutrients of NP&K.

ii) To denotify identical grades of complexes and

iii) To discourage physical mixtures and to switch over to the granular fertilizers in a time bound manner.

4.7.5 Considering the ground reality, the DAC has allowed the physical mixtures in the states of Kerala and few other states with certain conditions, while other states have been requested to switch over to granular mixtures over a period of time.

4.7.6 The GVK Rao High Powered Committee (1987) had recommended for discouraging the use of fertilizer mixtures. Similarly, many other committees in the past have also recommended discouraging the use of mixtures in view of their quality problem and availability of NPK complexes of various grades.

4.7.7 The increased use of high analysis chemical fertilizers and neglect of organic manures, has resulted in imbalanced use of fertilizers which has accentuated the deficiency of secondary and micronutrients. This necessitates balanced fertilization which entails not only the use of NPK but also secondary nutrients like sulphur and micronutrients like zinc, boron, manganese and molybdenum etc. in specific quantities per the soil/crop requirement and hence the need for development of customized fertilizers. They will have better efficiency vis-à-vis the general grade of complexes or fertilizer mixtures for increased factor productivity through the balanced application of fertilizers including limiting nutrients. The DAC, therefore, is of the view that fertilizer mixtures, though they have an important role in a limited area more specifically for the plantations, should be retained. However, in other areas, it should be discouraged and over a period of time it should be taken over by the customized fertilizers through appropriate policy initiatives, setting up of smaller units in the consumption areas and its effective quality control.

4.8 FCO PROVISIONS FOR FAST TRACK APPROVAL OF NEW PRODUCTS

4.8.1 To meet the requirement of specific soil and crop conditions, the State Governments have been empowered to notify specific fertilizer mixtures of both NPK as well as micronutrients. Most of the State Governments/UTs have since notified various grades of these mixtures for their farmers.

4.8.2 About 74 fertilizers of different grades have been notified under Schedule IA of FCO, this includes 14 grades of NP complexes, 11 grades of NPK complexes and many straight N, P & K and micronutrient fertilizers, besides, a number of grades of 100% Water Soluble fertilizers for use in fertigation in addition to the 3 liquid fertilizers which are also used in fertigation. In addition, the Govt. has approved a number of NPK complexes fortified with micronutrients, Neem coated urea and Bentonite Sulphur for commercial trial by the leading fertilizer manufacturers.

4.8.3 A new provision for provisional fertilizers has been made under clause 20 A of FCO, 1985 to include any potential new fertilizer for production and commercial trial in the country till its efficacy is finally established for its inclusion as a regular product under Schedule I of the FCO. Customized fertilizers have also since been introduced under the FCO.

4.8.4 The FCO is very dynamic and being subordinate legislation has flexibility for amendment in a hassle free manner. The Central Fertilizer Committee has been empowered to render technical advice to the Govt. on inclusion of any new product under the FCO including the specification and analysis or relaxation in provisions. The existing system is sufficient and is time tested.

4.9 TAXES AND DUTIES ON FERTILIZERS/RAW MATERIALS

4.9.1 Fertilizers are crucial inputs to Indian agriculture and the Government of India is subsidizing fertilizers to encourage its consumption for improving crop productivity and ensuring food security of the country.

4.9.2 Imposition of taxes and duties on fertilizer and/or its inputs increases the cost of fertilizers which defeats the very purpose of providing subsidy with a view to reduce the overall costs of fertilizers to the farmers.

4.9.3 For keeping the subsidy burden under control, the Government of India has already reduced the excise duty and custom duty on naphtha etc. for use as feedstock in manufacture of fertilizers, to zero. Yet, the subsidy burden has kept mounting, primarily on account of two factors, (a) increase in the prices of feedstock and (b) high level of State taxes on inputs. The rates of sales tax on natural gas/LNG, naphtha and FO/LSHS vary from state to state and range from 4 to 20 per cent. Such high rates of sales taxes neutralize the operational efficiency of the industry, besides adding to the subsidy burden.

4.9.4 Apart from sales tax, there are other various types of taxes such as additional sales tax, surcharge on sales tax, entry tax, purchase tax, turn over tax, octroi, etc. which are levied by the various State Governments on the raw materials/inputs used in the manufacture of fertilizers. Some of these taxes such as purchase tax, turnover tax and additional sales tax are not recognized by FICC for reimbursement to urea units. Nevertheless, these taxes are a burden on the fertilizer unit. It is further observed that even VAT rates are not uniform in the States where VAT has been adopted. In addition, Central Government has levied 'Service Tax' on many services including the transport sector which has impact on input prices. A compilation of various taxes and their rates as on 1.4.2006 is given in **Annexures 4.1 & 4.2.**

4.9.5 With a view to bring uniformity and in taxes on inputs, the Department has taken up the matter with the Inter-State Council. At present, the Department is pursuing the matter with the Empowered Committee of State Finance Ministers on VAT.

Annexure 4.1

						Local Sales Tax %		Entry Tax/Octroi %	
S.No.	STATE	UNIT	Applicability	CST %	Date of VAT	Vattable	Non Vattable	Vattable	Non Vattable
1	2	3	4	5	6	7	8	9	10
1	Uttar Pradesh	IFFCO- Aonla	Within State	4%			5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		4% on NG/RLNG& 5% on FO
			Outside State						
		INDOGULF-Jagdishpur	Within State	4%			5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		4% on NG/RLNG& 5% on FO
			Outside State						
		TATA	Within State	4%			5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		4% on NG/RLNG& 5% on FO
			Outside State						
		OCFL	Within State	4%			5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		4% on NG/RLNG& 5% on FO
			Outside State						
		IFFCO-Aonla exp.	Within State	4%			5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		4% on NG/RLNG& 5% on FO
			Outside State						
		IFFCO-P,PUR	Within State	4%					4% on NG/RLNG& 5% on FO
			Outside State						
		IFFCO-P,PUR EXP.	Within State				5% on NG/RLNG/PMT & 2.5% on Naphtha/FO		
			Outside State						
2	Tamil Nadu	MFL- Madras	Within State				3% Naphtha/LSHS, 25% HSD		4 % on Bags
			Outside State				4% Naphtha/LSHS		
			Outside State						
		SPIC- Tuticorin	Within State				3% Naphtha/LSHS, 25% HSD		
			Outside State				4% Naphtha/LSHS		
3	Rajasthan	CFCL-Kota	Within State		1.4.2006	4% on NG/LNG			
			Outside State	4%					
		SFC-Kota	Within State						3% on FO/LSHS, 4% Coal
			Outside State						
		CFCL-II	Within State	4% IOC-RLNG/Naphtha				3.5% on RLNG & 3% on Naphtha	
			Outside State		1.4.2006	4% on NG/LNG			
4	Punjab	NFL-Nangal	Within State	4%	1.4.2005				
			Outside State				2% FO/LSHS(Feed/Fuel), 10/=mt.Coal		
		NFL-Bhatinda	Within State	4%	1.4.2005				
			Outside State				2% FO/LSHS(Feed/Fuel), 10/=mt.Coal		
5	Maharashtra	RCF-Thal	Within State		1.4.2005	12.5% NG/Naphtha(Feed),8.5% on fuel			
			Outside State			8.5% on Gas feed/Naphtha fuel			

6	Madhya Pradesh	NFL-V,Pur	Within State		1.4.2006		12.5% NG		1% NG/RLNG/Naphtha
			Outside State						
		NFL-V,Pur Exp.	Within State		1.4.2006		12.5% NG		1% NG/RLNG/Naphtha
			Outside State						
7	Karnataka	MCFL-Mangalore	Within State		1.4.2005	8.5 % on FO	12.5% on Naphtha, 4% on FO		5% on FO
			Outside State						
8	Haryana	NFL-Panipat	Within State		1.4.2003		4% on FO/LSHS(Feed & Fuel)		
			Outside State	4%					2% on FO/LSHS(Feed),2% Coal
									10% on FO/LSHS (Fuel)
9	Gujarat	KRIBHCO-Hazira	Within State		1.4.2006		12.5% on NG/LNG, 16% Naphtha, 15% FO/LSHS		
			Outside State						
		GNFC-Bharuch	Within State		1.4.2006		12.5% on NG/LNG, 16% Naphtha, 15% FO/LSHS		
			Outside State						
		GSFC-Baroda	Within State		1.4.2006		12.5% on NG/LNG, 16% Naphtha, 15% FO/LSHS		
			Outside State						
		IFFCO-Kalol	Within State		1.4.2006		12.5% on NG/LNG, 16% Naphtha, 15% FO/LSHS		
			Outside State						
10	Goa	ZACL-Goa	Within State		1.4.2005	20% Naphtha & 12.5 % FO/LSHS			
			Outside State					18% on Naphtha & 2.5 % on FO/LSHS	
11	Assam	BVFC-Namrup	Within State		1.4.2005		20% on NG		
			Outside State						
12	Andhra Pradesh	NFCL-Kakinada	Within State						
			Outside State						
		NFCL-Kakinada Exp.	Within State		1.4.2005	12.5% on LSHS	12.5% on NG/Naphtha		
			Outside State			8.5% on LSHS			

Annexure 4.2

					Turnover Tax %		Purchase Tax %		Educational cess	Service Tax	Any Other, Specify %			
S.No.	STATE	UNIT		Applicability	Vattable	Non-Vattable	Vattable	Non-Vattable			Name of Tax	Vattable	Non-Vattable	Remarks
1	2	3		4	11	12	13	14	15	16	17	18	19	20
1	Uttar Pradesh	IFFCO- Aonla		Within State					2%	12%	GST		4%	Urea Subject to 6.5% UP Trade Tax & 1%
				Outside State										Development tax
		INDOGULF-Jagdishpur		Within State					2%	12%	GST		4%	
				Outside State										
		TATA		Within State					2%	12%	GST		4%	
				Outside State										
		OCFL		Within State					2%	12%	GST		4%	
				Outside State										
		IFFCO-Aonla exp.		Within State					2%	12%	GST		4%	
				Outside State										
		IFFCO-P,PUR		Within State										
				Outside State										
		IFFCO-P,PUR EXP.		Within State					2%	12%	GST		4%	
				Outside State										
2	Tamil Nadu	MFL- Madras		Within State							Surcharge on LST		5%	2.5% turnover tax on urea
				Outside State							Power Generation tax		Rs0.10/Unit	
				Outside State							Differential ST on Naphtha / FO/ LSHS		1%	
		SPIC- Tuticorin		Within State							Surcharge on LST		5%	
				Outside State										
3	Rajasthan	CFCL-Kota		Within State										Urea Sold in the State subject to 4% VAT. Vat credit in case of sale outside State subject to deduction of 4% VAT on input.
				Outside State										
		SFC-Kota		Within State										
				Outside State										
		CFCL-II		Within State										
				Outside State										
4	Punjab	NFL-Nangal		Within State					2%					No VAT on urea
				Outside State										
		NFL-Bhatinda		Within State					2%					
				Outside State										

5	Maharashtra	RCF-Thal		Within State					2%	12%				Sale of Urea outside State deduction of 4% on inputs
				Outside State										
6	Madhya Pradesh	NFL-V,Pur		Within State					2%	12%				Sale of urea subject to 4% VAT
				Outside State										
		NFL-V,Pur Exp.		Within State					2%	12%				
				Outside State										
7	Karnataka	MCFL-Mangalore		Within State										No VAT credit on Naphtha, VAT credit beyond 4% on FO
				Outside State										
8	Haryana	NFL-Panipat		Within State										No VAT on Urea
				Outside State										FO/LSHS used as Fuel subject to ED 16% +2% (ECS)
9	Gujarat	KRIBHCO-Hazira		Within State					2%					VAT @ 4% is applicable on urea. Vat credit not available on inputs
				Outside State										
		GNFC-Bharuch		Within State										
				Outside State										
		GSFC-Baroda		Within State										
				Outside State										
		IFFCO-Kalol		Within State										
				Outside State										
10	Goa	ZACL-Goa		Within State										
				Outside State					2%	12%				Urea subject to 4% VAT within State. Sale outside state deduction of 4% on inputs
11	Assam	BVFC-Namrup		Within State					2%	12%				Urea subject to 4% VAT, VAT credits on inputs not available
				Outside State										
12	Andhra Pradesh	NFCL-Kakinada		Within State										Urea subject to 4% VAt
				Outside State										
		NFCL-Kakinada Exp.		Within State										
				Outside State										

CHAPTER – V

GLOBAL DEMAND & SUPPLY SCENARIO

5.1 GLOBAL DEMAND & SUPPLY POSITION OF UREA

5.1.1 The global production of Urea was about 592 lakh metric tonnes (LMT) N during 2005. Out of which 453 LMT N was meant for domestic markets and about 136 LMT was exported. The major exporting regions include Russia and Ukraine in East Europe & Central Asia and Middle East countries, which account for about 60% of the world export of Urea. Other major exporting countries include Germany and Netherlands in West Europe, Romania in Central Europe, Canada, and U.S.A. in North America, Trinidad and Venezuela in Latin America and China, Indonesia and Bangladesh in Asia.

5.1.2 As per IFA, the world demand for urea is expected to grow by 123 LMT (57 LMT N), from a total quantum of 1313 LMT (604 LMT N) during 2006 to 1436 LMT (661 LMT N) during 2010. As against this, the total supply is expected to increase by 298 LMT (137 LMT N), from a total quantum of 1344 LMT (618 LMT N) during 2006 to 1641 LMT (755 LMT N) during 2010. Table below presents world supply demand balance of urea during 2006 to 2010.

WORLD SUPPLY DEMAND BALANCE OF UREA					
					(LMT product)
	2006	2007	2008	2009	2010
Supply	1343.9	1393.1	1471.6	1514.8	1640.7
Demand	1312.5	1344.7	1382.6	1410.2	1436.0
Surplus	31.4	44.8	89.0	104.6	201.7

5.1.3 Among the major surplus regions, Middle East will have a surplus of urea in terms of nitrogen of 11.2 million tonnes, East Europe & Central Asia 4.5 million tonnes and Central Europe 0.3 million tonnes by 2010. In socialist Asia, the surplus of urea will touch 1.3 million tonnes N. A statement of ammonia urea projects scheduled for coming up by 2015 world over is at **Annexure – 5.1.**

5.1.4 The world urea capacity is forecast to grow by an overall 28%, to 180 million tonnes of urea in 2010. In the year 2010 alone, capacity would expand by 14 million tonnes. Close to 50 projects are under way or being considered during the period from 2006 to 2010. The main additions will mostly occur in West Asia and China.

5.1.5. 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.

5.2 USE PATTERN OF FERTILIZER PRODUCTS IN THE WORLD

5.2.1 NITROGEN

5.2.1.1 Urea is the most popular fertilizer in the developing countries. It accounts for 60.5% of nitrogen consumption in China and 82.1% of N consumption in India. Its popularity is due to various positive qualities of urea e.g. the nutrient content in urea is higher than any other competing products available resulting in lowest cost of transportation per unit of nutrient. Its critical humidity is high compared to the ammonium nitrate and calcium ammonium nitrate (CAN). It can be easily stored and handled under the hot and humid conditions in India without any significant deterioration in quality. On the other hand the critical humidity of ammonium nitrate is very low requiring storage in controlled atmospheric condition. It is also an explosive being hazardous in storage, handling and application.

5.2.1.2 In developed countries, liquid fertilizers (nitrogen solutions) have significant contribution in consumption of nitrogen. For example, the solutions account for 26.8% nitrogen in France and 25% nitrogen consumption in USA. There is a significant use of ammonia in direct application in Canada (27.9% of nitrogen) and USA (26.3% of nitrogen). However, the Indian conditions with respect to climate, infrastructure, land holdings, etc. do not allow the direct application of ammonia. The application of nitrogen through compound fertilizers in India is similar to that prevailing in France, Germany, Canada and USA. The consumption pattern of various products in the world shows that India should diversify into other fertilizers including liquid fertilizers. The low analysis fertilizers like ammonium sulphate, ammonium chloride, CAN etc, do have application for specific crops. However, consumption of these products has been eclipsed due to withdrawal of subsidy on these fertilizers from 10.6.1994 when they were decontrolled and taken out from the purview of the Retention Price Scheme.

5.2.2 PHOSPHATES

5.2.2.1 In India, DAP is the major product contributing 62.7% of the total phosphate consumption. The other products are NP, NPK and SSP. China and Australia use SSP to meet 37.1% and Australia 24.5% of their respective requirement of phosphates compared to 9.9% share of SSP in India. Single super phosphate has its own unique qualities including its sulphur and calcium content pointing to its usefulness for sulphur deficient areas and oil seed and pulses. Its use should be encouraged in India. The production of SSP also does not need huge investment required for producing DAP and other complex fertilizers.

5.2.2.2 The data available does not bring out the micro picture in terms of the type and NP & NPK fertilizers used in various countries. However, there is enough evidence that customized compound fertilizers are widely used in developed countries which cater to the specific set of conditions of soil, crop and the climate. There is a need for a serious consideration to produce good quality customized fertilizers in the country. This can be done using the commonly available raw materials and semi finished fertilizers with small investment in plant and machinery. However, the pricing policy should encourage the diversification of products used in the Indian agriculture.

5.2.3 SUGGESTION FOR CREATION OF A TECHNOLOGY MISSION ON FERTILIZERS

5.2.3.1 The pattern of usage of fertilizers in India may change if the application of fertilizers is balanced and according to the soil and crop requirements. If the percentage of usage of phosphatic and potassic fertilizer increases then the demand of urea will undergo change. It is therefore, felt by this Sub Group that this aspect needs to be looked into by experts. It is therefore, suggested that a technology mission on fertilizers may be constituted comprising of experts from agricultural research institutes and agricultural universities to study the changes in pattern in usage of fertilizers in years to come.

Annexure – 5.1

Year	Country	Company	Location	Project status	Feedstock	NH3Cap	Downstream	NH3 surplus
2006								
January	Kazakhstan	Kazazot	Akatu	O/s	Nat Gas	80	Cx	0
June	Egypt	Alexandria	Abu Qir	u/c	Nat Gas	396	635 U	30
June	Egypt	Egyptian Fertilizer Co (EFC2)	Ain Sukhna	u/c	Nat Gas	396	635 U	30+
October	Iran	NPC-Razi 2	B. Khomeini	u/c	Nat Gas	677	none	677
October	Iran	Ghadir Ammonia & Urea Co. (Pars 1)	Bandar Assaluyeh	u/c	Nat Gas	677	1,073 U	65
June	S. Arabia	SAFCO IV	Al Jubail	u/c	Nat Gas	1,089	1,073 U	475
January	Indonesia	PT Pupuk Kujang	Cikampek	o/s	Nat Gas	396	572 U	70
April	Australia	Burrup fertilizers	Pty Ltd Burrup Pen, WA	o/s	Nat Gas	725	none	725
2006 TOTAL						**4,436**		**2,072**
2007					Nat Gas			
April	Lithuania	Achema	Ionava	Probable	Nat Gas	545	335U	0*
March	Egypt	Helwan Fertilizer Co.	Helwan	u/c	Nat Gas	396	635U	0
January	Iran	KPIC	Kermanshah	u/c	Nat Gas	396	660 U	0
July	Iran	Ghadir Ammonia & Urea Co. (Pars 2)	Bandar Assaluyeh	u/c	Nat Gas	677	1,073 U	65
April	Bolivia	Petroquimica	Santa Cruz	u/c	Nat Gas	33	85AN	0
2007 TOTAL						**2,047**		**65**
2008								
January	Russia	Acron	Dorogobuzh	2nd hand	Nat Gas	400	350 U	200
September	Egypt	MOPCO	Damietta	Contract	Nat Gas	396	635 U	0
April	Oman	SIUICI – Bahwan Group	Sohar	Contract	Nat Gas	660	1,666 U	0
2008 TOTAL						**1,456**		**200**

2009								
January	Turkmenistan	JSC Turkmendokun	Turkmenibad	U/c	Nat Gas	200	350 U	0
January	Egypt	Egypt Basic Industries Co (EBIC)	Suez	Finance	Nat Gas	660	None	660
July	Iran	NPC/Shiraz Petrochem.	Marvdasht	Bidding	Nat Gas	677	1,073 U	0
January	S. Arabia	Ma'aden	Al Jubail	Contractr	Nat Gas	660	0	660
July	Trinidad	Caribb. Petrochemical Manufacturing Ltd.	Point Lisas	Probable	Nat Gas	638	1,419 UAN	0
July	Trinidad	First UAN Trinidad (Terra/CF Inds)	Union Estate	Probable	Nat Gas	659	840 UAN	330
2009 Total						**3,494**		**1,650**
2010								
January	aLGERIA	Fertiberia/Asmidal	Arzew	Bidding	Nat Gas	1,089	None	1,089
July	qATAR	QAFCO V	N/a	Probable	Nat Gas	1,089	1,485 U	242
July	vIETNAM	Petrovietnam Fertilizer & Chemical Co.	Ca Mau	Finance	Nat Gas	445	725 U	0
2010 TOTAL						**2,623**		**1,331**
2005-2010 TOTAL POSSIBLE PROJECTS						**14,056**		**5,318**
2011								
	Abu Dhabi	Ruwais Fertilizer In. (Fertil)	Ruwais	Probable	Nat Gas	660	1,155 u	0
	Saudi Arabia	Ma'aden	Al Jubail	Probable	Nat Gas	660	DAP	0
	Saudi Arabia	SAFCO V	Al Jubail	Probable	Nat Gas	1,089	1,155 U	430
2011 TOTAL						**2,409**		**430**
2012								
	Egypt	Egypt Agrium	Damieta	Probable	Net Gas	800	1,200 U	100

		Nitrogen Products						
	Iran	Lavan or Pars 3B.	Assaluyah	Probable	Nat Gas	660	858 U	163
2012 TOTAL						**2,120**		**263**
2013								
	Pakistan	Engro Chemicals	Dharki	Probable	Nat Gas	410	726 U	0
2013 TOTAL						**410**		**0**
2014								
	Qatar	QAFCO VI	N/a	Probable	Nat Gas	**1,089**	**1155 U**	**430**
2014 TOTAL						**1,089**		**430**
2015								
	Iran	NPC-Pars 4B	Assaluyah	Probable	Nat Gas	**677**	**None**	**677**
	Oman	N/a	N/a	Probable	Nat Gas	**660**	**1,155 U**	**0**
2015 TOTAL						**1,377**		**677**
2005-2015 TOTAL POSSIBLE PROJECTS						**21,421**		**7,118**

CHAPTER – VI

ASSESSMENT OF FERTILIZER DEMAND DURING ELEVENTH FIVE YEAR PLAN

6.1 ASSESSMENT OF REGION WISE/STATE WISE DEMAND – SUPPLY FOR THE 11th PLAN AND BEYOND

6.1.1 The production of fertilizer is continuous whereas the demand for fertilizer is seasonal. Over the years, it has been the endeavour of the government to make available the required quantity of fertilizers to the farmers at right place, in right time. To fulfill this basic objective, there is the need for proper estimation of demand for fertilizers, both on short-term and long-term basis. While, the short-term demand projections prepared at the zonal conferences on the eve of each season, viz. kharif and rabi, have been found to be effective, the medium and long-term demand projections need greater attention. A realistic estimation of demand is essential for the whole gamut of activities in the fertilizer sector, including planning for production, import, movement, warehousing, etc. In addition, it is also essential to plan for the supply of feedstock and raw materials for the manufacture of finished fertilizers.

6.1.2 Various models have been developed for projecting fertilizer consumption. Notwithstanding the best of models/ tools/ techniques used for the medium to long term projections of demand by various national and international organizations of repute, there is always a variation between the projected demand and the actual consumption of fertilizers due to a variety of unforeseen factors, including weather aberrations, policy changes, etc. The actual consumption of total nutrients (N+P+K) deviated from the target by about 16% at the end of the 7th Plan, 22% at the end of the 8th Plan and 13% at the end of the 9th Plan. The deviation at the end of the 4th year of the 10th Plan, i.e. (2005-06) was about 7%. Therefore, it is preferable to adopt a methodology which has the minimum degree of variation from the actual. There is also the need for a mid-term review of the results and updating the figures, if the need arises.

6.1.3 DEMAND PROJECTIONS MADE BY VARIOUS AGENCIES

In the past, various organizations/ institutions adopted different methodologies for projections of demand for fertilizers. A few of them are listed below:

1. **Roy L. Donahue (1966)**. The methodology used was district-wise crop acreage x fertilizer recommendations.
2. **Donde and Brown (1972)**. Variables used – District-wise data on area under crops, irrigated area, farm harvest prices, and agricultural technology. Methodologies used – (a) time series, (b) multiple regression.
3. **National Commission on Agriculture (1976)**. Methodologies used (a) Replenishment of nutrient by crops, (b) area under crops and recommended doses, (c) demand for agricultural production and response ratio of crops to addition of fertilizers.
4. **National Council of Applied Economic Research (1978)**. Methodologies – Household sample survey.
5. **Working Group on Fertilizers for Five year Plans**. Methodologies used in the 9th and 10th Plan – Multiple regression model (FAI), Neural net approach (NIC), Sustainable growth approach (DAC).

6.1.4 MODEL ADOPTED BY THE WORKING GROUP HEADED BY PROF. Y. K. ALAGH

6.1.4.1 The Working Group on Review of Stage I & II of the New Pricing Scheme (NPS) and formulation of the Policy for Stage III for Urea units under the chairmanship of Dr. Y. K. Alagh, prepared the demand projections in 2005 for 2010-11. The model was prepared by the National Centre for Agricultural Economics and Policy Research (NCAEPR) for the Working Group. NCAEPR adopted two approaches, viz.

(a) **Normative approach**. The normative approach worked out the demand as the quantity of fertilizer needed to produce specified level of agricultural output.

(b) **Positive approach**. The positive approach estimated the quantity of fertilizers that would be demanded corresponding to different scenarios of variables that affect the demand for fertilizers

6.1.4.2 Table 1 and 2 present the All-India demand for fertilizer in 2010-11 under different scenarios as prepared by NCAEPR.

I. Normative Approach

Table 1: All-India Demand Scenario for Fertilizer in 2010-11			
	Quantity ('000 tonnes)		
	NPK	N	Urea
1. Output growth rate 2.72%, NPK ratio 2003	20,954	13,682	24,829
2. Output growth rate 4.08%, NPK ratio 2003	23,301	15,215	27,786
3. Output growth rate 2.72%, NPK ratio 1991	20,954	13,489	24,022
4. Output growth rate 4.08%, NPK ratio 1991	23,301	15,000	26,848
	Growth rate per annum (2002-03 to 2010-11)		
	NPK	N	Urea
1. Output growth rate 2.72%, NPK ratio 2003	2.53	2.53	2.95
2. Output growth rate 4.08%, NPK ratio 2003	3.72	3.72	4.22
3. Output growth rate 2.72%, NPK ratio 1991	2.53	2.36	2.57
4. Output growth rate 4.08%, NPK ratio 1991	3.72	3.56	3.82

II. Positive Approach

Table 2: All-India Demand Scenario for Urea in 2010-11	
	Quantity ('000 tonnes)
1. Business as usual (BAU)	24,959
2. BAU and freeze on subsidy	24,122
3. Freeze on subsidy, exploit irrigation	26,303
4. Average output growth rate 4%	27,452

6.1.4.3 A synthesis of the two approaches reveals that the demand for urea by 2010-11 would vary between 24 million tonnes at low agricultural output growth and 27.6 million tonnes corresponding to a relatively high growth scenario. Extrapolating the growth rate (between 2002-03 and 2010-11) used in the model, the demand for urea works out to 24.6 million tonnes for 2011-12 at low agricultural output growth, and 28.7 million tonnes at relatively high output growth scenario.

6.1.4.4 The model showed a growth rate of 2.53% for NPK at low agricultural output growth and 3.72% for NPK at high agricultural output growth. By using the growth rate of NPK presented in the model of NCAEPR on the base level consumption of 20.34 million tonnes achieved in 2005-06, the demand for total nutrients (NPK) is derived at 23.63 million tonnes at low agricultural output growth and 25.32 million tonnes at high agricultural output growth by the end of 11th Plan. The table given below shows the yearly projections of consumption based on the growth in consumption presented in the NCAEPR model:

Year	Demand for NPK (Lakh tonnes)	
	Scenario I	Scenario II
2006-07	208.5	211.0
2007-08	213.8	218.8
2008-09	219.2	227.0
2009-10	224.8	235.4
2010-11	230.5	244.2
2011-12	236.3	253.2

Scenario I: Agricultural output growth 2.72% per annum, NPK consumption growth 2.53% per annum

Scenario II: Agricultural output growth at 4.08% per annum, NPK consumption growth 3.72% per annum.

6.1.5 DEMAND PROJECTIONS BY DEPARTMENT OF AGRICULTURE & COOPERATION (DA&C)

6.1.5.1 There is no information available on cropwise fertilizer consumption in the country (except a study conducted by NCAER in 1978), which indicates that the major consumption is by cereal crops (61% i.e. Rice 35%, Wheat 26%), followed by 8% by Sugarcane and 5% cotton and 2% by Oilseeds. The remaining about 22% is consumed by commercial crops including horticultural crops. The gross area under food crops in recent years indicates that there is a decline in the area of foodgrains from 123 million hectare (mha) in 1999-2000 to 120 mha in 2004-2005 showing a diversion from food crops to horticultural sector as the area under Fruits and vegetables have increased from 6.69 mha during 1990-01 to 9.06 mha during 2002-03. There is also increase in area under oilseeds from 22.77 mha in 2000-01 to 23.66 mha during 2004-05.

6.1.5.2 The fertilizer consumption is a function of various biotic and abiotic factors like area under different crops , high yielding varieties , irrigation, fertilizer doses used, adequate availability of fertilizers, credit, rain fall pattern and weather conditions etc. besides the price of fertilizers. The increase in area under horticultural sector and commercial crops, will push up more demand of fertilizers. However, at present, there is no mechanism to quantify the sector/cropwise demand though the share of food crops to non food crops seems to be tilting from earlier 70:30 to 65:35 as is evident from the input survey.

6.1.5.3 Considering about 70 mha area under wheat and rice with optimal dose of 120-60-60 of NPK; 29 mha under coarse cereals with fertilizer doses of 60-30-30 and 21 mha under pulses with fertilizer dose of 30-60-30; the potential demand for food crops comes to about 23.8 million tones (MT) of NPK nutrients besides demand of non food crops like oilseeds and various commercial crops like sugarcane, cotton and also the horticulture sector including fruit and vegetables crops, the potential demand comes to 33 MT of NPK nutrients. However, considering the past trend and the fact that only suboptimal dose of fertilizers are presently being used by farmers, the effective demand for 2011-12 comes to 26 MT for the foodgrain demand of 244 MT as recommended by Working Group constituted by planning Commission for 11th plan as per the model adopted by the Task Force on Balanced Use of Fertilizers, set up by DAC in 2005 after updation of the share of foodgrains @ 65% and 35% for non food crops. The breakup of nutrients in the NPK ratio of 5:2:1 comes to 16.25 N, 6.50 P and 3.23

K MT for 2011-12. It may be mentioned that for promoting the balanced use of fertilizers, it is imperative that the contribution of Urea as major source of N, should be gradually reduced so also of DAP & MOP with proportionate increase in the share of complexes and SSP. Accordingly , the demand of Urea, DAP, complexes, MOP and SSP for 2011-12 may be as under:-

(Lakh Metric Tonnes)

Year	Urea	DAP	Complexes	SSP	MOP
2011-12	270	80	120	41	34

6.1.6 DEMAND PROJECTIONS BY FAI

6.1.6.1 The Working Group felt that the nutrient demand worked out should meet the foodgrain target. The rate of growth of the agriculture sector for the 11th Plan Period has been taken as 4% per annum. However, no official statistics is available for the projected area under various crops and application rates of fertilizers for the 11th Plan. FAI has projected demand for fertilizers by the following three approaches: (i) Population nutrition, (ii) Foodgrain target, and (iii) Multiple regression.

6.1.6.2 POPULATION NUTRITION

6.1.6.2.1 One approach to project the demand for the future is by using the projections of population and the per capita need for foodgrains. The mid-year projected population figures for 2001 to 2026 is brought out by the Registrar General of India (RGI). Based on the data on projected total population from RGI , the per annum growth of population works out to 1.37% , from a total number of 1.145 billion during 2007-08 to 1.208 billion during 2011-12. With the increase in population and stagnation in the growth in foodgrain production in the last decade, the net per capita availability of foodgrain has been going down over the years. The highest per capita availability of foodgrain was 510 gram per day during 1990-91 which has deteriorated to 463 grams per day during 2003-04. During the triennium 2001-02 to 2003-04, the average net per capita availability of foodgrains was 465 grams per day or 170 kg per annum. If the same level of the per capita net availability is maintained in the future years, the net requirement of foodgrains works out to 205 million tonnes for 2011-12 (Population 1.208 billion x 170 kg). Assuming, the net availability as 87.5% of the gross availability, the gross requirement of foodgrains works out to 234 million tonnes in 2011-12.

6.1.6.2.2 The 9th Five Year Plan adopted a response ratio of 1:7 for fertilizer to foodgrains. The 10th Plan adopted an average response ratio of 6.5. There are reports of a further decline in the response ratio during the recent years. By applying a response ratio of 1:6, the additional requirement of fertilizers for food grains would be 4.34 million tonnes by 2011-12. Currently, about 65% of the total fertilizer consumption is on foodgrains and the balance 35% on various other crops. So, the additional requirement of fertilizers (nutrients) would be around 6.67 million tonnes during 2011-12. The total requirement of fertilizer nutrients (N+P+K) will be 27.01 million tonnes (20.34 + 6.67) by the end of 2011-12. By applying NPK ratio of 5:2:1, the requirement of NPK (nutrients) will be 16.88 million tonnes of N, 6.75 million tonnes of P and 3.38 million tonnes of K. The yearwise details of demand projections of fertilizer nutrients are presented in **Annexure 6.1**.

6.1.6.2.3 To restore the net availability of foodgrains to the best achieved level of 510 grams per day (1990-91), the requirement of foodgrains would be as high as 257 million tonnes and a total NPK consumption of 33 million tonnes for all crops by the end of 2011-12. This implies a linear growth rate of about 10 million tonnes of foodgrains per annum.

6.1.6.3 FOODGRAINS TARGET APPROACH

6.1.6.3.1 The Working Group for the Eleventh Five Year Plan on ‘Crop Husbandry, Agricultural Inputs, Demand and Supply Projections and Agricultural Statistics’ projected demand for foodgrains at 244 million tonnes by the end of 11th Plan.

Assuming a response ratio of 1:6 for fertilizer to foodgrains, there will be need for about 19.2 million tonnes of fertilizer nutrients for foodgrains to achieve the target of 244 million tonnes of foodgrains. About 10.3 million tonnes would be needed for other crops. The total nutrient requirement for all crops will amount to 29.5 million tonnes, which includes 18.4 million tonnes of N, 7.4 million tonnes of P and 3.7 million tonnes of K by the end of 2011-12. The year wise details of demand projections of fertilizer nutrients are presented in **Annexure 6.2**.

6.1.6.4 MULTIPLE REGRESSION

6.1.6.4.1 Keeping in view the recent trend in the consumption of fertilizers and additional area to be brought under irrigation under the Bharat Nirman Progrmme, additional area under HYV, normal level of rainfall in the coming years, prices of fertilizer nutrients, the estimates of demand for fertilizer nutrients have been worked out in FAI for the 11^{th} 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 2006-07 to 2011-12.

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

The methodology and the findings of the study are shown in **Annexure 6.3**.

6.1.6.5 All India Demand Forecast of N, P_2O_5 and K_2O

6.1.6.5.1 Based on the above model, demand forecast has been made separately for N, P_2O_5 and K_2O. Taking into account the predicted values of independent variables and actual values of lagged consumption up to 2005-06 and predicted values of it thereon, the forecast of N, P_2O_5 and K_2O has been worked out.

6.1.6.5.2 Assuming normal rainfall for the forecast period with the actual and predicted values of other independent variables, the demand forecast of fertilizer nutrients for the period 2006-07 to 2011-12 has been worked out. Based on the model, the growth in total nutrient consumption is estimated at 4.1% per annum during 11th Plan, as against 4% per annum attained during the first four years of the 10th Plan. The total nutrient consumption for 2007-08 works out to 23.12 million tonnes. For 2011-12, the projected figure is 26.90 million tonnes.

6.1.6.5.3 The summary of results derived from various methodologies used for projections of demand for fertilizers nutrients (NPK) is shown below:

SUMMARY OF DEMAND PROJECTIONS OF FERTILIZER NUTRIENTS (N+P+K) BASED ON VARIOUS METHODOLOGIES

Methodology	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average per annum growth during 11th Plan: Quantity (million te)	Average per annum growth during 11th Plan: Compound growth (%)
	------------- million te --------------							
I. Projections based on NCAEPR Study (Agricultural output growth 4.08%)	21.10	21.88	22.70	23.54	24.42	25.32	0.69	3.7
II. Projections by DAC	21.05	21.85	22.69	23.54	24.44	25.05	0.64	3.5
III. Projections by FAI **A. Population nutrition Approach (Annexure 6.1)**								
(Net availability of foodgrains 465 gm per day, Response ratio 1:6)	23.08	23.88	24.67	25.47	26.27	27.01	0.63	3.2
B. Food grains Target Approach (Annexure 6.2)	21.77	23.23	24.73	26.28	27.86	29.49	1.25	6.3
C. Multiple Regression Method(Annexure 6.3)	22.05	23.13	24.09	25.04	25.96	26.90	0.75	4.1

6.1.6.5.4 The projections of fertilizer nutrients based on various approaches show a range of demand figures of total nutrients between 25 and 29 million tonnes for the terminal year of 11th Plan. The consumption of total nutrients is expected to increase by over 8% during 2006-07 compared to 2005-06. The anticipated consumption during 2006-07 is likely to be about 22 million tonnes. The demand for 26.9 million tonnes of nutrients by 2011-12 on the estimated base level consumption of 22.05 million tonnes in 2006-07 represents a per annum growth of 4.1%. The growth in fertilizer consumption during the first four years of the 10th Plan was 4% per annum. With the spurt in the growth of consumption experienced during the past two years (2004-05 and 2005-06), and the continued high growth trend in the current year (2006-07), an average growth of 4.1% per annum for total nutrients (N+P+K) on the base level consumption of 2006-07 appears to be plausible growth for the 11th Plan. Therefore, total nutrient consumption for 2011-12 is envisaged at 26.9 million tonnes. The details of NPK break up are shown below:

Table 3: All India Demand Forecast of Fertilizer Nutrients (Lakh tonnes) 2006-07 to 2011-12

Year	N	P_2O_5	K_2O	Total	Ratio N:P:K	Ratio N:P
2006-07	137.85	57.50	25.15	220.50	5.5:2.3:1	2.4:1
2007-08	143.85	60.80	26.60	231.25	5.4:2.3:1	2.4:1
2008-09	149.00	63.80	28.05	240.85	5.3:2.3:1	2.3:1
2009-10	153.90	66.80	29.65	250.35	5.2:2.3:1	2.3:1
2010-11	158.50	69.80	31.30	259.60	5.1:2.2:1	2.3:1
2011-12	163.10	72.90	33.00	269.00	4.9:2.2:1	2.2:1

6.1.6.5.5 Taking into account the average consumption level of 81% N through urea, 60% P through DAP, 30% P through complex fertilizers, 10% P through SSP and 68% K through MOP, the product wise demand for the period 2006-07 to 2011-12 has been worked out. Accordingly, the demand for urea may be around 25.4 million tonnes by the end of 2007-08. The demand for DAP, complex fertilizers (other than DAP) and SSP would be around 7.9, 7.7 and 3.8 million tonnes, respectively. The demand for MOP would be around 3.0 million tonnes. The projected demand for urea, DAP, complex fertilizers (other than DAP), SSP and MOP for the year 2011-12 is 28.8, 9.5, 9.3, 4.6 and 3.7 million tonnes, respectively. **Table 4** presents product wise demand of fertilizers during 2006-07 to 2011-12.

Table 4: All India Demand Forecast of Fertilizer Products (Lakh tonnes) 2006-07 to 2011-12					
Year	Urea	DAP	Complex fertilizers	SSP	MOP*
2006-07	243.05	75.00	73.60	28.75	28.50
2007-08	253.60	79.30	77.00	38.00	30.15
2008-09	262.75	83.20	81.00	39.90	31.80
2009-10	271.35	87.15	85.00	41.75	33.60
2010-11	279.45	91.05	89.00	43.60	35.45
2011-12	287.55	95.10	93.30	45.60	37.40
* = For direct consumption. Excludes demand for manufacture of complex fertilizers.					

To ensure uninterrupted supply in the eventuality of break down and unforeseen demand, buffer stock up to a limit of 5% of the seasonal requirement of the State is to be maintained. Also taking into consideration 10% of the supply in the pipeline, projected production capacity should be 15% above the projected demand of Urea, DAP and Complex fertilizers as indicated in Table 4 above.

6.1.7 ZONE WISE DEMAND FORECAST OF N, P_2O_5 AND K_2O

6.1.7.1 Table 5 shows the percentage share of various zones to all India consumption on nutrient basis. The share of consumption of N is highest in North zone followed by West, South and East. The share of consumption of P_2O_5 is highest in West zone followed by North, South and East. On the other hand, the share of K_2O consumption is highest in South zone followed by East, West and North. The share of each nutrient according to zones indicated below is the average consumption of 5 normal years of the recent past.

Table 5: Zone wise per cent age share to All India consumption of fertilizer nutrients			
	N	P_2O_5	K_2O
East	14.2	13.5	22.5
North	38.6	30.1	11.9
South	21.4	25.4	43.5
West	25.8	31.0	22.1

6.1.7.2 Accordingly, the zone wise demand forecast of fertilizer nutrients has been worked out. Table 6 presents zone wise consumption of fertilizer nutrients for the period 2006-07 to 2011-12.

Table 6: Zone wise demand forecast of fertilizer nutrients ('000 tonnes) 2006-07 to 2011-12

Year	N	P_2O_5	K_2O	Total
East Zone				
2006-07	1957	776	566	3300
2007-08	2043	821	599	3462
2008-09	2116	861	631	3608
2009-10	2185	902	667	3754
2010-11	2251	942	704	3897
2011-12	2316	984	743	4043
North Zone				
2006-07	5321	1731	334	7386
2007-08	5553	1830	352	7735
2008-09	5751	1920	372	8044
2009-10	5941	2011	393	8344
2010-11	6118	2101	413	8632
2011-12	6296	2194	431	8921
South Zone				
2006-07	2950	1461	1045	5455
2007-08	3078	1544	1108	5731
2008-09	3189	1621	1171	5980
2009-10	3293	1697	1241	6231
2010-11	3392	1773	1312	6477
2011-12	3490	1852	1386	6728
West Zone				
2006-07	3557	1783	570	5909
2007-08	3711	1885	601	6197
2008-09	3844	1978	631	6453
2009-10	3971	2071	664	6705
2010-11	4089	2164	701	6954
2011-12	4208	2260	740	7208

6.1.8 The projections of demand for fertilizer products presented in **Table 4** are based on the existing product nutrient ratio. However, there is greater need for balanced fertilization in the coming years. For accelerating growth in the production and attaining the target of 4% aggregate growth in agriculture during the 11th Plan, the balanced use of fertilizer has to increase substantially. Shift towards more balanced fertilization, technological changes, shift in cropping pattern, including shift to value added crops may alter the ratio of demands for different chemical fertilizers. If need be, it may be reviewed later depending upon the pricing policy promoting balanced use of fertilizer with necessary nutrient based subsidy and pricing structure. There has been fall in fertilizer use efficiency in Indian agriculture over the years. Therefore, for accelerated growth of agriculture, there is need for judicious use of fertilizer in addition to its higher use with due consideration to the improvement in soil health which has degraded over the years due to relatively higher nutrient mining compared to addition through various nutrient sources.

Annexure 6.1

REQUIREMENT OF FERTILIZERS BASED ON POPULATION NUTRITION METHOD								
Sl. no.	Item	Unit	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
1	Population	Million No.	1129	1145	1161	1177	1193	1208
2	Net availability of foodgrains (465 grams per day)	Kg. per annum	170	170	170	170	170	170
3	Net requirement of foodgrains (Item 1 x Item 2)	Million tonnes	192	194	197	200	202	205
4	**Gross requirement of foodgrains (Item 3 / 87.5%*)**	**Million tonnes**	**218.99**	**222.10**	**225.20**	**228.30**	**231.41**	**234.32**
5	Additional requirement of foodgrains on the level of 2005-06	Million tonnes	10.69	13.80	16.90	20.00	23.11	26.02
6	Response ratio of fertilizer nutrients (N+P+K) to foodgrains		1:6	1:6	1:6	1:6	1:6	1:6
7	Additional requirement of fertilizers for foodgrains (N+P+K) (Item 5 x response ratio)	Million tonnes	1.78	2.30	2.82	3.33	3.85	4.34
	Additional requirement of fertilizers for all crops (N+P+K) (65% on foodgrains and 35% on other crops)	Million tonnes	2.74	3.54	4.33	5.13	5.93	6.67
8	**Total requirement of fertilizers for all crops (Total consumption of N+P+K during 2005-06 + Additional consumption in the respective years)**	**Million tonnes**	**23.08**	**23.88**	**24.67**	**25.47**	**26.27**	**27.01**
9	Nutrientwise requirement (NPK use ratio = 5:2:1)							
	N	Million tonnes	14.43	14.92	15.42	15.92	16.42	16.88
	P	Million tonnes	5.77	5.97	6.17	6.37	6.57	6.75
	K	Million tonnes	2.89	2.98	3.08	3.18	3.28	3.38

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

Assumptions: 1. Net availability of foodgrains - 465 grams per day (average of 2002-2004)

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

Annexure 6.2

REQUIREMENT OF FERTILIZERS BASED ON FOODGRAIN TARGET								
Sl.no.	Item	Unit	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
1	**Demand projections of foodgrains**	**Million tonnes**	**213.9**	**219.6**	**225.4**	**231.5**	**237.6**	**244.0**
2	Additional requirement of foodgrains on the level of 2005-06	Million tonnes	5.56	11.27	17.13	23.15	29.33	35.68
3	Response ratio of fertilizer nutrients (N+P+K) to foodgrains		1:6	1:6	1:6	1:6	1:6	1:6
4	Additional requirement of fertilizers for foodgrains (N+P+K) (Item 2 x response ratio)	Million tonnes	0.93	1.88	2.86	3.86	4.89	5.95
	Additional requirement of fertilizers for all crops (N+P+K) (65% on foodgrains and 35% on other crops)	Million tonnes	1.43	2.89	4.39	5.94	7.52	9.15
5	**Total requirement of fertilizers for all crops (Total consumption of N+P+K during 2005-06 + Additional consumption in the respective years)**	**Million tonnes**	**21.77**	**23.23**	**24.73**	**26.28**	**27.86**	**29.49**
	Total requirement of fertilizers for foodgrains (65% of Item 5)	Million tonnes	14.15	15.10	16.08	17.08	18.11	19.17
	Total requirement of fertilizers for crops other than foodgrains (35% of Item 5)	Million tonnes	7.62	8.13	8.66	9.20	9.75	10.32
6	Nutrientwise requirement for all crops (NPK use ratio = 5:2:1)							
	N	Million tonnes	13.60	14.52	15.46	16.42	17.41	18.43
	P	Million tonnes	5.44	5.81	6.18	6.57	6.97	7.37
	K	Million tonnes	2.72	2.90	3.09	3.28	3.48	3.69

Annexure - 6.3

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 2006-07 to 2011-12.

(1) Irrigated area,
(2) Area under HYV,
(3) Fertilizer nutrient prices,
(4) Rainfall (as % of long term average value),
(5) Lagged dependent variable (Fertilizer 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:

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

Three different equations were generated for N, P_2O_5 and K_2O

(1) $\text{Log } Y_{Nt} = C + b_1 \text{Log}I_t + b_2 \text{Log}H_t + b_3 \text{Log}P_{Nt} + b_4 \text{Log } P_{Pt\,+}\ b_5 \text{Log } R_t + b_6 \text{Log } Y_{Nt-1}$

(2) $\text{Log } Y_{Pt} = C + b_1 \text{Log}I_t + b_2 \text{Log}H_t + b_3 \text{Log}P_{Pt} + b_4 \text{Log}P_{Nt} + b_5 \text{Log } R_t + b6 \text{Log } Y_{Pt-1}$

(3) $\text{Log } Y_{Kt} = C + b_1 \text{Log}I_t + b_2 \text{Log}H_t + b_3 \text{Log}P_{Kt} + b_4 \text{Log } R_t + b_5 \text{Log } Y_{Kt-1}$

Where :

Y_N = Consumption of N Y_P = Consumption of P_2O_5 Y_K = Consumption of 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

INPUT DATA

IRRIGATED AREA

According to Agricultural Census conducted by Agricultural Census Division of Ministry of Agriculture, about 87 per cent of the fertilised area in India is irrigated. Irrigated area has also been increasing progressively from 18.3 per cent of the total gross cropped area during 1960-61 to 40 per cent during 2003-04. The actual data of gross irrigated area is available upto 2003-04. For the period 1971-72 to 2003-04, the actual data of percentage gross irrigated area to gross cropped area has been used in the model. For 2004-05, an addition of 1.4 million hectares has been used in the net cropped area.

In regard to the prediction of irrigated area for 2004-05 to 2011-12, information available in the Approach Paper for 11th Plan has been used. In the Approach Paper for 11th Plan (page 24), it is stated that the Bharat Nirman Programme envisages creation of 10 million hectares assured irrigation during the 4-year period commencing from 2005 to 2009. Of the new potential envisaged under Bharat Nirman, about half is planned for the first two years of 11th Plan, i.e., 2007-08 and 2008-09. Assuming similar rate of creation continues thereafter, a total of 11 million hectares (mha) of new potential is expected in the 11th Plan consisting of 5.5 mha in major and medium irrigation, 3.5 through minor irrigation and about 2.0 mha through ground water development. Taking into account all these factors, area under net irrigation is projected to be 64.8 mha for 2007-08 and 76.5 mha for 2011-12. For working out gross irrigated area, the present ratio of net to gross irrigated area of 1: 1.38 has been applied for the 11th Plan period.

AREA UNDER HIGH YIELDING VARIETY (HYV)

The area under HYV has increased significantly since 1965. To obtain desired result, application of HYV seeds requires use of chemical fertilizers and irrigation. It is reported that entire HYV area in India is fertilised. The area under HYV increased from 1.88 mha during 1967-68 to 76.4 mha during 1996-97. Thereafter, no official figure of actual area under HYV is available. Therefore, actual figures of HYV for the period 1967-68 to 1996-97 have been used for arriving at percentage of irrigated area to HYV area. For the subsequent period, the area under HYV has been estimated on the basis of increase in irrigated area plus an area of about 3 to 5 million hectares per annum in the rainfed areas. Accordingly, the area under HYV for 2007-08 has been estimated at 94 mha for 2007-08 and 112 mha for 2011-12. As HYV has a pre-eminent role in raising agricultural productivity and its positive correlation with chemical fertilizers, HYV area as percentage of gross cropped area has been used as a variable in the model.

RAINFALL

Rainfall from monsoon is vital for use of chemical fertilizers in India. Fertilizer consumption declined in the year of adverse weather situation and increased significantly under the good weather conditions. Rainfall as a percentage of long-term average value is a good yardstick for the measurement of weather situation. Hence, rainfall as percentage of long-term average value has been used as a variable in the model. For the period 1971-72 to 2005-06, the actual figures of rainfall as a percentage of long-term average value have been used. For the period 2006-07 to 2011-12, normal rainfall with 100 per cent of long-period average has been used.

NUTRIENT PRICE

In the case of nutrient prices, retail prices of major fertilizers, which have bulk of the share in fertilizer consumption, have been considered. Accordingly, prices of N through Urea, weighted average prices of P_2O_5 through DAP and SSP and price of K_2O through MOP have been used in the model for N, P_2O_5 and K_2O respectively. The impact of increase in prices of all fertilizers has a certain degree of substitution effect from P to N application or vice versa. Therefore, in case of demand forecast for N, prices of N as well as P were used. Likewise, in case of demand forecast for P, prices of P as well as N were used. A modest increase of 5 per cent per annum on the nutrient prices of fertilizers for 11^{th} Plan has been assumed.

LAGGED VARIABLE

The growth in fertilizer consumption in a year is influenced by the consumption of fertilizer in the immediate past. Generally, good weather in succession leads to high growth in fertilizer consumption successively. For instance, good weather during the past two years and the current year resulted in a growth in the consumption of 9.5 % during 2004-05 and 10.6% during 2005-06. On the other hand, severe drought, followed by a good weather, do not translate into recovery to the previous normal level in the immediate following year, as farmers are left with limited resources to buy required quantity of fertilizers after the drought year. Therefore, growth in the previous years (with one year lag) has been used as a regressor in the model.

PERIOD COVERED

Actual time series data for the period 1971-72 to 2005-06 and predicted values for the period 2006-07 to 2011-12 on All India basis have been used in the model for the above variables, which were found statistically reliable. The variables (gross cropped area, irrigated area and area under HYV) for which latest actual data are not available upto 2005-06, estimates have been made upto 2005-06 and beyond from the period the actual data are available.

The predicted values of independent variables during 10th and 11th Plan periods are shown in the following table.

Projected Values of Independent Variables during the 10th and 11th Plan end

Year	Gross cropped Area	HYV Area	Irrigated Area		Rainfall (as % of normal rainfall)	N-price	P-price	K-price
			Net	Gross				
	(million hectares)					(Rs./tonne)		
2006-07 (10th Plan end)	198.7	90.0	61.5	84.9	100	10.50	17.71	7.43
2011-12 (11th Plan)	219.4	112.0	76.5	105.6	100	13.40	22.60	9.48

FINDINGS

The equations mentioned in item I was regressed by Ordinary Least Square Method (OLS). The following results were found satisfactory among various combinations of selected variables.

Table 1 (a) Effect of various factors on demand for Nitrogen – 1971-72 to 2005-06

Dependent variable : Consumption of Nitrogen (N)			
Variable	Coefficient	t-statistic	Probability
Constant	-1.748298	-2.845725	0.0084
LNPRICE	-0.264981	-3.185418	0.0036
LPPRICE	0.048777	1.118230	0.2733
LPIAREA	0.658105	2.376680	0.0248
LPHAREA	0.644672	4.570658	0.0001
LPRAINFALL	0.300425	4.594392	0.0001
LNCON(-1)	0.567898	7.033618	0.0000
R-Squared	0.997073		
Adjusted R-Squared	0.996423		

The variables included in the equation explained 99.7% variation in demand for nitrogen in the country. R^2 and adjusted R^2 were highly significant. Effect of irrigation and HYV area was strong on the consumption for nitrogen (N). A one per cent increase in the area under irrigation resulted in 0.66% increase in the consumption of N. Similarly, a one per cent increase in the area under HYV led to a 0.64% increase in the consumption of N. Weather has an important role on the fertilizer consumption. Fertilizer consumption declined in the year of adverse weather situation and increased significantly under the good weather conditions. A one per cent increase in the long-term average value of rainfall led to 0.30 per cent increase in the consumption of N. Fertilizer prices have increased at a low rate over the years. However, whenever, there has been a steep rise in the prices of fertilizers, there was a sharp decline in consumption of fertilizers, particularly of P and K fertilizers. A one per cent increase in the prices of N resulted in the decline in the consumption of fertilizers by 0.23 per cent or vice versa.

For P fertilizers, the variables included in the equation explained 99.1% variation in demand for phosphate in the country. For K fertilizers, the variables included in the equation explained 97.5% variation in demand for phosphate in the country. R^2 and adjusted R^2 were highly significant. Table 1(b) and 1(c) show the regression results of various combinations of selected variables.

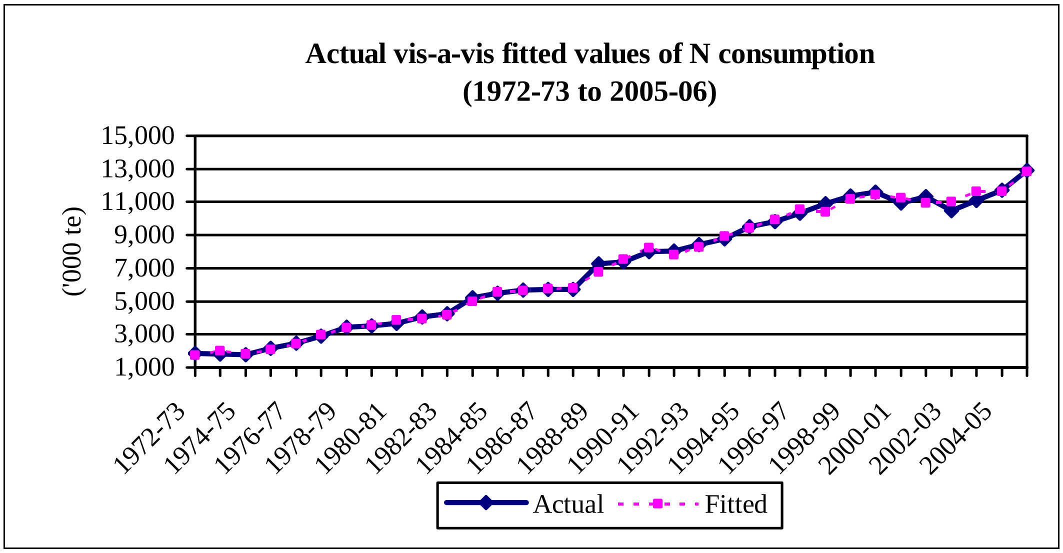
Table 1 (b) Effect of various factors on demand for Phosphate (P_2O_5) – 1971-72 to 2005-06

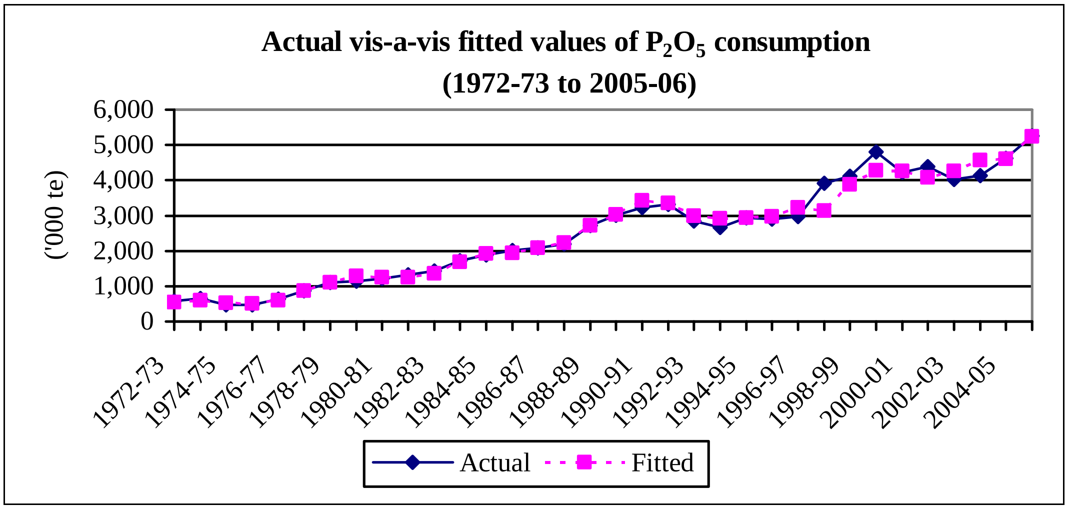
Dependent variable : Consumption of Phosphate (P_2O_5)			
Variable	Coefficient	t-statistic	Probability
Constant	-5.921621	-4.382093	0.0002
LNPRICE	-0.229642	-1.645456	0.1115
LPPRICE	-0.278743	-3.172482	0.0037
LPIAREA	2.028901	3.693141	0.0010
LPHAREA	0.714632	3.161948	0.0038
LPRAINFALL	0.265686	1.993423	0.0564
LPCON(-1)	0.494760	5.638506	0.0000
R-Squared	0.990620		
Adjusted R-Squared	0.988536		

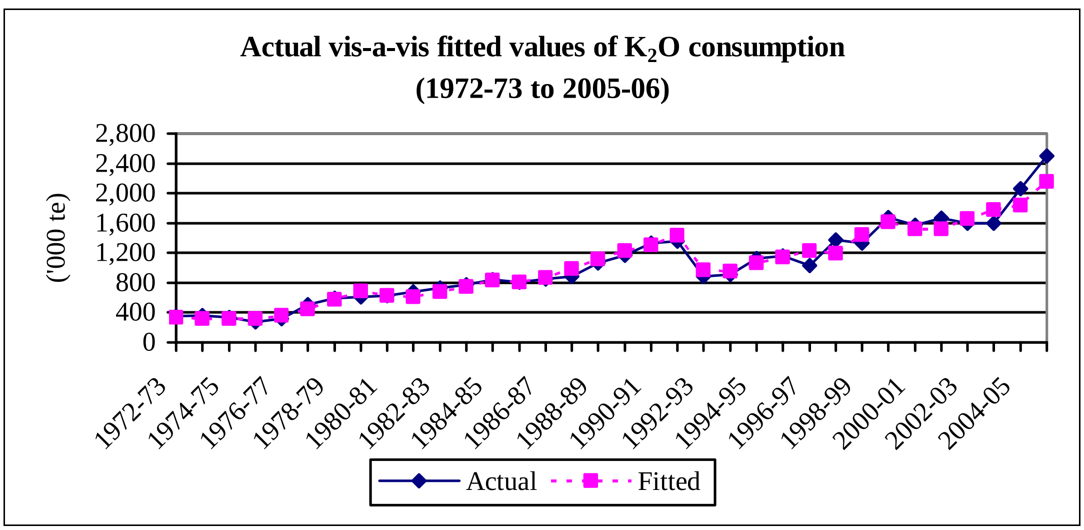
Table 1 (c) Effect of various factors on demand for Potash (K_2O) – 1971-72 to 2005-06

Dependent variable : Consumption of Potash (K_2O)			
Variable	Coefficient	t-statistic	Probability
Constant	-7.043734	-4.350183	0.0002
LKPRICE	-0.397757	-5.849777	0.0000
LPIAREA	3.165138	5.039049	0.0000
LPHAREA	0.106400	0.425452	0.6738
LPRAINFALL	0.112553	0.705481	0.4863
LKCON(-1)	0.346134	3.036343	0.0051
R-Squared	0.975073		
Adjusted R-Squared	0.970622		

The charts presented below show the actual and fitted values of All India consumption of N, P and K separately for the period 1972-73 to 2005-06.


Actual vis-a-vis fitted values of N consumption
(1972-73 to 2005-06)
('000 te)
15,000
13,000
11,000
9,000
7,000
5,000
3,000
1,000
1972-73
1974-75
1976-77
1978-79
1980-81
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
Actual
Fitted


Actual vis-a-vis fitted values of P_2O_5 consumption
(1972-73 to 2005-06)
('000 te)
6,000
5,000
4,000
3,000
2,000
1,000
0
1972-73
1974-75
1976-77
1978-79
1980-81
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
Actual
Fitted


Actual vis-a-vis fitted values of K_2O consumption
(1972-73 to 2005-06)
('000 te)
2,800
2,400
2,000
1,600
1,200
800
400
0
1972-73
1974-75
1976-77
1978-79
1980-81
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
Actual
Fitted

CHAPTER – VII

FERTILIZER AVAILABILITY, MOVEMENT, DISTRIBUTION AND INFRASTRUCTURE REQUIRED

7.1 INSTALLED CAPACITY OF FERTILIZER NUTRIENTS

7.1.1 The sector-wise and nutrients-wise installed capacity of fertilizers in the year 2005-2006 is given in the table below:

TABLE

SECTOR-WISE, NUTRIENT-WISE INSTALLED CAPACITY OF FERTILIZERS

S.No.	Sector	Capactiy Share (lakh tones)		Percentage	
		N	P	N	P
1.	Public Sector	34.98	4.32	29.0	7.6
2.	Cooperative Sector	31.69	17.13	26.3	30.3
3.	Private Sector	53.94	35.14	44.7	62.1
	Total	120.61	56.59	100.0	100.0

* *Installed capacity of the functional units only.*

Installed capacity, product-wise and sector-wise, may be seen at **Annexure-7.1**.

7.2 PRODUCTION AND CAPACITY UTILISATION OF FERTILIZER NUTRIENTS

7.2.1 Production and capacity utilization of fertilizers in terms of nutrients in the terminal year of the X Five Year Plan are given in the Table below:

TABLE

PRODUCTION AND CAPACITY UTILISATION OF FERTILIZER NUTRIENTS

ALTERNTIVE 1 (Assuming 90% capacity utilization in the existing plants)

Year	Nitrogen (LMT)		Percentage Capacity Utilisation	Phosphate (LMT)		Percentage Capacity Utilisation
	Target*	Actual	Utilisation	Target*	Actual	Utilisation
2002-03	108.52	105.08	96.8	47.08	39.04	82.9
2003-04	109.68	105.57	96.3	47.08	36.17	76.8
2004-05	111.39	113.05	101.5	47.08	40.28	85.6
2005-06	117.28	113.32	96.62	47.08	41.87	88.9
2006-07 (Estimated)	131.89	112.94	85.6	47.08	46.42	98.6

* *Assuming 90% capacity utilization in the existing plants.*

Source: Working Group Report on Fertilizers for the Tenth Plan

ALTERNTIVE 2

Year	Nitrogen (LMT)		Percentage Capacity Utilisation	Phosphate (LMT)		Percentage Capacity Utilisation
	Target*	Actual	Utilisation	Target*	Actual	Utilisation
2002-03	120.58	105.08	87.1	52.31	39.04	74.6
2003-04	121.74	105.57	86.7	52.31	36.17	69.1
2004-05	123.45	113.05	91.6	52.31	40.28	77.0
2005-06	129.34	113.32	87.6	52.31	41.87	80.0
2006-07 (Estimated)	143.95	112.94	78.5	52.31	46.42	88.7

* *Assuming 100% capacity utilization in the existing plants.*

Source: Working Group Report on Fertilizers for the Tenth Plan

7.2.2 During 2001-02, the terminal year of the 9th Five Year Plan, actual production of fertilizers in terms of 'N' and 'P' was 73.02 lakh MTs and 25.62 lakh MTs, respectively. In the year 2005-06, the production of 'N' has reached the level of 113.32 lakh MTs and of 'P' 41.87 lakh MTs.

7.2.3 It may be observed that there was a slow increase in fertilizer production in absolute terms during Tenth Five Year Plan. There was a shortfall in actual production vis-à-vis the target projected in the Working Group on Fertilizers for the Tenth Plan, particularly as per Alternative 2. The shortfall was on account of non-implementation of a number of projects, which were envisaged/expected to be implemented during the Tenth Plan. This included IFFCO-Nellore, KRIBHCO-Hazira third stream, KRIBHCO-Gorakhpur, RCF-Thal third stream and revamp of FCI-Sindri. The joint venture project, Oman-India Fertilizer Co (OMIFCO), which was expected to start production by 1999-2000, was delayed and was completed only during the course of Tenth Plan. What is significant is that, except the OMIFCO project, none of the projects envisaged by the working group of X Plan had any success. Except for marginal capacity addition (BVFCL Namrup –II plant) the situation can at best be termed as stagnant, in terms of installed capacities of urea. However, the operative capacities have declined significantly during the plan period. In addition to the closure of the urea plant of NLC-Neyveli, non operation of the RCF Trombay V (on account of gas limitation), Duncans Industries Plant-Kanpur and FACT-Cochin I (financial reasons) have contributed to the sub optimal capacity utilization vis a vis the installed capacity. While best ever urea production of *202.39* LMTPA had been achieved (during 2004-05) as against the installed capacity of 210.37 LMTPA, the situation had been far from flattering in case of DAP wherein the highest production had been only 52.36 LMTPA as against an installed capacity of 70.89 LMTPA. Production of complex grade fertilizers, however had been on the upswing.

7.3 ROLE OF STATES IN ASSESSING AVAILABILITY OF FERTILIZERS

7.3.1 Assessment of requirement of fertilizers had been found to be varying significantly across the States. Some States such as Karnataka, Tamil Nadu had consistently under assessed the requirement, while other States like Madhya Pradesh went in for over assessment. While it is not possible to make an accurate estimate, it is observed that the assessment process more often than not takes into consideration the physical realities of change in cropping patterns, change in externalities leading to such changes etc. It is felt that the role of States in demand assessment has to be more scientific and realistic.

7.3.2 While assessment of requirement is one area that has to be fine tuned, preparation of month wise demand pattern is another area where significant progress is to be made. It is observed that the sale patterns are significantly off the assessed demand patterns leading to complications in logistics planning. This problem has been further accentuated as movement and distribution of fertilizers has become significantly de-controlled. States may have to inculcate scientific planning/ monitoring process into this exercise, use highly calibrated simulators/ models. Use of IT may have to be made mandatory.

7.3.3 It is also observed that equitable and timely distribution of fertilizers at all locations within the States is often found to be wanting even when the availability is as per the assessed requirement of the State. There is no uniformity in planning and monitoring in a district wise format which is leading to such an anomalous situation. A uniform composite system of planning and monitoring encompassing States and the Centre in a seamless structure would greatly help in fine tuning the distribution setup of fertilizers. The recent efforts by the D/o Fertilizers in setting up of the Fertilizers Monitoring System (FMS) is a step in the right direction. The fertilizer industry as also the state governments need to be pro-actively involved in this effort to make it 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.

7.4 ADEQUACY OF TRANSPORTATION SUBSIDY FOR HILLY AND NORTH EASTERN STATES

With an objective to ensure adequate availability of urea to the North Eastern States, Government reimburses actual freight costs to the companies supplying urea to the North Eastern states (except Assam)under the Special Freight Reimbursement Scheme. This scheme seeks to compensate the increased freight charges incurred by the suppliers in transporting urea to these states due to difficult terrain. A limitation of this scheme is that it does not provide for adjustments in the road freight charges incurred in secondary transportation of urea.. Secondary Freight charges are fixed at the level of 8^{th} Pricing Period for urea (2000-03). This leads to a situation where suppliers are reluctant to transport urea over long distances in some of the states in the NE region. There is a need to address this issue through changes in the policy for freight charges reimbursement to the urea companies.

7.5 REVIEW OF BUFFER STOCKING ARRANGEMENTS FOR FERTILIZERS IN THE CONTEXT OF MEETING THE EXIGENCIES

Buffer stocking is operated by the Department of Fertilizers in case of de-controlled fertilizers, mainly DAP and MOP. Quantum of buffer stocking required is a function of overall demand – availability situation. The X Plan period had witnessed two extremes of this activity. While in the initial years, the department had not operated any buffer stock owing to low demand and enhanced availability, the penultimate years had seen record levels of buffer stocking in DAP (about 10 LMTPA). This can be attributed to an inconsistent policy, which was not able to attract enough domestic production or imports. The connotation of buffer stock had changed from that of stock that is used to deal with 'exigent' situations to the stock that is used to address the 'emergent' demand –supply gap. There is a vast difference in both these scenarios, and needless to say, buffer stocking being used to address policy deficiencies, rather than exigent situations leads to an inherently unstable condition. This issue needs a thorough review.

7.6 EXAMINE TRANSPORT LOGISTICS IN MOVEMENT OF FERTILIZERS AND RAW MATERIALS AND SUGGEST REDUCTION IN TRANSPORTATION ELEMENTS

7.6.1 UREA DISTRIBUTION POLICY:

- As per the present policy of Government of India, 50% of the annual reassessed production capacity of each unit is covered under ECA allocation and for the balance 50%, units are free to distribute according to their independent plan subject to intimation to Department of Fertilizer. Units can produce and supply Urea to the extent of their 100% reassessed capacity annually.

- Demand assessment of states like HP, J&K and other NE States where no producing units are located are fully met by ECA allocation. However, other states such as Bihar & Orissa which also do not have any units located in the state, major portion of their demand assessment is met from ECA allocation.

- While giving ECA allocation to various states the distribution plan given by various indigenous units for their deregulated quantity is taken into account.

- The gap between the demand assessment and the supply available out of indigenous production is met from imports.

- The units are required to furnish a monthwise/statewise supply plan for both ECA allocation quantity and the deregulated quantity to Department of Fertilizers (DoF) at the beginning of each seasons. Besides, units are required to submit state wise movement plan each month for both ECA allocation quantity and deregulated quantity to DoF. Based on the month wise requirement assessed for each state and the supply plan received for various units and likely arrival of imports, DoF issues Movement Plan..

- Economy of movement is also of prime consideration while deciding the ECA allocation of various units.

- In the recent past DoF has also allowed some of the units produce and supply over & above their 100% reassessed capacity to meet the gap in the demand and supply indigenously, based on the comparative advantage in the IPP and the concerned unit's group concession rate. The additional production so approved by DoF is covered under ECA allocation.

- Freight reimbursement: The equated freight as notified by FICC for each unit is reimbursed for the ECA allocation quantity and for the balance of 50% quantity supplied as deregulated by the units, notified equated freight minus Rs.100/- is reimbursed.

7.6.2 DISADVANTAGE OF PARTIAL DECONTROL:

- The units are constrained to supply deregulated quantity in the areas adjoining the units with least cost implication on account of freight in view of the lower reimbursement of freight.

- The deregulated quantity shall always flow to the markets where there is demand after meeting the demand in the primary markets.

- During the peak season especially it has been experienced that the deregulated quantity does not flow to the secondary markets in view of the peak demand in the primary markets.

- Even within a state, especially state with large geographical areas, the far flung districts do not get supplies as per the requirement.

- This has resulted in pockets of shortages in the peak consumption periods and excess availability in other areas.

- The deduction of Rs.100 from equated freight on deregulated quantity is disadvantageous in case of some of the units where the equated freight notified for the unit is on the lower side and the scope for operating within the stipulated freight reimbursement is not feasible.

- It has also been experienced that the consumption in some of the state could have been higher if the total availability upto the peak consumption period had been higher.

- Therefore, movement of urea should be brought either under total control or it should be fully decontrolled. There should be adequate provision in equated freight to move fertilizers to the block level.

7.6.3 While reduction in transportation costs may be a stated objective in terms of reducing subsidy burden, it invariably has to be reconciled with the larger objective of making available for sale to farmers at all locations in the country in a timely manner. The previous policy of freezing secondary transportation costs etc., in case of urea and a fixed transportation cost component with out any provision for escalation in case of de-controlled fertilizers is reported to have had its effect on availability in far flung areas, especially during the peak consumption period. Since raw materials/ feed stock is not freely and abundantly available at all locations of the country, transport/ logistics in the fertilizers sector is a residual activity and as such relocation options are limited. A realistic policy which either provides for transportation costs on actual basis or alternatively provides for price decontrol needs to be put in to place immediately to ensure supply of fertilizers products, particularly decontrolled fertilizers, to the consuming area.

7.7 SUGGEST WAYS AND MEANS TO STRENGTHEN INFRASTRUCTURAL FACILITY IN RAIL ROAD SYSTEMS

7.7.1 EVALUATION OF TENTH PLAN PERFORMANCE.

7.7.1.1 A review of the TENTH Plan performance indicates that the share of Railways in the fertilizer transport has remained in the region of 75%. In respect of Imported Fertilizers, the capacity utilization at the ports on a year –to year basis ranged from 48.62% to 97.08%. The low utilization of capacity was due to the sub optimal use of berths at Haldia owing to draft and berthing problems and Paradeep, due to high cost of handling and labour and other technical problems. New Mangalore, has emerged as a good alternative port which can potentially cover the entire hinterland of Kerala, Karnataka and southern region of Maharashtra. Pre-berthing detentions, low discharge rates, low turnaround, storage and evacuation problems, high handling costs which were common problems during the IX Plan continued to affect throughput during the X Plan period also, in spite of general improvement on efficiencies.

7.7.1.2 River transportation has not been fully utilized, not just because most of the fertilizer plants and ports have railway sidings within the premises with storage and loading facilities but also because of the infrastructure constraints

7.7.2 11TH PLAN PERSPECTIVE

7.7.2.1 The fertilizers demand during the terminal year of 11th Five- Year Plan has been estimated at 27 million tones NPK or 55 million tones product. Based on this and with rail-road coefficient of 75, the year-wise demand and rail-road fertilizer traffic are given below:-

DEMAND ESTIMATION AND LIKELY VOLUME OF RAIL TRAFFIC DURING THE 11TH FIVE YEAR PLAN

(Lakh Mts)

Year	**Estimated consumption**	**Movement by**	
		Rail	Road
2006-07	44890	33668	11222
2007-08	47125	35344	11781
2008-09	49130	36848	12282
2009-10	51100	38325	12775
2010-11	53020	39765	13255
2011-12	54980	41235	13745

7.7.2.2 The actual movement will be consumption driven which in turn will depend on how good is the monsoon. The movement pattern will however remain the same i.e. from Western to Northern and southern sectors, from Northern to Eastern and Central Sectors.

7.7.2.3 The existing evacuation facilities are just about matching the demand from the manufacturing units. However, rail and road facilities need to be augmented/strengthened further to cater to peak requirements and for timely evacuation from favoured Ports like Vizag, Kakinada, Paradeep, New Manglore , Kandla, Mundra etc.,.

7.8 HANDLING OF IMPORTED FERTILIZERS

7.8.1 The country has 11 major ports having an estimated capacity of nearly 56 lakh tonne for handling finished fertilizers and nearly 139 minor and intermediate ports of which only 20 ports with the capacity of 40 lakh MT could be utilized for handling fertilizers. Capacities to the extent of 15 lakh MT cannot always be fully utilized for logistic and other constraints such as closure of ports due to monsoon during peak consumption season, tide problem, lack of railway wagons/

berths/boats, godown facility etc. Available capacity, therefore is only 81 lakh MT. Considering a utilization factor of 80%, only 64.80 lakh MT may be available for fertilizer handling. Low cost investments for upgradation/ modernization of the mechanical equipment can however, provide an additional 25% throughput in the existing capacity due to improved performance. Although, the fertilizer companies situated near the port area are using mechanical facilities created at Paradeep, Cochin and Vizag for unloading of captive cargo, the use of these facilities is however not permitted (for handling of fertilizers) by others. Thus the available capacity at port is being underutilized. Corrective action in this direction needs to be taken urgently. Most ports are severely constrained to handle high volumes on sustained basis. Excepting Mundra port, no other port, currently is able deal with panamax vessels. With the sea movement from CIS countries and US gulf increasingly being taken up through these large vessels, accepting and handling them at Indian ports has become a severe limitation. While paradeep port has the draft to handle panamax vessels, it is 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.

7.8.2 The demand supply gap in product terms, which is to be met by imports, is 114.92 lakh MTs (including potash) in the terminal year of the Eleventh Plan. To this we have to add the additional facility required for import of urea from Oman project which is projected at 16.52 lakh MTs of urea. As such port loads are bound to put pressure on handling, movement and availability of fertilizers in the country, especially during the peak consumption season.

7.8.3 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. Ennore port near Chennai proposed to create deep draft berths to accommodate panamax vessels carrying fertilizers during the XPlan period and was expected to be operational in 2003/4. However, no progress is seen on this front even in the terminal year of the Plan period. Dredging of the existing entrance channel at Vizag & Kandla and creation of an additional berth at Vizag port could be undertaken to accommodate larger or even panamax vessels. Similarly matching infrastructure can be developed at Paradeep port for handling panamaxes. Paradeep port can then serve as a hub port for servicing the needs of the Eastern States which are deficient in urea production. Such a situation would also reduce longer lead movement from the Western and Central units to the Eastern States , thereby optimizing the movement pattern further.

7.8.4 To supplement the efforts of major ports that handle 60-70% of the finished fertilizers, improvement in the existing minor ports will be more economical than creating new ports. The existing minor ports are well connected with rail and road facilities, and can be upgraded with little investments. Reputed regular importers and professional stevedores could also be encouraged to take up augmenting facilities for handling fertilizer cargo. Port of Pipavav and Mundra are recent examples of such private participation.

7.8.5 Following are some additional suggestions to improve port handling:-

a) New Mangalore and Cochin ports should ensure working of all three shifts and also augment the warehouse capacity.

b) Chennai port should address the problems relating to frequent shifting of vessels between berths to improve the performance and also avoid berthing of fertilizer cargo in a contaminated jetty.

c) Use of deep water port at Kakinada port needs to be opened up for fertilizers to improve the handling capacity at this port.

d) The minor ports performance needs to be upgraded on acquiring self propelled barges/ boats in good numbers supported by good storage and evacuation facilities.

e) Widening of National and State Highways with proper matting to reduce transit time and transportation cost.

f) Warehousing capacities and Evacuation by the Railways are to be matched with the unloading capacity at each port.

g) Coastal Shipping/Inland Water transportation needs encouragement for movement of fertilizer by providing liberal assistance. The following needs to be addressed for effective use of Inland Waterways:

- → Development of infrastructure facilities for loading and unloading terminals.
- → Competitive water freights.
- → Integration of Inland Water Transportation with coastal shipping.
- → Night navigation facilities.
- → Round-the –year navigability.

7.9 ROAD TRANSPORT

7.9.1 The road transport plays a key role in the country's transport system and facilitates direct delivery at the customer's doorstep. It often comprises the first and the last leg in the chain even where the transportation is predominantly by Railways. Besides, it is the only means of mechanized transport which is not adequate to meet the demands of fertilizer industry. The impact of bad roads increases fuel consumption, maintenance cost and decreases the speed of trucks thereby affecting availability. 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.

7.9.2 To strengthen the infrastructure facility in road system in the country the Government is currently undertaking a National Highway Development Project (NHDP) that envisages four-laning/ six laning of major corridors. Since long lead traffic of fertilizers is significantly by rail, this project would have limited relief on fertilizer movement.

7.9.3 In addition, widening to 4 lanes of National Highways connecting major ports in the country in an aggregate length of 4000 Kms is also proposed which will facilitate fertilizer movement significantly.

7.10 RAILWAYS

7.10.1 Almost the entire volume of the imported fertilizers is transported by rail only. Railway is the primary carrier of fertilizer goods over longer leads in India, hence the economics of fertilizer distribution would fluctuate with the efficiency of Railway operation. In the last few years, the Indian Railways have demonstrated their commitment by increased induction of rolling stock and lifting of freight traffic. Along with agroclimatic conditions, cost-benefit of fertilizer usage etc., the efficiency of the Railway system has an equally important role to play in stimulating fertilizer consumption. Port Railways facilities and port-rail connectivity need to be strengthened significantly during the Plan period if timely availability of fertilizers has to be ensured.

7.11 INLAND WATERWAYS AND COSTAL SHIPPING

7.11.1 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. Most are over aged. Moreover, carrying domestic cargo in the coastal ships owing to a variety of reasons such as lack of priority berthing, high cost of bunkers, spares and stores, high handling costs etc. make the operation unviable.

7.12 LIQUID FERTILIZERS

7.12.1 Though sporadic efforts have been made to popularize the use of liquid fertilizers, their use has so far been accepted only in pockets. At the current levels of utilization, there is no requirement of any railway infrastructure at present for their transportation. Road tankers of 10-12 tonnes capacity are recommended for this purpose.

7.13 FERTILIZER STORAGE AND DISTRIBUTION

7.13.1 Though the available storage infrastructure has so far met the requirement of the fertilizer sector more or less adequately, some constraints have come to the fore in peak time. In view of competing demands for a number of agro-products, it will be desirable to strengthen the warehousing infrastructure to meet the requirement during the Eleventh Five-Year Plan. This is more so because fertilizer demand has a definite peak and non peak distribution of demand and is not amenable to 'just in time' inventory planning.

7.14 USE OF INFORMATION TECHNOLOGY

7.14.1 The Department of Fertilizers being the apex-monitoring agency, manufacturers/importers should be linked to it through an on line computer based inventory monitoring system. Besides such connectivity needs to be extended to consumption centers and districts so that fertilizer demand can be met expeditiously and in a timely manner.

7.15 OTHER POLICY ISSUES

7.15.1 Demand-Supply linkages: Due to deregulation during the Eleventh Plan, market forces were assumed to play an increasingly important role in matching demand with supply. However, it is necessary that a close look is given to these policies so that the primary objective of reaching fertilizers to all the required locations is not vitiated.

7.15.2 Packaging of fertilizer: It is pertinent to mention here that the use of bigger bags (600 kgs, 1000 kgs and 1500 kgs.) has been resorted to extensively in the Scandinavian countries. These are polypropylene bags with a separate inner liner of polyethylene. The inner liner, after, filling, is sealed. The outer bag has handle type of arrangement on the top, which is secured with a tape and can then, be lifted by fork lift or pulley type crane. Such bags can be stored in the open without any fear of damage. This will go a long way in reducing the transit and storage losses. Similarly small packs for use in the hilly regions of some States can be encouraged to improve movement and thereby consumption.

7.15.3 The developments of this concept would result in the following advantages:

(i) These bags could be loaded even in the monsoon in open wagons thereby eliminating the risk of damage by humidity and water.

(ii) Handling with simple mechanized devices (even a pulley and rope arrangement) will be possible, which will speed up loading and unloading operations.

(iii) From the rail wagons, these can be placed directly on trucks and taken right up to the retail point, thereby eliminating the use of packing materials.

(iv) These bags can also be useful in moving traffic involving the change of gauge, at the break of gauge point, the bags can be mechanically shifted from one gauge to other, thereby eliminating transshipment bottlenecks.

The use of bigger bags would however need advanced handling facilities at the farm level.

7.16 TRANSPORT OF FERTILIZERS IN BULK

7.16.1 The rate at which our fertilizer consumption has been increasing makes it imperative to bring about certain structural changes in the handling of fertilizers. Such a change is necessary not only from the point of view of speeding up movement by rail transport but also from the point of view of putting the logistics of fertilizers distribution on a firmer footing. It has already been accepted that fertilizers would be moved in train loads to nodal points and from there further dispersal would be by road within a reasonable radius of say about 230-250 kms. For inland surface transportation, use of specially designed railway cars to transport fertilizers in bulk, from the plants to the main distribution centers is quite common in Scandinavian countries. The hopper cars have sliding roof on the top, which is opened from the top to facilitate loading of fertilizers in bulk in a matter of few minutes each. There are two types of discharge arrangements in the Railway cars onto the underground hoppers (with belt conveyor arrangements to the storage godowns) – central discharge and side discharge. The rate of discharge from central discharge arrangement is faster than side discharge arrangement.

7.16.2 Innovative Packaging: Apart form sophisticated automatic arrangements for weighing a predetermined quantity of fertilizers (50 kgs) in the bags at the plants/main distribution centers, simpler arrangement for volumetric packing has been designed by Norsk Hydro (Norway). There is a small silo on top with a valve arrangement through which a predetermined quantity of fertilizer drops into a lower chamber and the valve closes automatically. A screen is provided on the top of the silo to prevent jumps coming down. Thereafter, the bag is placed below the nozzle and through another valve, when operated manually; the fertilizers in requisite quantity drop into the bag from the lower chamber. There is a small adjustable belt conveyor arrangement through which the bags can be loaded directly on the road trucks. These machines can be effectively used at the ports/nodal points.

7.16.3 Bulk transport of fertilizer: At present fertilizers are moved in conventional wagons, covered as well as open. Our dependence on the general service wagons has at time resulted in a serious constraint in the availability of wagons on account of unbalanced pattern of traffic as well as utilization etc. If specially designed wagons for handling of fertilizers are introduced they would work in closed circuit between the loading and consumption centers, as in case of petroleum tank wagons and thereby ensure guaranteed availability.

7.16.4 While efforts have to be made as mentioned above, in the short term there is a need to improve the usage of wagons that are currently available on the Indian railways. Design and standardization of covers to the open BOX wagons would greatly enhance the versatility of usage of existing railway stock and greatly improve the availability of rail wagons for fertilizer transportation. Mechanized bagging facilities with capacity corresponding to discharge rates in each port need to be set-up on priority.

7.16.5 It would also facilitate mechanized loading and unloading arrangements at the factories / ports and the nodal points. This is particularly necessary in case of giant fertilizer plants where manual bagging and loading could prove a serious bottleneck. Further, unloading of fertilizers from block rakes at the nodal points would also be speeded up, reducing the turnaround of wagons.

7.16.6 Transportation of fertilizers in bulk in specially designed wagons and containers would reduce the transportation costs of fertilizers and also disperse bagging away from the ports where it often leads to logistic bottlenecks

7.16.7 Bulk transport of fertilizers requires large capital investments for the terminals, and the rolling stock. Large volume of transportation and certainty of such transportation are necessary pre-requisites . However, to save costs, the industry, the ports and the railways can jointly explore the feasibility of introducing this concept in some nominated circuits.

Annexure – 7.1

INSTALLED CAPACITY PRODUCT-WISE AND SECTOR-WISE

(`000'MT)

NAME OF PLANTS	PRODUCT	Installed Capacity 2006-07		
	NAME	QTY	N	P
PUBLIC SECTOR:				
NFL:Nangal-II	Urea	**478.5**	**220.1**	**0.0**
NFL:Bhatinda	Urea	**511.5**	**235.3**	**0.0**
NFL:Panipat	Urea	**511.5**	**235.3**	**0.0**
NFL:Vijaipur	Urea	**864.6**	**397.7**	**0.0**
NFL:Vijaipur Expn.	Urea	**864.6**	**397.7**	**0.0**
Total (NFL):		**3230.7**	**1486.1**	**0.0**
BVFCL:Namrup-I	A/S	**0.0**	**0.0**	**0.0**
BVFCL:Namrup-II	Urea	**240.0**	**110.4**	**0.0**
BVFCL:Namrup-III	Urea	**315.0**	**144.9**	**0.0**
BVFCL:Durgapur	Urea	**0.0**	**0.0**	**0.0**
BVFCL:Barauni	Urea	**0.0**	**0.0**	**0.0**
Total (BVFCL):		**555.0**	**255.3**	**0.0**
FACT:Udyogamandal	A/S	**225.0**	**47.3**	**0.0**
	20:20	**148.5**	**29.7**	**29.7**
FACT:Cochin-I@	Urea	**0.0**	**0.0**	**0.0**
FACT:Cochin-II	20:20	**485.0**	**97.0**	**97.0**
	DAP	**0.0**	**0.0**	**0.0**
Total (FACT):		**858.5**	**174.0**	**126.7**
RCF:Trombay	Urea	**0.0**	**0.0**	**0.0**
RCF:Trombay	15:15:15	**300.0**	**45.0**	**45.0**
RCF:Trombay-IV	ANP(20.8:20.8)	**361.0**	**75.1**	**75.1**
RCF:Trombay-V	Urea	**330.0**	**151.8**	**0.0**
RCF:Thal	Urea	**1706.9**	**785.2**	**0.0**
Total (RCF):		**2697.9**	**1057.1**	**120.1**
MFL:Chennai	Urea	**486.8**	**223.9**	**0.0**
	17:17:17	**840.0**	**142.8**	**142.8**
	14:28:14	**0.0**	**0.0**	**0.0**
Total (MFL):		**1326.8**	**366.7**	**142.8**
SAIL:Rourkela	CAN	**480.0**	**120.0**	**0.0**
NLC:Neyveli $	Urea	**0.0**	**0.0**	**0.0**
PPL:Paradeep	DAP	**0.0**	**0.0**	**0.0**
By-Product	A/S	**182.9**	**38.4**	**0.0**
SSP Units	SSP	**80.0**	**0.0**	**12.8**

PPCL:Amjhore ***	SSP	**0.0**	**0.0**	**0.0**
PPCL:Saladipura ***	SSP	**0.0**	**0.0**	**0.0**
HCL:Khetri	SSP	**188.0**	**0.0**	**30.1**
TOTAL PUBLIC SECTOR:		**9599.8**	**3497.6**	**432.5**
COOP. SECTOR:				
IFFCO:Kandla	10:26:26	**515.4**	**51.5**	**134.0**
	12:32:16	**700.0**	**84.0**	**224.0**
	DAP	**1200.0**	**216.0**	**552.0**
IFFCO:Kalol	Urea	**544.5**	**250.5**	**0.0**
IFFCO:Phulpur	Urea	**551.1**	**253.5**	**0.0**
IFFCO:Phulpur Expn.	Urea	**864.6**	**397.7**	**0.0**
IFFCO:Aonla	Urea	**864.6**	**397.7**	**0.0**
IFFCO:Aonla Expn.	Urea	**864.6**	**397.7**	**0.0**
IFFCO:Paradeep	DAP	**1500.0**	**270.0**	**690.0**
	20:20	**100.0**	**20.0**	**20.0**
	10:26:26	**160.0**	**16.0**	**41.6**
	12:32:16	**160.0**	**19.2**	**51.2**
Total (IFFCO):		**8024.8**	**2373.9**	**1712.8**
KRIBHCO:Hazira	Urea	**1729.2**	**795.4**	**0.0**
TOTAL COOP. SECTOR:		**9754.0**	**3169.3**	**1712.8**
TOTAL(PUB.+CO-OP)		**19353.8**	**6666.9**	**2145.3**

Annexure – 7.2

NAME OF PLANTS	PRODUCT	**Installed Capacity 2006-07**		
	NAME	QTY	N	P
PRIVATE SECTOR:				
GSFC:Vadodara	Urea	**370.6**	**170.5**	**0.0**
	A/S	**228.0**	**47.9**	**0.0**
	DAP	**165.0**	**29.7**	**75.9**
Total (GSFC):		**763.6**	**248.1**	**75.9**
CFL:Vizag	28:28	**200.0**	**56.0**	**56.0**
	14:35:14	**200.0**	**28.0**	**70.0**
	20:20	**200.0**	**40.0**	**40.0**
Total (CFL):		**600.0**	**124.0**	**166.0**
SFC:Kota	Urea	**379.0**	**174.3**	**0.0**
DIL:Kanpur	Urea	**722.0**	**332.1**	**0.0**
ZIL:Goa	Urea	**399.3**	**183.7**	**0.0**
	19:19:19	**240.0**	**45.6**	**45.6**
	28:28	**0.0**	**0.0**	**0.0**
	DAP	**330.0**	**59.4**	**151.8**
Total (ZIL):		**969.3**	**288.7**	**197.4**
PPL:Paradeep	DAP	**720.0**	**129.6**	**331.2**
SPIC:Tuticorin	Urea	**620.0**	**285.2**	**0.0**
	DAP	**475.0**	**85.5**	**218.5**
Total (SPIC)		**1095.0**	**370.7**	**218.5**
MCF:Mangalore	Urea	**380.0**	**174.8**	**0.0**
	DAP	**180.0**	**32.4**	**82.8**

Total (MCF):		**560.0**	**207.2**	**82.8**
CFL:Ennore	16:20	**170.0**	**27.2**	**34.0**
	20:20	**70.0**	**14.0**	**14.0**
Total (CFL):		**240.0**	**41.2**	**48.0**
GNFC:Bharuch	Urea	**636.0**	**292.6**	**0.0**
	CAN	**142.5**	**35.6**	**0.0**
	23:23	**0.0**	**0.0**	**0.0**
	20:20	**142.5**	**28.5**	**28.5**
Total (GNFC):		**921.0**	**356.7**	**28.5**
TAC:Tuticorin	A/C	**64.0**	**16.0**	**0.0**
TCL:Haldia	DAP	**675.0**	**121.5**	**310.5**
	SSP	**165.0**	**0.0**	**26.4**
PNF:Nangal	A/C	**64.0**	**16.0**	**0.0**
GSFC:Sikka-I	DAP	**588.0**	**105.8**	**270.5**
GSFC:Sikka-II	DAP	**396.0**	**71.3**	**182.2**
Total (Sikka-I&II):		**984.0**	**177.1**	**452.6**
GFCL:Kakinada	DAP	**670.0**	**120.6**	**308.2**
IGCL:Jagdishpur	Urea	**864.6**	**397.7**	**0.0**
Hin.Ind.Ltd.:Dahej	DAP	**400.0**	**72.0**	**184.0**
DFPCL:Taloja	23:23	**230.0**	**52.9**	**52.9**
NFCL:Kakinada-I	UREA	**597.3**	**274.8**	**0.0**
NFCL:Kakinada-II	UREA	**597.3**	**274.8**	**0.0**
Total (NFCL):		**1194.6**	**549.5**	**0.0**
CFCL:Gadepan-I	UREA	**864.6**	**397.7**	**0.0**
CFCL:Gadepan-II	UREA	**864.6**	**397.7**	**0.0**
Total (CFCL):		**1729.2**	**795.4**	**0.0**
TCL:Babrala	UREA	**864.6**	**397.7**	**0.0**
KSFL:Shajahanpur	UREA	**864.6**	**397.7**	**0.0**
By-Product	A/S	**35.7**	**7.5**	**0.0**
SSP Units	SSP	**6441.2**	**0.0**	**1030.6**
TOTAL PRIVATE SECTOR:		**22216.4**	**5394.3**	**3513.5**
TOTAL(PUB.+COOP.+PVT.):		**41570.2**	**12061.2**	**5658.8**

CHAPTER VIII

CAPACITY ADDITION AND PRODUCTION PLANNING (RENOVATION, MODERNISATION AND EXPANSION) FOR ELEVENTH FIVE YEAR PLAN

8.1 UREA

8.1.1 The domestic production of urea has grown to the level of 20.11 million MT in the year 2005-06 and the consumption reached a level of 22.4 million MT. After accounting for OMIFCO imports of 1.325 million MT in that year, the gap in consumption and production remained at 0.925 million MT which was partly compensated through import of 0.731 million MT of urea. As no new production facilities have been envisaged at present the domestic level of production level will remain static where as the demand is likely to increase to around 25.36 million MT by 2007-08, 27.14 million MT by 2009-10 and 28.76 million MT by 2011-12. To reduce/eliminate this staggering demand-supply gap in urea, the Government of India is making a number of plans /strategies. The plans/strategies and likely incentives to increase the production levels in various plants are mentioned in brief herein. Production capacity should be planned more than 15% of the projected demand taking into consideration 5% buffer stocking and 10% of the supply in the pipeline.

A) EXISTING GAS BASED UREA UNITS

8.1.2 It may be noted here that the performance efficiency of the gas based urea plants in India are at par with the plants worldwide. Most of the plants are performing satisfactorily, and there is still scope for further capacity addition through revamp plans. The likely plant-wise capacity increase and the investment levels are given below;

Sl. No.	Plant	Capacity		Investment (Rs. Crores)
		Re-assessed (MTPD)	After Revamp (MTPD)	
1.	NFL, Vijaipur-II	2620	3300	385
2.	IFFCO, Aonla-II	2620	3030	107
3.	KSFL, Shahjahanpur	2620	3000	530
4.	IGFL, Jagdishpur	2620	3250	250
5.	RCF Thal	5130	5700	675
6.	KRIBHCO, Hazira	5240	5800	675
7.	RCF, Trombay	1000	1000	120
8.	IFFCO, Kalol	1650	1650	24
9.	GSFC, Vadodara	1123	1123	375
10.	CFCL, Gadepan-I	2620	3500	415
11.	IFFCO Aonla-I	2620	3030	110
12.	NFL, Vijaipur-I	2620	3030	252
13.	NFCL, Kakinada-I	1810	2600	300
14.	NFCL, Kakinada-II	1810	2600	300
15.	IFFCO, Phulpur-I	1670	2115	170
16.	IFFCO, Phulpur-II	2620	3030	174
17.	TCL,Babrala	2620	3500	150

Note:
1) The completion time schedule for these schemes would be around 2 years from date of start of implementation.
2) Naphtha–based Phulpur-I & II plants have already been converted to gas based.
3) Total capacity increase through revamp measures would be 8245 MT/day or 2.72 million MT per year.

B) EXISTING NAPHTHA BASED UREA PLANTS

8.1.3 All the naphtha-based plants are to be changed over to natural gas. Though this will not affect any increase in plant capacities Annual savings in subsidy shall be realized due to substitution by cheaper Natural Gas feedstock. Plant-wise capacity and the investment levels are given below:

Sl. No.	Plant Name	Present Capacity (MTPD)	Investment for Changeover of Feedstock (Rs. Crores)
1.	SFC, Kota	1149	36
2.	ZIL, Goa	1210	70
3.	MCFL, Mangalore	1152	85
4.	SPIC, Tuticorin	1879	120
5.	CFCL, Gadepan-II	2620	70

Note: The time schedule for implementing the changeover schemes would be around 2½ years from the date of start of implementation.

C) EXISTING FUEL OIL/LSHS BASED UREA PLANTS

8.1.4 All the fuel oil/LSHS based plants are to be changed over to natural gas. Though this will not effect any increase in plant capacities, annual savings in subsidy shall be realized due to substitution by cheaper Natural Gas feedstock.

Sl. No.	Plant Name	Present Capacity (MTPD)	Investment for Changeover of Feedstock (Rs. Crores)
1.	NFL, Nangal	1450	635
2.	NFL, Panipat	1550	635
3.	NFL, Bathinda	1550	635
4.	GNFC, Bharuch	1927	650

Note: The time schedule for implementing the changeover schemes would be around 3 years from the date of start of implementation.

D) NEW/EXPANSION

8.1.5 Out of the above-mentioned plants, capacity enhancement has been envisaged only in the gas based plants through revamp measures. To further enhance urea production capacities, new expansion units have been envisaged by the following units at present.

Sl. No.	Plant Name	Installed New Capacity (MTPD)	Estimated Investment (Rs. Crores)
1.	Indo Gulf, Jagdishpur	3450	2800
2.	RCF, Thal	3250	2500
3.	KRIBHCO, Hazira	3200	2500
4.	IFFCO, Nellore	3500	3300

Note: The time schedule for these plants would be around 33 to 36 months from the date of start of implementation. The total yields of urea from these would be 4.42 million MT per year.

E) JOINT VENTURES ABROAD

8.1.6 The revamping of the gas based plants and proposed expansion plants would provide additional urea production of around 2.72 million MT from revamp measures and 4.42 million MT from expansion projects million MT per year. However as the gap between demand and production is expected to be around 14 million MT by 2011-12, additional production facilities have to be planned. The best option to meet the remaining gap of about 8.37 million MT urea would be by which work out to around 5.63 million MT per year encouraging JV ventures to set up plants abroad in gas rich countries where cheap gas is available with buyback arrangements. Some quantity of urea may be retained for imports to get the benefits of international trade. Government of India have already taken initiative in this regard and encouraging sponsors from India to invest. The following overseas JVs have sponsors from the Indian fertilizer industry in urea sector.

i) One Joint Venture Project Oman India Fertilizer Company (OMIFCO) with IFFCO, KRIBHCO and Oman Oil Company is already operating at Oman with installed capacity of 1.654 Million MT urea.

ii) SPIC Fertilizers and Chemicals Ltd. UAE is implementing a JV urea project along with MC Investment Corporation of USA and Emirates Trading Agency of UAE with an annual urea production capacity of 0.396 million MT.

iii) Some other JV Projects are in the pipeline in countries like Iran, Saudi Arabia, Kuwait, Nigeria and Egypt.

8.1.7 BENEFITS TO THE COUNTRY/GOVERNMENT DUE TO RENOVATION/ EXPANSION OF EXISTING PLANTS ALONG WITH JV PLANTS ABROAD

(i) Dependence on imports will be reduced which is likely to check price of urea in international market.

(ii) The country can expect lower prices of urea in the domestic market, which will save subsidy outgo, in the long run.

(iii) Joint venture projects abroad can ensure supply of urea at low cost on a long-term basis, due to exploitation of cheaply available gas sources in those countries.

8.2 PHOSPHATIC

8.2.1 The estimated total demand supply gap by 2011-2012 would be 1.711 Million MT of P_2O_5 equivalent to around 3.9 million MT of DAP. The following strategy is suggested to meet the demand supply gap.

i) Direct import of DAP: 1 million MT

ii) The balance DAP gap may be met through JV abroad for manufacture of Phosphoric Acid with buy back arrangements to manufacture phosphates in India. This will require production facilities for 1.33 million MT of Phosphoric Acid per year in rock rich countries.

8.2.2 The setting up of phosphoric acid plant abroad will lead to Import of single intermediate raw material instead of large quantities of Rock Phos. & Sulphur. In addition to freight saving, this will also minimize environmental issues arising out of problems in disposal of gypsum and Fluorine emission in a phosphoric acid plant. The JV companies can further reduce costs through long-term captive supplies of rock phosphate or investment in rock phosphate mining.

8.3 POTASSIC

8.3.1 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. This has led to substantial increase in prices of MOP, which has approximately doubled over the last 2-3 years. The country is paying heavily for lack of potassic resources in the country and its heavy demand for sustenance of Indian agriculture. The Government needs 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 only provide a certain level of comfort to this highly dependent sector. Long-term buy-back arrangements with present suppliers can also be an alternative strategy to control the present trends of price increases.

8.3.2 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 focussed research.

8.4 SSP INDUSTRY: ROAD FOR REVIVAL

8.4.1 The Single Super Phosphate is the only fertilizer under Concession Scheme, which carries sulphur as an additional nutrient to the soil. Due to its comparatively lower selling prices, it is widely referred as the poor farmer's DAP. This sector has suffered serious problems after decontrol in 1992. Initially, there was no concession provided for the manufacture of SSP. Subsequently, this was introduced but the compensation was much less as compared to that on DAP. At present also, the quantum of concession on SSP is nearly half of what is proportionately applicable to DAP. Due to the localised nature of this industry, different State Governments are fixing the selling prices of SSP and the price varies widely across the states. Since the various State Governments fix the selling price and the adhoc concession is being fixed and disbursed by the Central Government, the absence of close coordination between the two is making the manufacturer of SSP unremunerative.

8.4.2 As a result, the production of SSP in the country has come down from 37.21 lakh tonnes in 1997-98 to 32.82 lakh tonnes in 1999-2000 and further to 23.63 lakh tonnes in 2005-06. The Government has recognised the problem of unremunerative costs to the industry and has increased the adhoc concession in the year 2005-06. Though this provided a temporary reprieve to the SSP industry, the increased concession has been gradually offset by increase in input costs, marketing & distribution costs, etc. over the last one year. For sustained growth of this sector, it is necessary that the concession paid on sale of SSP is linked to a rational nutrient value of 'P' as has been provided for in respect of DAP and complex grades of fertilizers, and further is based on an escalation formula which gets updated quarterly to reflect the changes in the input, production/marketing costs involved in the production and sale of SSP. Since the Government of India is paying concession on sale of SSP, it may also examine the feasibility of announcing selling prices of SSP for various states in the country after examining the location of various SSP industries in the country. This will provide a great degree of coordination between the selling prices and the concession paid on the sale of SSP, and help ensure that delivered cost reimbursed to manufacturers are rational and remunerative.

8.4.3 The other 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 half-yearly 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. This has definitely had an impact on the quality of the SSP being manufactured but there is still scope for further improvement. The Government can examine the feasibility of ensuring 100% sale of SSP through the major and established fertilizer manufacturers/importers, who can be held accountable for ensuring quality of product that they would be marketing.

8.4.4 The SSP sector in the country is largely dependent upon the indigenous rock phosphate, which is of inferior grade and is not suitable for production of phosphoric acid. Substantial amount of rock phosphate needs to be imported to also cater to the SSP sector. There are large deposits of inferior grade of rock phosphate in the country, which is not suitable for producing FCO grade SSP with 16% water-soluble P_2O_5 content. The Government can provide for other grades of SSP with lower water-soluble P_2O_5 content under the FCO as also the Concession Scheme so that the unutilised low grade rock phosphate in the country can be gainfully utilised for manufacture of SSP and provide another source of phosphatic nutrient to the farmer.

8.5 INVESTMENT IN THE FERTILIZER SECTOR

8.5.1 The total investment in the fertilizer industry was Rs. 9,334 crore by the end of the 7th Plan for creating new capacities and expansion of the existing units. The amount increased to Rs. 15,477 crore by the end of the 8th Plan and jumped to Rs.

25,644 crore by the end of the 9th Plan. There was hardly any investment during the 10th Plan. The total investment in the fertilizer sector by the end of 2005-06 was Rs.25,923 crore. The growth in production capacity was almost stagnant during the 10th Five Year Plan. As mentioned earlier, no new urea plant was commissioned during the 10th Five Year Plan, except for a small addition to the capacity from BVFC, Namrup II, after its revamp. The last urea plant was commissioned by Chambal Fertilizers, viz. Gadepan II, in October 1999. GSFC, Sikka II was commissioned during 2002 with an additional capacity of 3.96 lakh tonnes DAP. The growth in SSP capacity was stagnant.

8.5.2 Economic reforms have boosted the Indian economy with a high growth in GDP, supported by a massive growth in the services and manufacturing sectors. With the accelerated growth in the Indian economy, other sectors have high rates of return on investment, but the fertilizer sector has failed to attract more investment due to low returns under its highly restrictive pricing policy. The Retention Pricing Scheme (RPS), provided for a 12% post-tax return to the units. During the later part of RPS, due to under-recoveries under various heads, the units were getting much lower returns. Under the New Pricing Scheme (NPS), due to the shift to 'group average or unit RP, whichever is lower', the returns were further reduced. The NPS did not issue a definite rate of return but simply mentioned viability on one of the objectives. According to a Study made by *CRIS INFAC*, returns from this sector have remained very depressed as shown in the table below:

Fertilizer Industry – Key Performance Indicators					
	2000-01	2001-02	2002-03	2003-04	2004-05
Operating margins (%)	13.4	13.6	12.2	11.4	10.4
Return on Capital Employed (%)	9.6	10.4	8.5	9.8	11.3

Urea Companies – Key Performance Indicators					
	2000-01	2001-02	2002-03	2003-04	2004-05
Operating margins (%)	13.83	13.75	11.82	11.22	10.43
Return on Capital Employed (%)	9.24	10.20	8.37	8.92	10.39

Source: CRIS INFAC

8.5.3 To increase the capacity of urea by about 12 million tonnes, to 31.5 million tonnes, India will need to invest at least Rs.36,000 crore in the sector at current capital costs. So far, all capacities in India have been created under the RPS regime, which provided incentives for investment. A new policy is urgently needed which provides incentives for attracting investment for creating new capacity.

8.5.4 A long term clear policy would give an opportunity to the constituents in the sector to bring in investments to meet the shortfall in supplies. In case adequate incentives are provided and given that India will have sufficient gas available in future, India can actually be a urea surplus country. The 11^{th} Plan envisages pricing reforms & suitable fiscal incentives to encourage investment in this sector.

8.5.5 MEASURES FOR ATTRACTING INVESTMENT IN THE SECTOR

(a) PRICING REFORMS

- Since all urea plants will ultimately shift to NG as feedstock/fuel in accordance with the policies of the government, subsidizing feedstock should be explored as a logical step rather than subsidizing urea.
- This will enable the government to bring the industry under an import parity based pricing (IPP) regime, with adequate pricing safeguards in the form of a collar and a cap, in the event that the selling prices to farmers continue to be fixed by the government
- An IPP regime will lead to greater operational efficiency and manufacturers will have incentives to invest in technological upgradation and plan additional capacities for the future.
- The ideal situation would be to free the industry of all price & distribution controls. Serious attempts be made to achieve this goal during the Eleventh Plan period.

(b) FISCAL INCENTIVES

The Fertilizer Industry should be declared an industry of national importance. The Plan also envisages that 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 are listed below:

- 100% income tax exemption for a block of five years and an additional 50% tax exemption for two years thereafter
- External commercial borrowings by SEZ unit's upto US$500 million in a year without any maturity restrictions through recognized banking channels.
- Exemption from customs duties on import of capital goods, raw materials, consumables, spares etc
- Exemption from Central Excise duties on procurement of capital goods, raw materials, consumable spares etc., from the domestic market.
- Exemption from Central Sales Tax and Service Tax

(c) OTHER INCENTIVES

- Viability gap funding for investment in new projects. The model followed for BOT projects for infrastructure where the best bidder is the one who asks for the least Government contribution to bridge the viability gap could be adopted for new urea producing units.
- Facilitating long term contracts for gas
- Securitization of subsidy receivables to ensure regular cash flow
- Review the position of LRAC.

CHAPTER IX

REQUIREMENT & AVAILABILITY OF FEEDSTOCK, RAW MATERIAL AND INTERMEDIATES FOR ELEVENTH FIVE YEAR PLAN

9.1 FEEDSTOCK REQUIREMENTS FOR UREA

9.1.1 Government's policy has aimed at achieving the maximum possible degree of self-sufficiency in the production of nitrogenous fertilizers based on utilization of indigenous feedstocks. Prior to 1980, nitrogenous fertilizer plants were based mainly on naphtha as feedstock. A number of fuel oil based ammonia-urea plants 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 Bassein basins, a number of gas based ammonia-urea plants have been set up since 1985. Later, however, the gas availability started declining particularly in relation to the increased demand. In view of the limitations on availability of gas, a number of urea expansion projects were taken up during 1990s with naphtha as feedstock with the flexibility for switching over to gas as and when it becomes available.

9.1.2 At present, out of 28 urea units with capacity of 197.0034 lakh metric tonnes per annum (LMTPA), 16 natural gas based plants account for 66.08% (130.1749 LMTPA), 8 naphtha based plants account for 23.07% (45.4535 LMTPA) and 4 FO/LSHS based plants account for 10.85% (21.375 LMTPA) of the capacity. For gas based units, cost of feedstock accounts for 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	16	130.1749	66.08
Naphtha	8	45.4535	23.07
FO/LSHS	4	21.375	10.85
Total	**28**	**197.0034**	**100**

9.1.3 Until 31.3.2003, the subsidy to urea manufacturers was being regulated in terms of the provisions of the erstwhile Retention Price Scheme (RPS). Group based , New Pricing Scheme (NPS) for urea units, introduced from 1.4.2003, aims to induce the urea units to achieve internationally competitive levels of efficiency and encouraging the use of gas as feedstock, and bringing in greater transparency and simplification in subsidy administration. The ultimate aim is to move towards a single producer price, convergence between this, the MRP and the international prices of urea, and eventual decontrol.

9.1.4 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 (Notified upto August 2006)

Group	Latest weighted average group concession rate (Rs./MT)
Pre-92 Gas	5355
Post-92 Gas	7057
Pre-92 Naphtha	17637
Post-92 Naphtha	12489
FO/LSHS	11430
Mixed feed	9272
Overall Weighted Average	**9444**

Statement showing average energy consumption per MT of urea by urea manufacturing units

Group	Average energy consumption per MT of urea (G Cal)
Pre-92 gas	6.160
Post 92 gas	5.672
Pre 92 naphtha	7.746
Post 92 naphtha	5.781
FO/LSHS	9.263
Mixed feed	6.959

9.1.5 The following table shows the urea manufacturing capacity, the cost of production and share of subsidy for the year 2004-05.

Statement showing the Estimated Share of Production & Subsidy for the year 2004-05				
Feedstock	**Capacity**		**Weighted average group concession rate**	**Percentage of subsidy**
	Lakh/MT	Percent	Rs./MT	(%)
Pre-92 gas	46.38	24%	5680	7%
Post 92 gas	55.18	28%	7784	18%
Total gas	**101.56**	**52%**	**6823**	**25%**
Pre 92 naphtha	28.17	14%	16127	31%
Post 92 naphtha	17.29	9%	15066	17%
Total Naphtha	**45.46**	**23%**	**15724**	**48%**
FO/LSHS	21.38	11%	11430	14%
Mixed feed	26.22	13%	9272	13%
Grand total	**194.62**	**100%**	**9738**	**100%**

9.1.6 It may be observed from the above table that the urea produced with gas accounts for 52% of the total production (65% including mixed feed units) and the share of total subsidy is only 25% (38% including mixed feed units). The remaining 62% of the total subsidy goes to the naphtha FO/LSHS units which accounts for only 34% of the production capacity. This is mainly on account of the high cost of naphtha and FO/LSHS. The following table indicates the comparative cost of various feed-stock utilized in the manufacture of urea:

Comparative price of various feedstock

Name of feedstock	**Price (US $/MMBTU)** 12.1.2007
APM Natural Gas/ PMT JV Gas	2-3
R-LNG	5-12
Naphtha	14-18
FO	12-14
LSHS	12-14

9.1.7 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/ modernisation, should be based on NG/R-LNG.

9.1.8 However, due to the dwindling supplies of natural gas, even the existing gas based units have been facing shortage of natural gas. Against the total requirement of 33.01 MMSCMD of gas for the existing gas based units, the actual average supply during 2004-0-5 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 has 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 continues to be acute.

9.1.9 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 HFC and FCI. 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 XI Plan Period would be 76.269 MMSCMD. The break-up of the gas requirement year-wise and the corresponding production capacity of urea is given in the table below.

Table: Projected Gas Demand in the XI Plan Period - Fertilizer Sector

	2007-08	2008-09	2009-10	2010-11	2011-12
Gas Demand (MMSCMD)	41.02	42.889	55.899	76.259	76.259
Expected Urea Production Capacity (LMT)	226.156	226.156	259.656	329.352	329.352

Note: The production capacity has been planned 15% over the projected demand keeping in view the requirement to be kept in buffer stock and pipeline.

9.1.10 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 XIth Plan, i.e. 2011-12, in the conservative and optimistic scenario is expected to be 191.42 MMSCMD and 285.42 MMSCMD respectively. The gas supply projections during the XIth Plan are indicated below:

Gas supply projections during XIth Plan (MMSCMD)		
Sources	**2007-08**	**2011-12**
ONGC + OIL (A)	57.28	51.08
Pvt./JVs (certified by DGH) (B)	23.26	57.22
Additional gas anticipated (not certified by DGH yet) (C)		94
Total LNG supply (D)	30.45	83.12
Total Projected Supply Conservative scenario (A+B+D) Optimistic Scenario 2 (A+B+C+D)	 110.99 110.99	 191.42 285.42

Projected gas requirement for fertilizer industry, unit-wise, during 2007-08 to 2010-11 is at Annexure**-9.1**.

9.1.11 As regards the question of availability of gas for fertilizer industry, although the sector has been treated as priority sector along with power in the context of allocation of APM gas, the proportionate amount of gas for fertilizer sector has been declining. The relevance and importance of this is that, although not comparable to power, which is in itself an energy form/source, fertilizer is only a consuming sector. However, particularly 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 Rs.24,000 crores in 2005-06 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 requirements in the fertilizer sector. It may also be added that as of now, there are no options, such as the possible use of coal for power generation, in so far as the fertilizer industry is concerned and there are limits to the possibility of creating urea capacities abroad, though the Department is seriously pursuing such possibilities wherever feasible. Besides, the production of fertilizers (urea) involves the most efficient use of gas since it uses both its heat value and the chemical components.

9.1.12 As far as the price of gas is concerned, it may be mentioned that, the basic price of APM gas remained at Rs.2850/- per 1000 SM3 from 01.10.1999 to 30.06.2005 and was revised to Rs. 3200/MCM effective from 1.7.2005. The JV gas from Panna-Mukta-Tapti (PMT) and Ravva fields was earlier being supplied as part of the APM gas. From 1.4.2005, 6 MMSCMD of JV gas is being procured by GAIL at market driven prices but being supplied to urea units and power plants at APM prices, the difference being subsidized from the Gas Pool Account.

9.1.13 The Planning Commission in a recently prepared approach paper for the 11th Five Year Plan has advocated export parity price of surplus petroleum products. Indian oil companies exported about 3 million tonnes of naphtha during the year 2004-05. Incidentally, about the same quantity of naphtha was consumed by the fertilizer industry in 2005-06. During 2005-06, the average import price of Naphtha was US$ 12.57/MMBTU, whereas the average export price of Naphtha during the same period was US$ 11.03/MMBTU. As such, there was a difference of about US$ 1.54/MMBTU between import price and export price of Naphtha during 2005-06

9.1.14 CONNECTIVITY, AVAILABILITY AND PRICING OF GAS

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 (M/P&NG). Broadly, the 37 urea units {28 functional units, 2 units under shutdown and 7 closed units of Hindustan Fertilizer Corporation Ltd (HFC) and Fertilizer Corporation of India Ltd (FCI)} 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 of HFC and FCI.

9.1.15 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 too, except in respect of units at Goa, Mangalore and Tuticorin. These three units will have to explore alternative feedstock like Coal Bed Methane (CBM) and Coal Gas. A statement indicating the unit-wise pipeline connectivity is at **Annexure-9.2** and proposed pipeline network is at **Annexure-9.3.**

9.1.16 In the meetings held between the officials of Ministry of Petroleum & Natural Gas and the Department of Fertilizers, the Ministry of P&NG has conveyed that there should be no problem of general availability of gas/LNG from the year 2008-09 onwards and DoF could go ahead with its long term planning for the fertilizer sector. It was also stated that the domestic gas availability scenario will remarkably improve from 2008-09, and that fertilizer units may get in touch with gas suppliers and tie up their requirements. As per the production sharing contracts for such private/JV gas production, the gas producers have freedom to market their gas on market considerations and the Government has no control over its allocations.

9.1.17 On the issue of pricing, M/P&NG 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.

9.1.18 COAL GASIFICATION TECHNOLOGY

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. Since syngas can be used in manufacture of urea, the Department of Fertilizers has decided to constitute a Coordination Group in the Department of Fertilizers to study the feasibility of adoption of coal gasification technology in fertilizer sector in India. The Coordination Group will comprise of representatives from Ministry of Coal, Ministry of Petroleum & Natural Gas, Department of Fertilizers, GAIL (India) Limited, Projects & Development India Limited (PDIL) and Fertilizer Association of India (FAI).

9.1.19 A Core Group has been formed in the Department of Fertilizers to assist the Coordination Group and the Core Group comprises of representatives from the Department of Fertilizers, GAIL (India) Limited, PDIL and FCI Aravali Gypsum & Minerals India Limited (FAGMIL). The Core Group has been, inter alia, assigned to ascertain the price and availability of coal in view of the New Pricing and Supply Policy being introduced by Ministry of Coal and will make projections regarding prices of coal.

9.1.20 GAIL intends to set up a Coal Gasification Plant in Talcher (Orissa) for which a Techno-economic feasibility study has been carried out through M/s Uhde India Limited with Shell Technology. The estimated project cost works out to Rs. 2400 crores and the gestation period of the project is of 39 months. The plant will require 5200 tonnes of coal per day (average ash content 32.8%) and dolomite 546 tonnes per day. The capacity of the plant is 7.76 MMSCMD of synthesis gas. Two washeries will also be set up to bring down the ash content of coal from 36% to 32%. A final decision to set up this plant has not been taken so far.

9.1.21 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, more particularly in the eastern region, in abundant measure.

9.1.22 COAL BED METHANE (CBM)

Coal bed Methane (CBM) can also be used as feedstock in the manufacture of urea. Work is in progress in 16 CBM blocks. There are 6 blocks in Jharkhand (Area of exploration in the districts of Hazaribagh, Giridh, Bokaro, Bhanbad, Chatra, Iatehar, Ranchi), 3 blocks in Madhya Pradesh (Shahdol and Chindwara), 3 blocks in west Bengal (Burdwan, Purulia and Bankura), two blocks in Rajasthan (Jalore and Barmer, one block each in States of Maharashtra (Chandrapur), Gujarat (Banaskantha) and Chhatisgarh (Koriya). The work of exploration is at various stages of progress but none of the blocks has been commissioned so far. Once the blocks become operational, the revival of closed urea units viz FCI-Sindri (Jharkhand), HFC-Barauni (Bihar bordering West Bengal), HFC-Haldia (West Bengal), FCI-Ramagundam (Andhra Pradesh but bordering Chandrapur district of Maharashtra), FCI-Talcher (Orissa but near Jharkhand) can be thought of and supplies of CBM from blocks located in state of Madhya Pradesh, Rajasthan and Gujarat can be used to supplement the deficit being felt by existing gas based units in the supplies of NG/LNG and to non-gas based units which are required to switchover to NG/LNG.

9.1.23 The expected CBM production during the Eleventh Five Year Plan Period is shown in Table below-

(**SM3**)

State	Coafield/Block	2007-08	2008-09	2009-10	2010-11	2011-12
West Bengal	Raniganj South	60,000	230,000	350,000	460,000	600,000
	Raniganj East	0	0	30,000	100,000	200,000
	Raniganj North	0	0	0	30,000	50,000
	Sub Total	**60,000**	**230,000**	**380,000**	**590,000**	**850,000**
Jharkhand	Jharia	40,000	260,000	500,000	800,000	1,000,000
	Bokaro	0	120,000	350,000	550,000	800,000
	North Karanpura	0	80,000	150,000	300,000	600,000
	South karanpura	0		0	50,000	100,000
	Sub Total	**40,000**	**460,000**	**1,000,000**	**1,700,000**	**2,500,000**
Madhya Prad	Sohagpur East & W	50,000	400,000	700,000	1,000,000	1,400,000
	Satpura	0	0	0	0	20,000
	Sub Total	**50,000**	**400,000**	**700,000**	**1,000,000**	**1,420,000**
Chattisgarh	Sonhat	0	20,000	130,000	140,000	200,000
Maharashtra	Wardha	0	0	0	0	10,000
Rajasthan	Barmer	0	0	50,000	100,000	250,000
Gujarat	Sanchor	0	0	30,000	80,000	120,000
Grand Total		**150,000**	**1,110,000**	**2,290,000**	**3,610,000**	**5,350,000**

9.1.24 REQUIREMENT OF NAPHTHA

Consumption of naphtha for the production of urea in the last three years is given below.

2002-03	3.027 Million MT
2003-04	3.225 Million MT
2004-05	3.165 Million MT
2005-06	2.96 Million MT

9.1.25 The consumption of naphtha in the past few years has been more or less at the same level for urea production. 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

2007-08	2008-09	2009-10	2010-11	2011-12
3.20	3.20	-	-	-

9.1.26 REQUIREMENT OF FUEL OIL/LSHS

Consumption of fuel oil/LSHS during the lat three years is given below.

2002-03	1.863 Million MT
2003-04	1.893 Million MT
2004-05	1.863 Million MT
2005-06	1.79 Million MT

9.1.27 During the course of Tenth Five Year Plan, there was a negative average growth rate in the consumption of FO/LSHS by the fertilizer sector. None of the new plants or existing plants are likely to be based on FO/LSHS as feedstock. Hence, it has been assumed that the demand for FO/LSHS during the first two years of the Eleventh Five Year Plan would be at the same level as in the year 2005-06 by the fertilizer sector and for the rest of the three-year it 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 tones).

9.1.28 REQUIREMENT OF COAL

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.

9.1.29 The actual consumption of coal during 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07 by fertilizer units is given in the table below;

S. No.	Year	Coal consumption (LMT)
1.	2002-03	28.685
2.	2003-04	26.967
3.	2004-05	23.739
4.	2005-06	27.313
5.	2006-07	30.924*

*Estimated

9.1.30 Requirement of coal by fertilizer units during 11th Five Year Plan is projected as follows:

S. No.	Year	Projected coal requirement (LMT)
1.	2007-08	31.420
2.	2008-09	31.420
3.	2009-10	31.420
4.	2010-11	26.720
5.	2011-12	25.120

9.1.31 In case, the HFC-Barauni, HFC-Durgapur, HFC-Haldia, FCI-Sindri, FCI-Talcher and FCI-Ramagundam, which are presently closed, are revived on coal gas, then the estimated annual coal requirement for these 6 units would be 114 LMT as the annual requirement of coal for one urea unit of a production capacity of 8.58 LMTPA is 19 LMT.

9.2 RAW MATERIAL FOR DAP

9.2.1 ROCK PHOSPHATE

9.2.1.1 In case of phosphates, the paucity of domestic raw material constrains the attainment of self-sufficiency. The indigenous production of Rock Phosphate during 2004-05 was 1.359 million tonnes and the imports were around 4.845 million MT. In addition, the indigenous rock is of inferior quality and requires beneficiation. At present, most of the indigenous rock is used in SSP Plants. The fertilizer PSU, RCF along with JV Partner is actively considering installation of Phosphoric Acid Plant in Rajasthan using indigenous rock after beneficiation and blending with imported rock. 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.

9.2.1.2 Since the availability of rock phosphate in the country is limited, it is necessary that large scale survey and exploration be carried out in this sector for finding out new geological reserves of rock phosphate which can be now mined economically in the increased price scenario. A nodal agency can be identified, which can be dedicated towards coordinating and monitoring the extensive surveys and exploration in this sector.

9.2.1.3 The world rock phosphate production will increase from 177 million MT in 2005 to 195 million MT in 2010. China alone will account for one-third of this growth. The rock phosphate production (excluding China) is forecast at 136 Million MT in 2010. 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.

9.2.2 SULPHUR

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.

The sulphur import in 2004 stood at 2 million tones and is expected to rise slightly during the 11th plan period in the event of the unutilized capacities in phosphatic sector are utilized completely.

9.2.3 PHOSPHORIC ACID

9.2.3.1 The indigenous production of phosphoric acid has picked up slowly during the 10th plan period with 1.243 million tonnes of production in 2005-06. 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% utilisation of indigenous capacity during the plan period.

9.2.3.2 The global phosphoric acid capacity is forecast to increase by 5.4 million MT between 2006 and 2010 to 48.5 million MT P_2O_5. The new projects will be in Algeria, China, Egypt, Morocco, Russia, Saudi Arabia and Tunisia. Only four new plants will be dedicated towards export and all of these are under captive supply agreements. Therefore no significant addition to merchant phosphoric acid capacity is expected during the forecast period (Source: IFA). It is observed that large phosphoric acid capacities are currently closed in EU and US due to unremunerative returns. The need to encourage Indian companies to set up more phosphoric acid joint ventures abroad to cater to increasing indigenous demand for phosphatic fertilizers is the obvious direction for the XI Plan period.

9.2.3.3 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 tones of phosphoric acid (as P_2O_5), India imports more than 2.5 million tones 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 P2O5 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 P2O5, will lead to sharp increase in international prices due to tight supply position.

9.3 DAP

9.3.1 The import of DAP has risen sharply in 2005-06 and the trend is likely to continue in 2006-07 with a total import of 2.5 million tones of DAP. The import of DAP during the 11th 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 tones in 2011-12. However, if there is no further addition to indigenous production, the imports can go up further to 3.9 million tones by 2011-12.

9.3.2 World production of the main processed phosphatic fertilizers (MAP, DAP and TSP) was stable in 2005 at 23.1 million MT. Between 2006 and 2010, new processed phosphate projects will essentially focus on DAP. Global DAP capacity is projected to grow by a net 3.3 million MT P_2O_5 reaching 24.1 million MT P_2O_5 in 2010. China will contribute substantially to the growth in DAP capacity. The other main additions will come from Saudi Arabia and North Africa. In contrast, some DAP capacity was shutdown in US in 2005 and 2006 (Source: IFA). It is observed that large capacities are lying closed in United States due to un-remunerative costs and shortage of indigenous raw material/intermediates.

9.3.3 The international trade of DAP is approximately 12.4 million tones per annum and the Indian import constitute approximately 20% of the trade. Any increase/decrease in Indian demand has a major impact on the DAP prices as

India is the leading importer of DAP in the world. The world trade of DAP is not expected to significantly increase in the next 5-6 years and, therefore, it is necessary that our demand for P2O5 in the country should not be highly dependent upon imported DAP. At best, it can continue at present level with efforts to bring it down to approximately 1-1.5 million tones of import every year.

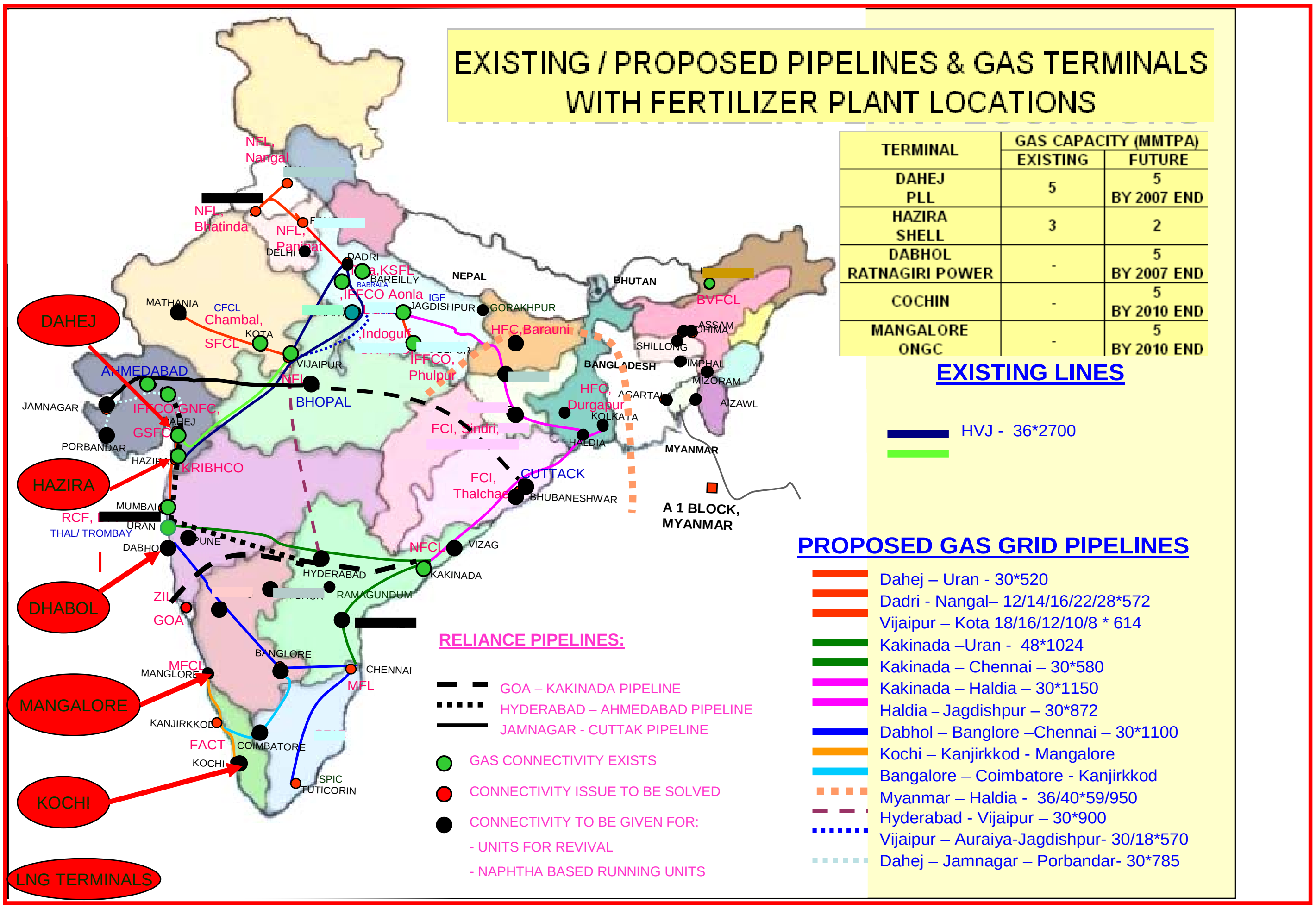
Annexure-9.1

GAS REQUIREMENT FOR FERTILIZER INDUSTRY (MMSCMD)													
										Projected requirement			
Sl. No.	Name/Number of Plants	Capacity (LMT)	Requirement - 2006-07	Current Gas supply 2006-07					Percent Shortfall	2007-08	2008-09	2009-10	2010-11
				APM Gas	JV gas	R-LNG	Others	TOTAL					
	Gas Based Plants on HBJ Pipeline												
1	KRIBHCO - Hazira	17.292	4.184	2.286	0.511	0.000	0.967	3.764	10.04%	4.314	3.750	3.750	5.890
2	TCL - Babrala	8.646	1.770	0.828	0.316	0.582	0.018	1.744	1.47%	1.759	2.129	2.129	2.129
3	KSFL - Shahjahanpur	8.646	1.820	0.793	0.388	0.657	0.000	1.838	-0.99%	2.170	2.300	2.300	2.300
4	IGL - Jagdishpur	8.646	1.810	0.704	0.306	0.669	0.000	1.679	7.24%	1.930	2.130	2.130	4.350
5&6	NFL - Vijaipur I & II	17.292	3.642	2.195	0.561	0.636	0.000	3.392	6.86%	3.710	3.810	4.270	4.270
7&8	IFFCO - Aonla I & II	17.292	3.300	1.796	0.640	0.545	0.053	3.034	8.06%	4.020	4.020	4.020	4.020
9&10	IFFCO - Phulpur I & II	14.157	2.557	0.000	0.000	1.541	0.000	1.541	39.73%	3.860	3.860	3.860	3.860
11&12	CFCL – Gadepan-I & II	17.292	3.320	0.700	0.300	2.540	0.000	3.540	-6.63%	3.131	3.482	5.192	5.192
13	SFC – Kota	3.790								0.620	0.700	0.700	0.700
	On HVJ Pipeline (1 to 13)	113.053	22.403	9.302	3.022	7.170	1.038	20.532	8.35%	25.514	26.181	28.351	32.711
14&15	NFCL - Kakinada I &II	11.946	2.433	1.431	0.276	0.000	0.000	1.707	29.84%	3.580	3.580	3.580	3.580
16	RCF, Thal	17.068	4.500	2.270	0.000	0.000	0.000	2.270	49.56%	4.320	5.040	7.130	7.240
17	IFFCO- Kalol	5.445	1.200	0.187	0.000	0.544	0.000	0.731	39.08%	1.060	1.060	1.060	1.060
18	GSFC- Badodra	3.706	1.825	0.613	0.130	0.347	0.227	1.317	27.84%	1.886	2.386	2.386	2.386
19	GNVFC -Bharuch	6.360								1.022	1.022	3.422	3.422
20&21	BVFCL, Namrup – II & III	5.550	2.170							1.720	1.720	1.720	1.700
22	RCF Trombay	3.300	1.800	0.736	0.000	0.000	0.000	0.736	59.11%	1.900	1.900	1.900	1.900
	SUB-TOTAL(14 to 22)	53.375	36.331	14.539	3.428	8.061	1.265	27.293	24.88%	41.002	42.889	49.549	53.999
	Naphtha Based Plants												
23	ZIL- Goa	3.993										1.500	1.500
24	MCFL- Mangalore	3.800										1.000	1.000
25	SPIC- Tuticorin	6.200										1.600	1.600
26	MFL- Chennai	4.868										1.340	1.340
27	FACT- UDYOGAMANDAL	3.300										0.910	0.910
	SUB-TOTAL(23 TO 27)	22.161										6.350	6.350
	Fuel Oil / LSHS Based Plants												
28	NFL, Nangal	4.785											1.260
29	NFL, Panipat	5.115											1.350
30	NFL, Bhatinda	5.115											1.350
	SUB-TOTAL(28 TO 30)	15.015											3.960
	Total (Gas+Naphtha+FO)	203.603	36.331	14.539	3.428	8.061	1.265	27.293	0.249	41.002	42.889	55.899	64.309
	Closed Units												
31	FCI, Sindri	8.646											1.690
32	FCI, Gorakhpur	8.646											1.690
33	FCI, Ramagundam	8.646											3.500
34	FCI, Talcher* (Coal Gas.)	8.646											0.000
35	HFCL, Barauni	8.646											1.690
36	HFCL, Durgapur	8.646											1.690
37	HFCL, Haldia	8.646											1.690
	SUB-TOTAL(31 TO 37)	60.522											11.950
	Total Requirement, MMSCMD	264.125	36.331	14.539	3.428	8.061	1.265	27.293	0.249	41.002	42.889	55.899	76.259

Annexure-9.2

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	Dec' 2006
B	**Gas Based Plants on other Pipelines**			
14 15	RCF, Thal RCF Trombay	Uran Sector	Existing	2007-08
16&17	Kakinada – I & II	K G Basin	Existing	2008-09
18&19	BVFCL, Namrup – II & III	North East	Existing	2007-08
20 21 22	IFFCO, Kalol GSFC Vadodra GNVFC Bharuch	Gujarat Region	Existing	2007-08
C	**Naphtha Based Plants**			
1	ZIL, Goa	-	No definite plan in sight	-
2	MCFL, Mangalore	-	No definite plan in sight	-
3	FACT, Cochin	-	From Kochi LNG terminal Subject to availability & tie-up of gas	2009
4	SPIC, Tuticorin	-	No definite plan in sight	-
5	MFL, Chennai	-	Kakinada – Chennai	2008-09 or 2009-10
D	**FO/LSHS Based Plants**			
1	NFL, Nangal	-	Dahej - Dadri	2008-09
2	NFL, Panipat	-	Dahej – Dadri/ Pipeline to Panipat	2008-09
3	NFL, Bhatinda	-	Dahej – Dadri / Pipeline to Bhatinda	2008-09
E	**Closed Units**			
1	FCI, Ramagundam	-	Spur on Kakinada to Uran via Hyderabad	2008-09
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	2009-10


EXISTING / PROPOSED PIPELINES & GAS TERMINALS
WITH FERTILIZER PLANT LOCATIONS
TERMINAL | GAS CAPACITY (MMTPA) EXISTING | FUTURE
DAHEJ PLL | 5 | 5 BY 2007 END
HAZIRA SHELL | 3 | 2
DABHOL RATNAGIRI POWER | - | 5 BY 2007 END
COCHIN | - | 5 BY 2010 END
MANGALORE ONGC | - | 5 BY 2010 END
EXISTING LINES
HVJ - 36*2700
PROPOSED GAS GRID PIPELINES
Dahej – Uran - 30*520
Dadri - Nangal– 12/14/16/22/28*572
Vijaipur – Kota 18/16/12/10/8 * 614
Kakinada –Uran - 48*1024
Kakinada – Chennai – 30*580
Kakinada – Haldia – 30*1150
Haldia – Jagdishpur – 30*872
Dabhol – Banglore –Chennai – 30*1100
Kochi – Kanjirkkod - Mangalore
Bangalore – Coimbatore - Kanjirkkod
Myanmar – Haldia - 36/40*59/950
Hyderabad - Vijaipur – 30*900
Vijaipur – Auraiya-Jagdishpur- 30/18*570
Dahej – Jamnagar – Porbandar- 30*785
RELIANCE PIPELINES:
GOA – KAKINADA PIPELINE
HYDERABAD – AHMEDABAD PIPELINE
JAMNAGAR - CUTTAK PIPELINE
GAS CONNECTIVITY EXISTS
CONNECTIVITY ISSUE TO BE SOLVED
CONNECTIVITY TO BE GIVEN FOR:
- UNITS FOR REVIVAL
- NAPHTHA BASED RUNNING UNITS
DAHEJ
HAZIRA
DHABOL
MANGALORE
KOCHI
LNG TERMINALS
A 1 BLOCK, MYANMAR

CHAPTER – X

ISSUE OF REVIVAL OF SICK AND CLOSED FERTILIZER COMPANIES

10.1 SCOPE OF REVIVAL

There are several reasons for considering the revival of the closed units of these companies as an alternative to allowing them to be liquidated. Some of the more pressing reasons are briefly discussed below.

10.2 Most of the units of these closed companies have excellent existing infrastructure in the shape of residential colonies, coal and electricity tie-ups, water filtration plants, Railway sidings and a very sizeable area of land. This infrastructure is ideal for Brown Field Projects. Liquidating this infrastructure would be a colossal national loss of valuable resources.

10.3 Some of these units are located near coal pitheads, which ensure availability of cheap coal for fuel and feedstock. This makes these units of strategic value for power plants as well as for fertilizer/petrochemical complexes through the route of coal gasification. Majority of these units are also likely to be on the proposed national gas grid.

10.4 Most of these closed units are located in industrially backward areas. Already closure of these units has had an adverse impact on the economy of these areas, specially the States of Bihar, West Bengal, Chattisgarh and North Eastern Region. A case in point is Sindri, closure of which has turned a once prosperous Township into a ghost town.

10.5 Then there is the question of demand-supply gap vis-à-vis domestic production of nitrogenous fertilizers. The installed urea capacity of 28 plants presently functioning in the country is 197 lakh metric tonne (LMT) against which actual production in 2006-07 is expected to be around 202 LMT. However, the demand for urea for agricultural use in the current year is likely to be around 230 LMT. In the previous year 2005-06, the actual urea consumption of 222 LMT was partially met from urea imports of around 20 LMT, including 13.5 from Oman India Fertilizer Company (OMIFCO). The Working Group on Fertilizers for the Tenth Plan has estimated that by the end of Eleventh Five Year Plan (i.e. 2011-12) the demand for 'N' nutrient would be 161.71 LMT per annum which would translate into about 281 LMT of Urea. This would require an additional urea capacity of 66.58 LMT over the domestic urea production capacity and that of OMIFCO.

10.6 Clearly there is a need to strengthen domestic urea production capacity to fulfill the demand-supply gap for food security as also to reduce dependence upon imports. A portion of this gap can be met by de-bottlenecking and expansion of the existing urea units, and also by reviving the closed urea units of HFCL and FCIL which are situated mainly in the Eastern region, which hardly has any existing urea capacity at present. Further, the revival of these urea plants could be considered on NG/LNG, which would become available in sufficient quantities by 2010-11 along with pipeline connectivity.

10.7 Shortfall in availability of fertilizers is mainly attributable to deficiency in production units. There are States where there are virtually no fertilizer plants. In States, such as Bihar, Jharkhand, Chattisgarh and West Bengal, where these closed units are situated, there are at present no functional fertilizer plants.

10.8 Finally, by reviving these units, the Government would be fulfilling its own commitment to the public. The revival of these units will also boost the agricultural development in these areas and create a new environment of industrial development in such areas.

10.9 POSSIBLE MODES FOR REVIVAL

There are several possibilities for reviving of the closed units of FCIL/HFCL. Some of the possibilities are:

(a) To explore the possibility of hiving off individual units to existing profit making fertilizer PSUs or invite 'Expression of Interest' for Joint Ventures in a transparent manner for revival, without infusion of capital or guarantee being sought from the Government.

(b) Setting up of new Brownfield Fertilizer Plants, using natural gas/LNG/Coal gas/CBM as feedstock, by setting up a Joint Venture with Strategic Partners, with no fresh infusion of capital or guarantee being sought from the Government.

(c) Setting up of a new Joint Venture project with the public/private equity participation in non-fertilizer sector, such as petrochemical complex or power plant etc.

(d) Any other suitable/viable model, keeping in view that fertilizer production should be a necessary activity in the model, along with any other viable economic activity.

10.10 The technical and operational efficiency of the Indian industry is comparable to the international standards. The average efficiency in Indian industry for recovery of P_2O_5 from rock phosphate to phosphoric acid is 92.54%. The P_2O_5 recovery efficiency within the industry varies from 85.05% to 96.9%. Similarly, the 'N' recovery efficiency varies in the industry from 93.68% to 99.22% with the average efficiency of Indian industry at 97.01%. The P_2O_5 recovery from phosphoric acid to manufacture DAP/ complex fertilizers varies between 93.04% to 99.58% with the average efficiency of the industry at 97.6%.

10.11 The average conversion efficiencies in the Indian industry as enumerated above is comparable to international standards and even better in many cases. The variance in P2O5 recovery from rock phosphate is also due to the fact that various industries use different types of rock phosphate, which have varying amenability for conversion to phosphoric acid. Nevertheless, the industry needs to be more competitive and the units with low conversion efficiency need to improve these parameters through better operations and required investments. The present Concession Scheme based on cost plus methodology with the base costs derived on the basis of average industry cost, do not provide enough incentive for improvement. It is felt that a departure from the cost based Concession Scheme to a regime based on international benchmarks and prices, will induce the Indian industry to be even more competitive through improvement in their conversion efficiencies and low conversion costs.

CHAPTER – XI

INTEGRATED NUTRIENT MANAGEMENT AND BALANCED FERTILIZATION

11.1 Maintenance of the health of Indian soils is under continuous threat of various types of degradation, particularly nutrient mining. It is estimated that crops withdraw annually about 10 million tonnes of nutrients (NPK) more than what is applied, thus impoverishing the soil. The complementary use of chemical fertilizers, organic manures, and bio-fertilizers referred to as integrated nutrient management, could play a major role for solving the problem of nutrient mining, because no single source of nutrients can meet the entire nutrient demand of crops.

11.2 The increase in consumption of fertilizers during the 10^{th} plan period has not led to a corresponding increase in agricultural productivity and production. The marginal productivity of our soils during the plan period has shown a declining trend vis-à-vis use of fertilizers. According to the Indian Agricultural Statistics Research Institute (IASRI), the overall crop response rate (kg grain per kg NPK) for fertilizer has been declining over the years, from 7.5:1 in 1992-97 to 7.0:1 in 1997-99 and 6.5:1 in 1999-2000. The crop response may be still lower at present. There has been a very significant growth in fertilizer consumption in the last three years. However, there has been practically no increase in food grain production.

The diminishing and negative returns on fertilizer use could be due to several reasons, including, diversion of area to non food grain crops, aberrant weather conditions and uncorrected deficiencies of other nutrients. Besides NPK, soils are getting depleted of secondary and micronutrients. The country has entered into an era of multinutrient deficiency. At least 7 essential nutrients (N, P, K, S, Zn, Fe and B) are already of widespread practical importance. The concept of "balanced fertilisation" now goes beyond NPK and emphasis on secondary and micronutrients is a must.

11.3 SECONDARY NUTRIENTS

Among the secondary nutrients (sulphur, calcium and magnesium); sulphur is of paramount importance from the point of view of crop production. It is now considered as the fourth major nutrient. The deficiency of sulphur is on the increase due to the extensive use of high analysis fertilizers (Urea, DAP, MOP) under intensive cultivation. The need for meeting S containing fertilizers like SSP has increased due to widespread deficiency of sulphur in Indian soils. Out of over 49,000 soil samples collected from 18 major states under the TSI-FAI-IFA sulphur project, 46% samples were found deficient and 30% potentially deficient in sulphur. The deficiency of sulphur has crossed all regional/state boundaries. Contrary to the general belief that sulphur is important mainly for oilseed crops, the field trials showed significant increase in yield of all major crops. The deficiency of sulphur in India is bound to increase in future as the requirement of sulphur far exceeds its application through all fertilizer sources. At the present levels of production, the estimated gap between requirement and use of sulphur is 1 million tonne per annum, which is likely to increase further with increase in crop production.

11.3.1 AGRONOMICAL IMPORTANCE OF SSP

The need of sulphur containing fertilizers, particularly SSP, has increased due to increasing deficiency of S, which has started limiting the response to applied primary nutrients (N, P, K). SSP is the oldest and traditional fertilizer in Indian Agriculture. It is generally used as a phosphatic fertilizer (16 % P_2O_5) but it also contains 12 % sulphur. In fact, SSP out performs many other phosphatic fertilizers due to its S content. SSP is very suitable for preparation of fertilizer mixtures/customised fertilizers due to its compatible nature. It also has the added advantage that indigenous rock phosphate can be used as a raw material to make it. Sulphur deficiency can also be corrected by other sources like ammonium sulphate, elemental sulphur, etc. but farmers may have to pay higher prices per unit of nutrient. SSP, the most easily available, affordable, well known and well established source of phosphorus and sulphur should be restored to its earlier importance as a source of P2O5 to improve soil health and productivity.

The main micronutrient deficiencies in India, in decreasing order, relate to zinc, boron, iron, manganese, molybdenum and copper. Currently, micronutrients are generally applied when there is a noticeable deficiency, not as a routine application based on soil tests. Different methods of applications are: direct application to soil, fertigation, foliar spray and seed treatment. All have pros and cons depending on the nutrient, crop and soil characteristics. A high cost - benefit ratio is often associated with the use of micronutrients (often higher than 1:10).

11.4 MICRONUTRIENTS

In India, comprehensive scientific data on the extent of micronutrient deficiencies is available, but reliable information is not available on actual production and use of micronutrient fertilizers. There is a large gap between the demand and supply of micronutrient fertilizers. Inadequate and irregular supply of micronutrients is largely because the production of micronutrient fertilizers is reserved for small scale industry. Among the micronutrients (Zinc, Iron, Copper, Manganese, Molybdenum, Boron, Chlorine), the deficiency of Zinc is most acute followed by Iron and Boron. With increasing demand for food for the ever increasing population, the deficiency of micronutrients is bound to increase further, if corrective measures are not taken immediately.

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. Database integrating the available information on micronutrients in soils, crops, animals and humans should be developed, at least on a country basis. Quality control is a much neglected area which should get due importance during the Eleventh Plan. Fortification of popular fertilizers should be encouraged to increase the use of micronutrients.

11.5 EFFICIENT USE OF FERTILIZERS

With the continuous and steady increase in the use of fertilizers and considerable escalation in their prices, the need to utilise every available unit of plant nutrient in the most productive and profitable manner has become all the more essential. There has been a genuine concern over low nitrogen use efficiency for economic as well as environmental reasons. 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.

Rice is the principal crop of India and urea is the most widely used nitrogenous fertilizer in India. Nitrogen use efficiency in rice is hardly 40 %, even under well managed conditions. Fertilizer materials that are better than prilled urea should be promoted to get a higher fertilizer use efficiency. In general the use of slow-release N fertilizers, nitrification inhibitors or urea supergranules (USG) can increase fertilizer use efficiency for N by 10-20 %. On a national scale this could lead to considerable savings in fertilizer needs and also subsidy. Furthermore, by reducing leaching and denitrification losses of N, use of these materials reduces environmental degradation.

The advantage of deep placed USG in transplanted rice over split application of prilled urea was recognised long ago. It’s lack of popularity at farmers level can be attributed to its inadequate availability, lack of availability of suitable machinery for placing granulated urea into the soil and lack of fiscal support by the government. The central government has given permission to 3 companies, National Fertilizers Ltd., Shriram Fertilizers Ltd. and Indogulf Fertilizers Ltd. to manufacture and sell neem coated urea. The acceptance and demand for neem coated urea at farmers' level are very good and there is a considerable potential to improve the N use efficiency by promoting neem coated urea. However, the major barrier in wide scale production of neem coated urea is the somewhat higher cost and that the present MRP does not cover the additional cost of coating urea with neem oil. Manufacturers are not allowed to charge the extra cost from the farmer, which is a deterrent for production and consequently, the availability of neem coated urea. Products and practices which will improve fertilizer use efficiency need special encouragement through a combination of extension services and flexible pricing.

11.6 BALANCED FERTILISATION

Balanced fertilizer use is a must for sustaining optimum yields and profits. It ensures high productivity in accordance with nutrient demand by crops and for individual nutrients without causing harm to the environment. It is also seen as a dynamic approach which responds to the needs of higher productivity and emergence of any new nutrient deficiencies. Balanced fertilizer use and efficient fertilizer use are the two aspects of a sound soil fertility management programme.

Fertilizer use in India is imbalanced and is skewed in favour of nitrogen. Future gains in food grain production will be more difficult and expensive considering the increasing problem of multinutrient deficiencies. The present fertilizer product pattern which is dominated by urea, DAP and MOP is not in a conducive for solving the problem of multinutrient deficiency. New fertilizer materials with value addition/ fortification with secondary and micronutrients would be required to ensure balanced fertilizer use involving all or most of the nutrients required by crops.

11.6.1 VALUE ADDED/FORTIFIED FERTILIZERS

The application of secondary and micronutrients through blending or fortification with macronutrient fertilizers is the best option to ensure the balanced and efficient use of nutrients. Fortified fertilizers can play an important role in increasing the use of micronutrients. At present there are 3 fortified products (Zincated urea, Boronated SSP; & 10:26:26 fortified with Boron) included in the FCO but there is no commercial production as the MRP in the case of Zincated Urea & Boronated SSP is inadequate to recover the additional cost of fortification while in the case of 10:26:26 fortified with Boron, there is no separate MRP to cover the cost. Manufacturers should be allowed to charge from the farmers and they should be compensated by notifying a higher MRP.

11.6.2 SPECIALTY FERTILIZERS

Current market preferences for high quality farm produce have brought additional pressure on farmers to deliver quality farm produce so as to get a good price for their produce. Specialty fertilizers improve the quality of produce of all types of crops. They are more critical for cash crops such as potato, fruits and vegetables etc. Schedule-1 of the FCO does provide for these fertilizers but regulatory mechanism governing import and method of cultivation adopted by farmers are hurdles in promoting the use of such fertilizers. Therefore, the policy on specialty fertilizers currently in place needs to be reviewed. Tariff /duties/taxes should also be reviewed to make the policy simple and importer friendly.

11.6.3 CUSTOMISED FERTILIZER

Soil fertility status, climate, and cropping pattern in a region pave the way for the development of customised fertilizer formulations for that location/region which leads to integrated, balanced and efficient use of fertilizers. Customised fertilizers facilitate the application of the complete range of plant nutrients in the right proportion and to suit the specific requirements of a crop during its stages of growth. 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. Depending on the soil test report, climate, water requirement, crop and seed chosen (like doctor's prescription), a particular type of grade of fertilizer (customised fertilizer) is prescribed along with the recommended doses and time and method of application to get the best yield and maintain soil health. This needs research and field trials before such formulations become really useful. Awareness among the farmers must also be created so that they do not fall prey to spurious claims. The recommendations given by the 'Task Force on Balanced Use of Fertilizers' should also be kept in mind.

11.7 PRICING POLICY

Adoption of an appropriate pricing policy is a prerequisite for ensuring the integrated and balanced use of fertilizers. Current pricing and subsidy schemes do not include secondary and micronutrients. The pricing policy should encourage the use of all plant nutrients in a balanced manner. The subsidies on fertilizer should be rationalised so that there is parity in nutrient pricing to promote balanced fertilisation. The selling price of fertilizers also needs to be rationalised realistically so as to prevent any excess use of subsidised fertilizer. The selling prices of fertilizers can be benchmarked with agriculture output prices (minimum support prices) to provide a logical pricing mechanism.

From the present product based subsidy and pricing mechanism, the need is to progressively move towards a nutrient based subsidy and pricing mechanism. The pricing of value added/fortified fertilizers can be left to the market forces. Apprehension regarding spurt in prices of such products appear unwarranted so long as there is continued control on the selling price of straight fertilizers like urea, DAP, & MOP, which continue to be the main source of nutrients for Indian agriculture.

11.8 AMENDMENTS TO THE FERTILIZER (CONTROL) ORDER, 1985

With the objective of promoting balanced fertilisation and encouraging development of crop and location specific fertilizers, a system with quick approvals of various grades of complex or granulated fertilizers is a must. This will encourage healthy competition in the fertilizer industry, which will try to innovate and produce various grades of fertilizers in order to provide better productivity and income to the farmers. The industry should be enabled to undertake extensive soil testing and recommend scientific use of fertilizers.

11.9 BIOFERTILIZERS

Biofertilizers are a cost effective and an eco-friendly supplement to provide plant nutrients, especially nitrogen and for improving efficiency of phosphorus in the soil. Biofertilizers consist of nitrogen fixers (Rhizobium, Azotobacter, Blue Green Algae, Azolla), Phosphate Solubilising Bacteria (PSB) and fungi (Micorrhizae). A contribution of 20-30 kg N/ha has been reported from use of biofertilizers. Biofertilizer production in India is about 50 years old but the growth in biofertilizer use remained very slow until the 1980s due to lack of awareness and its slow impact on crop yields. The growth in biofertilizer production and consumption has been rapid in the last 15 years and the maximum growth was witnessed for PSBs. At present, the annual production capacity of biofertilizer is estimated at about 22,000 tonnes and the consumption is about 12,000 tonnes. The present level of bio-fertilizer use is still quite low and there is a substantial potential to increase it to 50,000-60,000 tonnes by 2020.

The Department of Agriculture & Cooperation has taken up a scheme “National Project on Organic Farming” from October, 2004. Setting up of bio-fertilizer production units is an important component of the scheme for which back ended capital investment subsidy @ 25% of the total cost of the project or Rs.20.00 lakh per unit, whichever is less, is being provided. In order to ensure supply of quality bio-fertilizers and in exercise of the powers conferred under Section 3 of the Essential Commodities Act, 1955, the Central Government has issued the Fertilizer (Control) Amendment Order 2006 vide gazette notification no. S.O. 391 (E) on 24.3.2006. Through this Amendment Order, 4 bio-fertilizers have been brought under FCO namely, rhizobium, azotobactor, azospirilium and phosphate solubilising bacteria.

The production of bio-fertilizers is inter-linked with continuous research. Therefore, research for new and efficient strains of bio-fertilizers are to be included in the production system. Application of bio-fertilizers as a fertilizer supplement is relatively a new concept and hence requires extensive market development efforts aimed at increasing acceptance of the product at the farmer's level. Agriculture extension services therefore play an important role in marketing of bio-fertilizers. Another aspect to be covered in research is to increase the shelf life of bio-fertilizers which is a major hurdle in its propagation and use.

11.10 ORGANIC MANURES

Use of organic manures (farmyard manure and compost) is the oldest and most widely practised method of nutrient replenishment. Although, the use of organic manures has not increased much during the last 4-5 decades, it still has a significant role to play in nutrient supply and soil health. The supplementary and complementary use of organic manure, besides improving soil physico-chemical properties also improves the efficiency of use of chemical fertilizers. Organic manures also help retain moisture and hence facilitate water conservation. The average use of organics is around 2 tonnes per ha per year which is very low compared to the desirable rate of 10 tonnes per ha. Of late, both, the central and state governments have placed considerable emphasis on improving the availability of organic manures. To ensure the quality of the organic manures supplied commercially to farmers the government has brought three organic fertilizers (viz. city compost, vermicompost and press mud) under the FCO.

11.11 SOIL HEALTH ENHANCEMENT

The stagnation in production and productivity of food grains for the past few years has become a source of concern and is posing a serious threat to our national food security. The depletion in soil fertility due to imbalanced and unscientific use of fertilizer is one of the major constraints in improving crop productivity. The effect of depletion of soil nutrients is cumulative and its effects pile up as each year goes by unless corrective measures are taken in time. It is high time that due attention is paid to the problem of degradation of soil health. The complementary use of chemical fertilizers, organic manures, and bio-fertilizers should be encouraged to improve soil health.

11.12 SOIL TESTING

Soil testing is a prerequisite to know the fertility status of the soils. However, the analyzing capacity of soil testing labs is grossly inadequate. Public-private partnership (PPP) should be encouraged for strengthening and making more effective the soil testing infrastructure in the country. It is also important to ensure that the existing soil testing facilities are fully utilized and the soil test based fertilizer recommendations reach the farmers in time and they are used by farmers to achieve higher crop yields and profitability. In most of the states, the existing fertilizer recommendations and soil fertility maps are outdated and obsolete and need to be revised at the earliest possible. Soil fertility maps should be prepared of all the nutrients, including secondary and micronutrients and updated at regular intervals. In fact, the direction in which soil health is moving in the country should be monitored at, say 5 year intervals, something on the lines that ground water levels are monitored through a net-work of observation wells.

11.13 AGRICULTURE EXTENSION

India has a vast agricultural extension system (Govt. Agri. Dept., SAU, ICAR, input industries, NGOs, etc.) to educate the farmers on improved farm technologies. However, the reach of extension agencies to farmers is very weak and the state extension machinery has almost ceased to exist. There is a lack of synergy between research, extension and policy which is largely responsible for the wide gap between potential and actual yields. Farmers' knowledge regarding the right product, dosage, time and method of application is very limited, leading to inefficient use of fertilizers. Extension systems should be rejuvenated and reoriented with focus on the poor farmers and low fertilizer consumption areas in mission mode with the ultimate aim of increasing farm profitability.

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. As far as possible, fertilizer dealerships should be upgraded to agro-input sale cum service centres by equipping them with diagnostic facilities (soil and water), bringing all agri-inputs under one roof and providing linkages with banks for credit. Knowledge base and communication skills of extension workers should be sharpened through regular training to enable them to communicate with the farmers and advice them more effectively. Public-private partnership would go a long way in improving farmers' awareness about the importance of balanced (beyond NPK), efficient (value added products) and integrated (fertilizers, biofertilizers, organic manure etc.) use of plant nutrients to maintain soil health and increase crop productivity.

CHAPTER – XII

SUBSIDY ON FERTILIZERS – VARIOUS PROJECTIONS & ISSUES

A) UREA

12.1 With the objective of making available fertilizers to the farmers at affordable prices, the urea, the only controlled fertilizer, is made available to farmers at statutorily notified maximum retail price and decontrolled phosphatic and potassic fertilizers are sold at indicative MRPs. Since the MRP/Indicative MRPs are generally far less than the cost of production of these fertilizers, the difference between their assessed cost of production and MRP/Indicative MRPs is paid as subsidy/concession to manufacturers/importers of these fertilizers. The following table gives the figures of subsidy expenditure on urea and decontrolled phosphatic fertilizers since 1995-96:

Rs in Crores

Period	**Amount of concession disbursed on decontrolled fertilizers**	**Amount of subsidy disbursed on urea**			**Total for all fertilizers**
		Indigenous urea	**Imported urea**	**Total for urea**	
1995-96	500.00	4300.00	1935.00	6235.00	6735.00
1996-97	1671.77	4743.00	1163.08	5906.08	7577.85
1997-98	2596.00	6600.00	721.96	7321.96	9917.96
1998-99	3789.94	7473.00	124.22	7597.22	11387.16
1999-2000	4500.00	8670.00	74.07	8744.07	13244.07
2000-2001	4319.00	9480.00	0.98	9480.98	13799.98
2001-2002	4503.52	8257.00	47.34	8304.34	12807.86
2002-03	3224.52	7790.00	0.00	7790.00	11014.52
2003-04	3326.00	8521.00	0.00	8521.00	11847.00
2004-05	5142.18	10243.15	493.91	10737.06	15879.24
2005-06	6596.20	10460.17	1418.07	11878.24	18474.44
2006-07(BE)	5749.00	10410.37	1093.54	11503.91	17252.91

12.2 The sharp rise in fertilizer subsidy over the years can be attributed to the following main factors:

- Under-provision for subsidy expenditure leading to a carry over for the next year

- Increase in the fertilizer consumption in respect of all major nutrients.

- Increase in the prices of feedstock for urea viz. naphtha, fuel oil and gas; (the prices of naphtha which were Rs.12500/- per M.T. in the beginning of the year 2003-04 have now increased to about Rs. 30,000/MT and the price of APM gas have also been increased from Rs. 2850/MCM to Rs. 3200/MCM from 1.7.2005).

- Increase in the quantum of import of urea;

- Increase in the prices of raw materials/ intermediates for the production of DAP as also in the international prices of MOP.

- For more than four years, there has been no increase in selling prices of fertilizers i.e., since 28.2.2002, although the cost of production of fertilizers has been rising steadily due to increase in the cost of feedstock/intermediates.

12.3 The trend towards increased consumption is likely to continue. Furthermore, the general thrust of the Government is to substantially increase the rate of growth in the agriculture sector. The Task Force on the balanced use of fertilizers set up by the Department of Agriculture & Cooperation has projected that the requirement of fertilizers in nutrient terms will reach 28.8 million MTs in the final year of Eleventh Plan as compared to the present consumption of 19 million MTs.

12.4 Moreover, the average consumption of fertilizers per hectare of arable land in our country is approximately 99.7 kg/hectare only whereas the world average is at 100 kg/hectare. Our neighbours namely Pakistan (138 kg), Sri Lanka (310 kg), Bangladesh (177 kg) and China (276 kg) are much ahead in terms of fertilizer consumption per hectare of arable land. Similarly, the average productivity in our country is less than 50% when compared with that in the agriculturally developed countries like China (paddy-6074 kg/hectare) etc. It is evident that there is a need to further increase the fertilizer usage levels in our country to achieve the desired levels of productivity.

12.5 The figures of production, import and consumption of major fertilizers viz, urea, DAP, MOP and NPK complexes for the period from 1998-99 onwards are given in the Table below:

UREA

(□□□□)

Year	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Production	198.3	196.51	192	187.27	192.03	202.63	200.98
Consumption	202.78	191.86	199.17	188.20	200.00	205.48	222.9*
Imports	5.33	-	2.2	-	-	6.41	20.57

DAP

(LMTs)

Year	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Production	38.63	48.89	50.94	52.36	47.36	51.85	46.28
Consumption	69.37	58.85	61.81	58.07	60.52	60.78	67.64 *
Imports	32.68	8.6	9.33	3.70	7.34	6.44	24.38

MOP

(LMTs)

Year	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Production	0	0	0	0	-	-	-
Consumption	20.49	18.29	19.92	19.73	20.13	23.10	27.31*
Imports	28.98	25.68	28.3	25.33	25.83	34.09	45.78

NPK

(LMTs)

Year	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Production	50.01	47.44	49.09	48.59	45.10	53.63	67.64
Consumption	45.23	47.80	49.63	50.67	51.20	53.63	66.94*

* Figures for consumption for the year 2005-06 are provisional as provided by DAC.

12.6 While the cost of production of fertilizers has been rising steadily due to increase in the cost of feedstock/intermediates, the increase in sale prices of fertilizers has not been commensurate with the increase in the cost of production of fertilizers. There has been no increase in sale prices of fertilizers since 28.2.2002. A marginal increase in selling prices of fertilizers announced on 28.2.2003 was withdrawn w.e.f 12.3.2003, but the increase in selling prices was rolled back after a few days i.e., w.e.f 12.3.2003 to the levels as were existing prior 28.2.2003. The current selling prices prevailing since 28.2.2002 of major fertilizers are given in the table below:

Selling price of fertilizers

S.No.	Name of the fertilizer	Maximum Retail Price (Rs. per tonne)
1.	Urea	4830
2.	DAP	9350
3.	Complex fertilizers	6980-9080
4.	MOP	4455
5.	SSP	Varies from State to State

12.7 The increase in sale prices of fertilizers has not been commensurate with the increase in the cost of production of fertilizers is evident from the fact that the while the weighted average cost of production of urea has increased from Rs.

1340/MT in 1977-78 to Rs. 9444/MT, the MRP of urea, which was Rs. 1550/MT in 1977-78, is now at present only Rs. 4830/MT i.e., while the increase in the cost of production is by more than 7 times, the increase in selling prices of urea during this period was only by 3 times

12.8 Pricing policies governing the payment of subsidy to fertilizer manufacturers have been rationalized with a view to encourage production of fertilizers at energy efficiency norms at par with the international standards and to induce companies to take cost reduction measures on their own to be competitive.

12.9 Recognizing the cost effectiveness and efficiency of natural gas over naphtha and FO/LSHS, the pricing policy, announced in January 2004, provides that new urea projects, expansion of existing urea units and capacity increase through de-bottlenecking/revamp/modernization will be also allowed/recognized if the production comes from using natural gas/LNG as feedstock. For the same reasons, a policy for conversion of the existing naphtha/FO/LSHS based urea units to natural gas/LNG as feedstock has also been formulated in January 2004, which encourages early conversion to natural gas/LNG. Furthermore, the Department of Fertilizers is in the process of fixing milestones for conversion of non-gas based units to natural gas/LNG as the gas based production is cheaper and efficient as compared to naphtha and FO/LSHS.

12.10 As per a sensitivity analysis done by the Department, any increase or decrease in the cost of feedstock by US $ 0.5/MMBTU would have an impact on subsidy expenditure to the tune of Rs. 1158 crore per annum.

12.11 If the naphtha based and FO/LSHS based units convert to NG/LNG and gas/LNG is made available as per requirement, then as per the sensitivity analysis done, the extent of savings at various prices of NG/LNG would be as follows:

Rs. in crore

Saving in subsidy at Ng/LNG price of US $ 6.5/MMBTU	**Saving in subsidy at NG/LNG price of US $ 7/MMBTU**	**Saving in subsidy at NG/LNG price of US $ 7.5/MMBTU**	**Saving in subsidy at NG/LNG price of US $ 8/MMBTU**	**Saving in subsidy at NG/LNG price of US $ 8.5/MMBTU**	**Saving in subsidy at NG/LNG price of US $ 9/MMBTU**

2458	**2158**	**1859**	**1559**	**1259**	**960**

12.12 Furthermore, replacement of naphtha by NG/LNG in case of gas based units which are using naphtha to meet the shortfall of would also result in savings to the Government. The quantum of savings would be about Rs. 522 crore per annum if NG/LNG is made available at a price of US $ 5/MMBTU. If additional gas/LNG becomes available at US $ 7/MMBTU, then the savings would be Rs. 340 crore and only Rs. 157 crore if additional gas is available at US $ 9/MMBTU.

'MAKE OR BUY' OPTION:

12.13 A decision for 'make or buy for urea' can be taken when a comparison is made between the cost of production of indigenous urea with the import parity price (IPP) of urea in the international market. While the total weighted average cost of production of urea is at present Rs. 9444/MT, the weighted average cost of production of gas based units is Rs. 6280/MT, it is Rs. 15679/MT for naphtha based units and Rs. 11430/MT for FO/LSHS based units. At present, the IPP of urea is Rs. 11232/MT. The table below gives the IPP of urea since July 2003.

Quarter	IPP (Rs./PMT)
July - September, 2003	7240
Oct-Dec. 2003	7830
Jan-March, 2004	8698
April-June, 2004	9012
July-September, 2004	8658
Oct-Dec., 2004	11573
Jan.-March, 2005	12028
April-June, 2005	12161
July-September, 2005	11096
Oct-Dec, 2005	11624
Jan-March, 2006	11232

12.14 It would be seen that the weighted average cost of production of urea of gas based units is only Rs. 6280/MT as compared to present IPP of Rs. 11232/MT. it is, therefore, necessary to strengthen the domestic production capacity of urea, which is not only cost competitive but would also help in attaining self-sufficiency in production of urea which is of utmost importance in the interest of food security. It is in this context that the Government has encouraged production of urea based on gas as feedstock. Furthermore, non-gas based units are also required to switchover to NG/LNG.

12.15 PROJECTION FOR UREA SUBSIDY WITH CURRENT MRP

The capacity of production of urea is expected to increase from 197 lakh tonnes in the terminal year of X Plan to 315 lakh tonnes in the XI Plan.. It would have impact on the total subsidy outgo for urea. First of all, mere increase in production would increase the subsidy. Secondly, the enhanced production will come at a higher cost. Thirdly, there will be increase in the cost of the present supply of gas. However, there is likely to be a reduction in subsidy due to change of feedstock in naphtha and fuel oil based plants to NG/LNG. Additional production will come through debottlenecking of existing plants, expansion projects, revival of closed plants and green field project. All this will come with a significant capital investment. The price of future supplies of gas is likely to be about $6 per million BTU. The APM gas to the existing gas plants is dwindling. Therefore, weighted average cost of gas for the existing gas based plants is likely to increase from US $ 3.70 per million BTU to $ 5.25 per million BTU during the next 3 years. Taking all the factors into consideration and assuming figures of investment based on available information, the likely impact on subsidy from various categories of plants is shown below:

Net Impact of Substitution of Feedstock and Additional Urea Capacity on Urea Subsidy

Table Number	Item	Additional Capacity Lakh MT	Likely Investment (Rs. Crores)	Increase (+) or Decrease (-) in Urea Subsidy (Rs. Crores)
1	**Increase in cost of NG in Existing Gas Based Plants**	Nil	Nil	2467
2	**Substitution of Naphtha in**	Nil	Nil	- 1334

	Existing Gas Based Plants			
3	**Substitution of Naphtha in Existing Naphtha Based Plants**	**Nil**	**Not considered**	**- 2365**
4	**Substitution of F.O./LSHS in Existing F.O. Based Plants**	**Nil**	**2500**	**- 81.66**
5	**Additional capacity through**			
	a) Debottlenecking,	**25.186**	**5040**	**1853.16**
	b) Expansion and Revival Projects	**83.50**	**25050**	**7612.85**
	c) New Green Field Project	**10**	**3300**	**963.91**
Over all	**Additional Capacity**		**Million MT/yr**	**11.87**
	Total Likely Investment		**Rs. /Cr**	**35890**
	Likely Impact on Outgo of subsidy		**Rs. /Cr /year**	**9166**

It shows that the net impact on subsidy for urea is likely to increase by more than Rs. 9000 crore at current prices for supply of 315 lakh tonnes of urea by 2011-12, if there is no increase in the MRP of urea. This amount will be in addition to the estimated subsidy on urea of Rs. 11878 Cr in the year 2005-06. The details of calculations and assumptions are given in Annexure 12.4 to 12.10 for various categories of plants.

B) P&K FERTILIZERS

12.16 There has been a steep rise in the overall concession on sale of P&K fertilizers during the 10th plan period. This rise has been on account of increase in consumption and at the same time, due to steep increase in the cost of production, which has been completely cushioned from the farmers by enhanced concession rates. The total amount of concession released on sale of P&K fertilizers during the 10th Plan period and the per tonne average concession released on sale of DAP and MOP has been as below:

Table 3.1

Subsidy on N,P&K Fertilizers (Rs.in Crores)							
Years	**Urea subsidy**	**P & K fertilizers**			**Total subsidy disbursed in year**	**Carry-over to next year**	**Net incidence of subsidy for the year**
		Indigenous	**Imported**	**Total**			
2002-2003	7788	2488	737	3225	11013		
2003-2004	8509	2606	720	3326	11835	2002	
2004-2005	10637	3977	1165	5142	15779	3372	17149
2005-2006	11749	4500	2050	6550	18299	5771	20698

Table 3.2 – Average Concession paid on P&K fertilizers

Years	Average Concession	
	Indigenous DAP	**MOP**
2002-03	2570	3087
2003-04	3254	2822
2004-05	4826	5610
2005-06	5759	6592
% Increase in 05-06 over 02-03	124.10%	113.52%

12.17 The rise in concession rates and overall subsidy bill during the 10th plan period is a matter of concern. The major increase in subsidy bill has been due to the increased cost of raw materials/intermediates in the international market. It is necessary that the Indian fertilizer entities are encouraged to invest overseas in phosphatic and potassic sector, in order to ensure sustained supply of raw material/intermediates to indigenous industry and at the same time, provide some immunity from the volatilities of international prices.

12.18 The consumption of fertilizers during the 11th plan period is also expected to increase considerably and this will have an inflationary impact upon the overall subsidy bill. The average concession rates in the last quarter of 2005-06 are at an all time high and it may not be sustainable to further increase the concession rates to cushion the impact of increase in cost of production, if any. The global energy prices do have a direct bearing on the cost of production of fertilizers and, therefore, the increase in subsidy bill on account of increase in concession rates to offset increases in costs will depend upon global energy price trends. However, it is felt that any further increase in cost of production needs to be shared with the consumers by benchmarking the subsidy levels as a percentage of average delivered cost of fertilizers.

12.19 The growth in demand of subsidy during the 11th Five Year Plan has been projected to go up to Rs.47000 crores in 2011-12 in case the present trend of consumption and increase in cost of production continues. The annual subsidy bill during 11th Plan period has been projected with various assumptions relating to increase in consumption, increase in cost of production, conversion of naphtha based units to gas based units, annual inflation, etc. for varying scenarios as can be seen at **Annexure-12.1, 12.2 and 12.3.** Even the most optimistic scenario wherein the consumption growth is restricted to 2% per annum and the cost of production kept at present level with increased MRPs from 2007-08 onwards, projects an annual subsidy bill of Rs.29206 crores in 2011-12. The projected growth in subsidy bill during the plan period is a matter of concern. Efforts need to be made to control the costs of production through strategic intervention in the production supply chain and at the same time, the cost of fertilizers to the farmers needs to be rationalised with a direct linkage to the agriculture output prices.

12.20 The significant increase in concession rates as well as use of P&K fertilizers in quantitative terms has led to much higher requirement of subsidy. Adequate budgetary provisions should be made to ensure timely payment to the fertilizer industry,

12.21 The delay in certification of sales by the State Governments is still a major impediment in early submission of claims by the companies and receipt of concession thereon. The Government is aware of the problems being faced by the industry on this count and has authorised an alternate web-based mechanism for on line monitoring of production & sales of P&K fertilizers and release of concession thereon. This new mechanism needs to be implemented at the earliest.

12.22 The industry has also been complaining about the concession rates being fixed by the Government. According to them, the delivered price of fertilizers received by them is inadequate to fully offset their costs of production, marketing and distribution till the farmgate level. The main concern of the industry has been the fixed costs relating to marketing, distribution, transportation and sales of fertilizers, which has remained stagnant for the last four years. A policy needs to be evolved to look into the adequacy/inadequacy of concession on sale of P&K fertilizers is considered necessary and needs to be completed expeditiously. The Policy should have an inbuilt escalation/de-escalation clause so that trends in cost of production, marketing and distribution are either indexed or captured through a mechanism of moving averages while ensuring that the subsidy levels remain within the annual entitlements under the relevant provisions of the WTO Agreements.

SUGGESTED MEASURES TO REDUCE SUBSIDY EXPENDITURE:

12.23 Following measures are suggested for bringing down the subsidy expenditure:

(i) By time bound action plan on adequate availability of gas and pipeline connectivity for the fertilizer sector:

For gas based units, cost of feedstock accounts for 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. The production of urea based on natural gas as feedstock is energy efficient and cheaper. As far as urea is concerned, 66% of subsidy goes to 36% production based on naphtha and FO/LSHS while 34% of subsidy goes to 66% of production of urea based on gas. This clearly brings out that gas based production is cost effective and must be encouraged. There are at preset 10 plants including those belonging to private sector who are producing at a cost more than import parity price of urea. Out these, there are four units whose per tonne subsidy itself is more than IPP.

All non-gas based units must be converted to gas at the earliest. The non-gas based units which do not convert within the stipulated period of three years should either be shut down or their concession rates should be restricted to IPP. Conversion of non-gas based units would result in subsidy reduction by 3300 crore per annum.

Capital subsidy should be granted for early conversion of FO/LSHS based plants.

Additional domestic capacity should be based on gas.

Incentivising additional production beyond 100% by gas based units should be encouraged by making them available gas at reasonable rates.

Coal gasification should be encouraged even if certain capital subsidy is to be granted. However before that a cost benefit analysis should be done to see that it is cost effective in the long run.

As the cost of feedstock is pass through under NPS, the subsidy bill will automatically go up as the prices of petroleum products are soaring up. In a futuristic scenario, price of natural gas will be market determined. There is need to make available maximum quantity of cheap (APM) NG to the fertilizer sector on priority and ensure supply of the balance requirement on reasonable rates.

As per a sensitivity analysis done by the Department, any increase or decrease in the cost of feedstock by US $ 0.5/MMBTU would have an impact on subsidy expenditure to the tune of Rs. 1158 crore per annum.

(ii) BY RENOVATION/MODERNIZATION/REVAMP OF EXISTING UREA UNITS

Renovation/modernization/revamp of urea should be undertaken so that they become energy efficient. Even in the gas based category, there are units whose energy consumption is much higher than international standards. PDIL has carried out a study in this regard. With an investment of 15,858 crore, all plants can be made energy efficient, which will result in annual savings to the tune of Rs. 10,208 crore with a pay back period of 1.55 years.

(iii) BY SETTING JOINT VENTURE PROJECTS ABROAD BASED ON CHEAPER FEEDSTOCK:

Exploring possibilities of setting up Urea Joint Ventures abroad on the pattern of OMIFCO and tying up long term supplies of LNG in the countries having rich reserves of gas and where gas is available at prices less than US $ 1/MMBTU.

Possibilities for setting up Joint venture ammonia plants with buy back arrangement need to be explored in the countries which have abundant reserves of gas.

(iv) BY CREATING SCHEMES FOR IMPORT SUBSTITUTION

Current status of imports of finished fertilizers and intermediates/raw materials used in the manufacture of fertilizers is of the order of Rs. 16783 crore.

A definite policy needs to be evolved in Project Division of the Department for import substitution or tying up long term arrangements for their imports.

The current policy of pricing of phos acid, sulphur, rock phosphate is merely is based on the concept of international market price of the products which means it is only a spot price. It does not indicate any long contractual price. Since the demand pattern of the Indian Fertilizer Sector of urea as well as Phosphates/ Potassic fertilizers is well known, any agency on behalf of the Government should negotiate with international suppliers to book their production on a long term basis for 5 to 25 years since the requirement of the fertilizers is likely to growth in coming years. An alternative could be to set up joint ventures in the countries nearest to the cheapest feed stock. This step can remarkably take care of futuristic requirement and the subsidy bill on market pushed imports might fall down. The economics has to be examined separately by the experts. For example, currently we are importing Ammonia 30 lakh MT @ approximately at an average rate of 270 US$ PMT whereas if same ammonia is produced in any country where the gas rate is less than the US$ 1/MMBTU, the price of import of JV will be substantially be lower than import price. The JVs will also have flexibility of sell the entire production to international market in case the production is not lifted by Indian government. The JVs could also be considered to be funded by plan budget. It is also pointed out on that from 2006-2011 various plants are in the field of urea, ammonia and DAP, etc. are coming up all over the world. The project division / or any company designated by DoF should start negotiating for long term off-take of these plants.

A special task should be entrusted to a fertilizer company like PDIL to explore possibilities of JVs abroad and options of investments in foreign countries.

Additional production capacity needs to be created in the country based on natural gas by way of setting up new and expansion projects, revival of closed urea units, and production beyond 100% by existing urea units.

Ammonia plants need to be set up within the country based on gas so that ammonia is available at cheaper rates as compared to imported ammonia.

Possibilities of acquiring mines of rock phosphate, Muriate of Potash, sulphur etc, in the counties, which have abundant reserves of these mines, should be explored and JV plants should be put up with the help of private sector and public sector companies. This is the only way to curtail prices of these commodities in the international market. Acquiring of mines and long term tie-ups will go a long way in stabilizing the prices of these commodities.

(v) BY ENCOURAGING BALANCED FERTILIZATION:

Balanced application of fertilizers should be encouraged which should emphasize usage of complex fertilizers as against the present emphasis on usage of straight fertilizers like urea, DAP and MOP. Pricing of fertilizers should be nutrient based.

(vi) In times to come the other alternatives and modalities for management and disbursement of subsidy including disbursement of fertilizers subsidy to farmers need to be explored. On this issue, two concept papers have been received by the Working Group which are appended.

(viii) Impact of increase in MRP of urea on subsidy reduction is analyzed in Annexure-12.11. In addition, impact of increase in consumption of urea on subsidy outgo is at Annexure-12.12.

Annexure – 12.1

SUBSIDY PROJECTIONS FOR 11th PLAN PERIOD (till 2011-12) ---SCENARIO-I (OPTIMISTIC)																
Assumptions:																
1. Fertilizer consumption growth rate is around 2%																
2. MRPs are 60% of the average delivered costs of 2006-07																
3. Naptha based production of urea is completely converted to gas by 2008-09																
4. The conversion is at an average feedstock of $4 per MMBTU.																
5. The raw material/intermediate cost to phosphatic Industry remains at the present level.																
6. The World Potash prices stabilises at the present level.																
7. Rupee dollar exchange rate of Rs.45 per dollar																
8. Annual inflation of 5%																
Projected Consumption of fertilizers:																
	2007-08	**2008-09**	**2009-10**	**2010-11**	**2011-12**		*Avg. Price*	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**				
UREA	247	252	257	262	267											
DAP	70	72	73	75	76		***Imp.Urea***	250	250	250	250	250				
MOP	31	31	32	32	33		***Imp.DAP***	315	330.75	347.29	364.65	382.88				
COMPLEXES	78	79	81	82	84											
SSP	31	31	32	32	33											
Projection of Subsidy bill during 11th Plan period:																
	Estimated sources of sales (lakh MT)					**Average delivered cost (Rs. per MT)**					**MRP as 60% of the delivered cost(2006-07)**	**Total subsidy bill (in Rs Crores)**				
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*		*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*
Indigenous Urea	200	200	200	200	200	10912.65	11458.28	9313.09	9778.75	10267.69	6548	9089.3	10180.57	5890.19	6821.5	7799.37
Indigenous P&K Fertilizers																
Indigenous DAP	55	55	55	55	55	17474.1	18347.81	19265.2	20228.46	21239.88	10484	3844.56	4325.09	4829.66	5359.45	5915.73
Complex fertilizers	77.52	79.07	80.65	82.26	83.91	13728.75	14415.19	15135.95	15892.74	16687.38	8058	4395.97	5026.65	5708.49	6445.24	7240.93
SSP	30.6	31.21	31.84	32.47	33.12							298.35	304.32	310.4	316.61	322.94
Total																
Imported P&K Fertilizers																
Imported DAP	15.38	16.79	18.22	19.69	21.18	16703.94	17456.98	18247.68	19077.92	19949.66	10484	956.63	1170.6	1414.8	1691.96	2004.98
MOP	30.6	31.21	31.84	32.47	33.12	12188.4	12797.82	13437.71	14109.6	14815.08	8058	1263.9	1479.39	1712.7	1965.13	2238.11
Total																
Imports of Fertilizers (urea)																
Imports from Oman	16.2	16.52	16.52	16.52	16.52	8860	8529.25	8529.25	8434.75	8387.5	6548	403.7	357.04	357.04	341.43	333.62
Other imports	30.64	35.26	40.29	45.43	50.67	12981.25	12981.25	12981.25	12981.25	12981.25	6548	2026.3	2331.62	2664.63	3004.31	3350.77
Net Subsidy Requirements												22278.7	25175.28	22887.91	25945.62	29206.45

Annexure – 12.2

SCENARIO-II (REALISTIC)																
Assumptions:																
1. Fertilizer Consumption growth rate is around 3%																
2. MRP of Urea and MOP is increased by 10% in 2007-08																
3. Naptha based production of urea is completely converted to gas by 2009-10																
4. The conversion is at an average feedstock of $5 per MMBTU.																
5. The raw material/intermediate cost to phosphatic Industry increases slightly by 2% per annum,in real terms.																
6. The World Potash prices increase at approximately 2% per annum, in real terms.																
7. Rupee dollar exchange rate of Rs.45 per dollar																
8. Annual inflation of 5%																
Projected Consumption of fertilizers:																
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*		*Avg. Price*	2007-08	2008-09	2009-10	2010-11	2011-12				
UREA	249	257	264	272	281											
DAP	71	73	75	78	80		*Imp.Urea*	250	250	250	250	250				
MOP	31	32	33	34	35		*Imp.DAP*	315	337	361	386	413				
COMPLEXES	78	81	83	86	88											
SSP	31	32	33	34	35											
Projection of Subsidy bill during 11th Plan period:																
	Estimated sources of sales (lakh MT)					**Average delivered cost (Rs. per MT)**					**New MRPs**	**Total subsidy bill (in Rs Crores)**				
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*		*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*
Indigenous Urea	200	200	200	200	200	10912.65	11458.28	12031.2	10211.47	10722.04	5313	11559.3	12650.57	13796.39	10156.94	11178.08
Indigenous P&K Fertilizers																
Indigenous DAP	55	55	55	55	55	17474.1	18697	20006	21406	22904	9350	4468.26	5140.85	5860.8	6630.8	7454.7
Complex fertilizers	78.28	80.63	83.05	85.54	88.1	13728.75	14690	15718	16818	17995	8058	4439.06	5347.28	6361.42	7493.19	8754.98
SSP	30.9	31.83	32.78	33.77	34.78							301.28	310.31	319.62	329.21	339.09
Total																
Imported P&K Fertilizers																
Imported DAP	16.07	18.2	20.4	22.66	24.99	16703.94	17755.81	18903.31	20098.63	21389.56	9350	1181.78	1530.03	1948.7	2435.65	3008.68
MOP	30.9	31.83	32.78	33.77	34.78	12188.4	13042	13955	14932	15977	4900.5	2251.96	2591.2	2968.23	3387.16	3852.21
Total																
Imports of Fertilizers (urea)																
Imports from Oman	16.2	16.52	16.52	16.52	16.52	8860	8529.25	8529.25	8434.75	8387.5	5313	603.77	561.06	561.06	545.45	537.64
Other imports	33.06	40.22	47.92	55.85	64.02	12981.25	12981.25	12981.25	12981.25	12981.25	5313	2594.63	3156.39	3760.88	4383.49	5024.79
Total Net Subsidy Rqts.												27400.04	31287.69	35577.1	35361.89	40150.17

Annexure – 12.3

SCENARIO-III (PESSIMISTIC)																
Assumptions:																
1. Fertilizer Consumption growth rate is around 4%																
2. MRPs remain at present level																
3. Naptha based production of urea is completely converted to gas by 2009-10																
4. The conversion is at an average feedstock of $6 per MMBTU.																
5. The raw material/intermediate cost to phosphatic Industry increases slightly by 4% per annum, in real terms.																
6. The World Potash prices increase at approximately 4% per annum, in real terms.																
7. Rupee dollar exchange rate of Rs.45 per dollar																
8. Annual inflation of 5%																
Projected Consumption of fertilizers																
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*		*Avg. Price*	2007-08	2008-09	2009-10	2010-11	2011-12				
UREA	252	262	272	283	294											
DAP	72	75	78	81	84		*Imp.Urea*	250	250	250	250	250				
MOP	31	32	34	35	36		*Imp.DAP*	315	343	374	408	445				
COMPLEXES	79	82	85	89	92											
SSP	31	32	34	35	36											
Projection of Subsidy bill during 11th Plan period:																
	Estimated sources of sales (lakh MT)					**Average delivered cost (Rs. per MT)**					**MRPs**	**Total subsidy bill (in Rs Crores)**				
	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*		*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*
Indigenous Urea	200	200	200	200	200	10912.65	11458.28	12031.2	10642.97	11175.12	4830	12525.3	13616.57	14762.39	11985.95	13050.24
Indigenous P&K Fertilizers																
Indigenous DAP	55	55	55	55	55	17474.1	19047	20761	22629	24666	9350	4468.26	5333.35	6276.05	7303.45	8423.8
Complex fertilizers	79.04	82.2	85.49	88.91	92.47	13728.75	14964	16311	17779	19379	8058	4482.16	5676.84	7055.46	8642.87	10468.03
SSP	31.2	32.45	33.75	35.1	36.5							304.2	316.37	329.02	342.18	355.87
Total																
Imported P&K Fertilizers																
Imported DAP	16.76	19.63	22.62	25.72	28.95	16703.94	18042.69	19524.88	21150.5	22919.56	9350	1232.52	1706.41	2301.11	3035.12	3928.26
MOP	31.2	32.45	33.75	35.1	36.5	12188.4	13285	14481	15784	17205	4455	2412.82	2865.16	3383.37	3976	4653.7
Total																
Imports of Fertilizers (urea)																
Imports from Oman	16.2	16.52	16.52	16.52	16.52	8860	8529.25	8529.25	8434.75	8387.5	4830	682.02	640.85	640.85	625.24	617.44
Other imports	35.48	45.23	55.7	66.59	77.91	12021.25	12021.25	12021.25	12021.25	12021.25	4830	2615.32	3333.81	4105.57	4908.2	5742.94
Total Net Subsidy Requirements												28722.6	33489.36	38853.83	40819.01	47240.28

Annexure – 12. 4

IMPLECATION DUE TO CHANGE IN PRICE OF GAS TO THE EXISTING GAS BASED PLANTS

Present weighted average price of NG US $ / MMBTU		3.7
Weighted average price of NG US $ / MMBTU when APM NG supply will reduce to 25% and 75% will be JV-NG		5.25
Present level of consumption of NG in MMSCMD		31.1
Total Gas consumed in a year (330 days) MMSCM		10263
Energy in NG Kcal/cubic meter		8500
Total Energy in Gas in MMKcal		87235500
Total Energy in Gas in MMBTU		346063229
	Price difference US$ / MMBTU	1.55
	Extra Price of energy / year in US $	536398004.2
	Extra Price of energy / year in rupees	24674308192
	Rs. Crore /year	2467.43

Annexure – 12 . 5

Substitution of Naphtha with Gas in Gas Based Plants - Impact on urea subsidy

SL No.	Name of the plant	Quantity in MMSCMD (8500 Kcal/sm^3)	
		Requirement at 100% capacity	Actual Supply in 2005-06
1	IFFCO- Aonla (I+II)	3.450	2.998
2	RCF-Thal	4.250	2.056
3	IGFL _ Jagdishpur	1.810	1.709
4	NFL- Vijaipur	3.550	3.205
5	NFCL- Kakinada	2.433	1.898
6	TCL- Babral	1.760	1.663
	Total	17.253	13.529
	Estimated impact on changeover to NG		
1	Gas required/ Day	MMSCMD	3.724
2	Gas required/ year (330 days)	MMSCM	1228.92
3	Energy value in gas @ 8500kCal/SM^3)	10^6 kCal	10445820
4	Energy value in gas @3.967BTU/kCal	MMBTU	41438568
5	Naphtha Delivered Price(Rs.25000/mt)	$/MMBTU	13.00
6	Delivered price of NG from KG basin	$/MMBTU	6.00
7	Diff in cost of energy (Naph - NG)	$/MMBTU	7.00
8	Difference in cost of total energy	Million $	290.07
9	Difference in cost of total energy	Rs. Crore ($=Rs.46)	1334
10	Expected savings in out go	Rs/ crore/year	**1334**

Annexure - 12.6

Substitution of naphtha with gas as feedstock in Naphtha Based Plants - Impact on Urea subsidy

	Name of the unit (Naphtha Based)	Urea Capacity LMTPA	Gas MMSCMD
1	SFC, Kota	3.79	0.70
2	CFCL,Gadepan II	8.65	0.60
3	SPIC, Tuticorin	6.20	1.77
4	MFL, Chennai	4.87	1.63
5	DIL , Kanpur	7.22	1.90
	Total	30.73	6.60
	Estimated impact on changeover to NG		
1	Gas required/ Day	MMSCMD	6.60
2	Gas required/ year (330 days)	MMSCM	2178.00
3	Energy value in gas @ 8500kCal/SM^3)	10^6 kCal	18513000
4	Energy value in gas @3.967BTU/kCal	MMBTU	73441071
5	Naphtha Delivered Price(Rs.25000/mt)	$/MMBTU	13.00
6	Delivered price of NG from KG basin	$/MMBTU	6.00
7	Diff in cost of energy (Naph - NG)	$/MMBTU	7.00
8	Difference in cost of total energy	Million $	514.09
9	Difference in cost of total energy	Rs. Crore ($=Rs.46)	2365
10	Expected savings in out go	Rs/ crore/year	**2365**

ASSUMPTIONS :

1 All naphtha based plants to be switched over to NG as feedstock except ZIL,MCFL

2 Price of naphtha taken as US $ 13 /MMBTU , at Rs. 25000/mt

3 Delivered price of NG from KG Basin taken as US $ 6 / MMBTU

4 1 US $ = Rs. 46

Annexure – 12.7

Substitution of F.O / LSHS with gas as feedstock in F.O/LSHS Based Plants - Impact on Urea subsidy

Item		**Unit**	**Debottlenecking Project(existing unit)**
Plant Capacity		MT Urea	**643500**
Estimated Capital Cost (Derived from front end cost of new plant with capacity correction)		Rs crore	750
Year of Commissioning Zero Date April 2007			2009
Debt : Equity			2:1
	Debt	Rs crore	500
	Equity	Rs crore	250
Capital related charge (CRC)	Interest @ 12%	Rs crore /year	60
	Return on Equity @ 18% pre-tax	Rs crore /year	45.00
	Depreciation (15 yrs life)	Rs crore /year	47.48
	sub total	Rs crore /year	152.48
	CRC	Rs./MT Urea	2980.94
Energy Cost			
	Avg energy consumption/ MT Urea	millionkCal	6.00
		MMBTU	24
	A typical price of NG from inland field	$/MMBTU	6
	Cost of energy / mt urea	US $	**142.81**
		Rupees (Rs.)	6569.35
Delivered Cost of Urea Rs/MT from Brown Field Project.	CRC	Rs. / MT	2980.94
	Energy Cost	Rs. / MT	6569.35
	Conversion charges	Rs. / MT	1200.00
	Weighted Avg Inland Freight	Rs. / MT	600.00
	Distrbution margin + Bagging Cost	Rs. / MT	300.00
	Total	Rs. / MT	11650.29
Out Go of subsidy as concession	Maximum Retail Price	Rs. / MT	4830
	Concession on Urea	Rs. / MT	6820.29
	Capacity of all FO based plant	MT	2145000.00
	Total Out go of Concession	Rs.Crore / Year	1462.95
	Avg price of urea from F.O/LSHS based	Rs. / MT	12031.00
	Concession on Urea	Rs. / MT	7201.00
	Out go of Concession with F.O/LSHS	Rs.Crore / Year	1544.61
	Savings on changeover	Rs.Crore / Year	81.66
Assumptions :	1 Project size assumed 6.435 lakh tonne / annum		
	2.Cost has been derived from proposed front end change of GNFC-Bharuch for 6.435 LMTPA Urea		
	3. US $ = Rs 46		
	6. Conversion charges have been assumed equivalent to Rs. 1200/MT urea at all the places		
	4.Energy consumption/MT Urea taken as 6 million kCal for a debottlenecked plant		
	5. Distribution margin and cost of Bagging assumed lumsum as Rs. 300/ MT		
	6. Weighted Average Inland freight as per current price level Rs.600/ MT		

Annexure – 12.8

COST OF UREA PRODUCTION AND LIKELY OUTGO OF SUBSIDY ON UREA PRODUCED FROM DEBOTTLENECKING PROJECTS

Item		**Unit**	**Debottlenecking Project(existing unit)**
Plant Capacity		MT Urea	**175000**
Estimated Capital Cost (Based on KRIBHCO estimate)		Rs crore	350
Year of Commissioning Zero Date April 2007			2008
Debt : Equity			2:1
	Debt	Rs crore	233
	Equity	Rs crore	117
Capital related charge (CRC)	Interest @ 12%	Rs crore /year	28
	Return on Equity @ 18% pre-tax	Rs crore /year	21.00
	Depreciation (15 yrs life)	Rs crore /year	22.16
	sub total	Rs crore /year	71.16
	CRC	Rs./MT Urea	4066.00
	Avg energy consumption/ MT Urea	millionkCal	5.50
		MMBTU	22
	A typical price of NG from inland field	$/MMBTU	6
	Cost of energy / mt urea	US $	**130.91**
		Rupees (Rs.)	6021.91
Delivered Cost of Urea Rs/MT from Brown Field Project.	CRC	Rs. / MT	4066.00
	Energy Cost	Rs. / MT	6021.91
	Conversion charges	Rs. / MT	1200.00
	Weighted Avg Inland Freight	Rs. / MT	600.00
	Distrbution margin + Bagging Cost	Rs. / MT	300.00
	Total	Rs. / MT	12187.91
Out Go of subsidy as concession	Maximum Retail Price	Rs. / MT	4830
	Concession on Urea	Rs. / MT	7357.91
	Capacity expected from Debottlenecking	MT	2518600.00
	Total Out go of Concession	Rs.Crore / Year	1853.16
Assumptions :	1 Project size assumed 1.75 lakh tonne / annum		
	2.Cost has been derived from KRIBHCO proposed debottlenecking project		
	3. US $ = Rs 46		
	6. Conversion charges have been assumed equivalent to Rs. 1200/MT urea at all the places		
	4.Energy consumption/MT Urea taken as 5.50 million kCal for a debottlenecked plant		
	5. Distribution margin and cost of Bagging assumed lumsum as Rs. 300/ MT		
	6. Weighted Average Inland freight as per current price level Rs.600/ MT		
	7.Additional urea from debottlenecking of existing units taken as projected in XI plan i.e 25.186 lakh MT		

Annexure – 12.9

COST OF UREA PRODUCTION AND LIKELY OUTGO OF SUBSIDY ON UREA PRODUCED FROM EXPANSION AND REVIVAL PROJECTS (BROWN FIELD)

Item		**Unit**	**Brown field expansion Proj**
Plant Capacity	Per Annum	Million MT Urea	**1**
Estimated Capital Cost		Rs crore	3000
Year of Commissioning Zero Date April 2007			2010
Debt : Equity			2:1
	Debt	Rs crore	2000
	Equity	Rs crore	1000
Capital related charge (CRC)	Interest @ 12%	Rs crore /year	240
	Return on Equity @ 18% pre-tax	Rs crore /year	180.00
	Depreciation (15 yrs life)	Rs crore /year	189.90
	sub total	Rs crore /year	609.90
	CRC	Rs./MT Urea	6099.00
Energy Cost			
	Avg energy consumption/ MT Urea	millionkCal	5.25
		MMBTU	21
	Price of NG (A typical price)	$/MMBTU	**6**
	Cost of energy / mt urea	US $	**124.96**
		Rupees (Rs.)	5748.18
Delivered Cost of Urea Rs/MT from Brown Field Project.	CRC	Rs. / MT	6099.00
	Energy Cost	Rs. / MT	5748.18
	Conversion charges	Rs. / MT	1200.00
	Weighted Avg Inland Freight	Rs. / MT	600.00
	Distrbution margin + Bagging Cost	Rs. / MT	300.00
	Total	Rs. / MT	13947.18
Out Go of subsidy as concession	Maximum Retail Price	Rs. / MT	4830
	Concession on Urea	Rs. / MT	9117.18
	Total Capacity expected from Brown Field	Lakh MT	83.50
	Total Outgo of Concession	Rs.Crore / Year	7612.85
Assumptions :	1 Project size assumed 1 million tonne / annum		
	2.Capital cost has been derived from KRIBHCO Expansion project		
	3. US $ = Rs 46		
	6. Conversion charges have been assumed equivalent to Rs. 1200/MT urea at all the places		
	4.Energy consumption/MT Urea taken as 5.25 million kCal for a new plant		
	5. Distribution margin and cost of Bagging assumed lumsum as Rs. 300/ MT		
	6. Weighted Average Inland freight as per current price level Rs.600/ MT		
	7. Brown Field projects includes expansion at the same site and Revival of closed units. Total Cap 83.50 (33.50+50.00) Lakh MT		

Annexure - 12.10

COST OF UREA PRODUCTION AND LIKELY OUTGO OF SUBSIDY ON UREA PRODUCED FROM GREEN FIELD PROJECT AT NELLORE (AP)

Item		**Unit**	**Green Field Project at Nellore (AP)**
Plant Capacity	Per Annum	MT Urea	**1000000**
Estimated Capital Cost (Based on Brown field offer)		Rs crore	3300
Year of Commissioning Zero Date April 2007			2009
Debt : Equity			2:1
	Debt	Rs crore	2200
	Equity	Rs crore	1100
Capital related charge (CRC)	Interest @ 12%	Rs crore /year	264
	Return on Equity @ 17.2% pre-tax	Rs crore /year	189.20
	Depreciation (15 yrs life)	Rs crore /year	208.89
	sub total	Rs crore /year	662.09
	CRC	Rs./MT Urea	6620.90
	Avg energy consumption/ MT Urea	millionkCal	5.25
		MMBTU	21
	A typical price of NG from inland field	$/MMBTU	6
	Cost of energy / mt urea	US $	**124.96**
		Rupees (Rs.)	5748.18
Delivered Cost of Urea Rs/MT from Brown Field Project.	CRC	Rs. / MT	6620.90
	Energy Cost	Rs. / MT	5748.18
	Conversion charges	Rs. / MT	1200.00
	Weighted Avg Inland Freight	Rs. / MT	600.00
	Distrbution margin + Bagging Cost	Rs. / MT	300.00
	Total	Rs. / MT	14469.08
Out Go of subsidy as concession	Maximum Retail Price	Rs. / MT	4830
	Concession on Urea	Rs. / MT	9639.08
	Capacity expected from Green Field	MT	1000000
	Total Out go of Concession	Rs.Crore / Year	963.91
Assumptions :	1 Project size assumed 1 million tonne / annum		
	2.Cost has been derived from KRIBHCO proposed brown field expansion project		
	3. US $ = Rs 46		
	6. Conversion charges have been assumed equivalent to Rs. 1200/MT urea at all the places		
	4.Energy consumption/MT Urea taken as 5.25 million kCal for a new plant		
	5. Distribution margin and cost of Bagging assumed lumsum as Rs. 300/ MT		
	6. Weighted Average Inland freight as per current price level Rs.600/ MT		

Annexure-12.11

Impact of increase in MRP of urea on subsidy reduction – An analysis

S.No.	Increase in MRP by (Rs./MT)	% increase over present MRP of Rs. 4830/MT	Consumption during 2005-06 (LMT)	Reduction in subsidy (Rs. in crore)
1.	100	2.07	222.9	222.9
2.	200	4.14	222.9	445.8
3.	300	6.21	222.9	668.7
4.	400	8.28	222.9	891.6
5.	500	10.35	222.9	1114.5
6.	600	12.42	222.9	1337.4
7.	700	14.49	222.9	1560.3
8.	800	16.56	222.9	1783.2
9.	900	18.63	222.9	2006.1
10.	1000	20.70	222.9	2229.0

Annexure-12.12

Impact of increasing consumption on subsidy outgo

Sl. No.	Increase in Consumption by (LMT)	The present delivered price of imported urea (Rs. PMT)*	MRP of urea (Rs.PMT)	Per Tonne Subsidy Rs. (PMT)	Subsidy Outgo (Rs.in crore)
1	1	13194	4830	8364	83.64
2	5	13194	4830	8364	418.2
3	10	13194	4830	8364	836.4
4	15	13194	4830	8364	1254.6
5	20	13194	4830	8364	1672.8
6	25	13194	4830	8364	2091
7	30	13194	4830	8364	2509.2
8	35	13194	4830	8364	2927.4
9	40	13194	4830	8364	3345.6
10	45	13194	4830	8364	3763.8
11	50	13194	4830	8364	4182
12	55	13194	4830	8364	4600.2
13	60	13194	4830	8364	5018.4
14	65	13194	4830	8364	5436.6
15	70	13194	4830	8364	5854.8
16	75	13194	4830	8364	6273
17	80	13194	4830	8364	6691.2
18	85	13194	4830	8364	7109.4
19	90	13194	4830	8364	7527.6
20	95	13194	4830	8364	7945.8
21	100	13194	4830	8364	8364

* Delivered Price Rs. 13194/MT = Rs.11844/MT - IPP +1350/MT - Freight, Stevedoring, Bags etc)

CHAPTER – XIII

R&D AND TECHNICAL ISSUES IN FERTILIZER INDUSTRY

CURRENT STATUS OF R&D IN FERTILIZER SECTOR

13.1 The number of fertilizer producers have full-fledged R&D centers like GSFC Baroda, FEDO Cochin, SPIC Tuticorin, RCF Trombay, GNFC Bharuch, DMCC Ambernath 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 collected by FAI, fifteen fertilizer producers were involved in some kind of R&D activities. The R&D centers of ten producers were recognized by DSIR. During the process of preparing report of sub group IV for 10th five year plan, the letters were sent to seventy-two producers of all types of fertilizers and concerned consultants/laboratories, seeking information on their R&D activities. The response has come from only twenty-four producers and one consultant which confirm the conclusion of FAI. There has not been much of change during last five years and hence the data/information collected are fully representative of current status. However it should be noted that full fledged exercise like last time 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, SPIC and GSFC are going beyond these exercise and are producing some encouraging results. The current activities in PDIL are related only to the day to day operations of catalyst plant. PDIL have closed down general R&D as per directive of GOI.

13.2 Research and Development projects are also sponsored by the DoF/industry for the work to be carried out in R&D laboratories and academic institutions like IIT's, IIP, BITS Pilani etc. Over the years a vast infrastructure has been created in the country, which include a chain of national laboratories, universities and specialized institutions. 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.

13.3 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

13.4 The company wise expenditure made on R&D projects in the country in the fertilizer sector in last 3 years is as follows

Company	**Amount spent, Rs lakh**
RCF	369
IFFCO-Phulpur	12.15
IFFCO-Aonla	0.0
IFFCO-Kandla	31.73
GNFC	384.87
SFC-Kota	0.05
NFL	0.58
SPIC	26.66
CFCL-Gadepan	0.0
PPL-Paradeep	0.0
BVFCL- Namrup	0.0

As is evident from the table above the total amount of expenditure made on R&D for last three years of units by fertilizer plants is of the order of Rs. 8.25 crores which is miniscule of the turnover of these units. This does not commensurate with the size and status of fertilizer industry.

ACHIEVEMENTS

13.5 Some of the highlights of the achievements of R&D work carried out by R&D centers of fertilizer industry are hereunder:

- PDIL has done pioneering research over 35 years in the area of catalyst and has significant achievement in the development of practically the entire range of catalyst relating to ammonia production. Success has also been achieved in the development of sulphuric acid catalyst and ammonia dissociation. In the catalyst field there are such renowned firms like ICI, BASF, UCIL and Haldor Topsoe and PDIL's work in the catalyst field is at par with the best development in these organizations.

- Urea hydrolyser and NOX abatement process from the tail gas of nitric acid plant has been developed by PDIL.

- A process was developed by SPIC R&D center for bio-hydrolysis of urea, which is being used for pollution control in commercial scale. Similarly a process for electrostatic removal of chromium from cooling water has been developed and commercialized.

- Process for preparation of Plant Growth Regulator (SPIC Cytozyme), non-chromate cooling water treatment system and bio treatment process for urea plant wastewater developed by SPIC are available for commercial benefits

- Liquid fertilizer UAN-32 developed by GNFC is available for commercial benefits.

- GSFC R&D center has developed expertise in corrosion monitoring and selection of material of construction. Other companies on commercial basis are utilizing their expertise.

- IFFCO, Phulpur unit has demonstrated the technology for making brick from fly ash. The technology is ready for commercialization.

- Patented Slow release Fertilizer developed by MFL awaits commercial exploitation.

Though there have been some significant achievement but practically little has been commercially exploited. The efforts required between lab scale/pilot plant scale and commercialization are greatly lacking. It is recognized that unless demonstration plants are not set up it is difficult to commercialize and improve the new innovations but the system prevalent in the country greatly discourages for such decisions.

AREAS OF STRENGTH

13.6 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 modern fertilizer plants. Catalyst plays an important role in the manufacture of fertilizers. Indian companies manufacture now all most entire range of catalysts based on indigenous and/or imported know-how. Highly qualified scientists and technologists are involved in the R&D centers.

The identified strength 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 recent technical achievements (like hydrolyser of PDIL and bio hydrolyser)
- Long experience
- Scope to develop several new products

AREAS OF WEAKNESS

13.7 In spite of tremendous efforts made in developing our technological base in the fertilizer sector, gap still exists. The country still imports basic process know-how for ammonia, urea and phosphoric acid plants besides, some critical mechanical and electrical equipment, and micro processor based instrumentation.

Despite vast knowledge pool in the country there are several weak points in the systems itself and inter systems. 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

The obvious purpose of identifying area of strength and weakness is to take action to overcome weaknesses and maintain or increase the strength.

13.8 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, 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.

13.9 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 suggested above and with various laboratories and other research institutes and academia. Identification of new thrust areas for future R&D and preparation of time bound programmes as also fund requirement and means to source them

13.10 It is also felt that there should be urgent and sincere attempt be made to exploit indigenous raw material resources. Some research in the past had been carried to exploit Indigenous resources like coal, rock phosphate etcetera but results were not encouraging, funding was short and economics were not favourable. However, now with very high cost of inputs derived from petroleum and NG/RLNG and rock phosphate, time has come to re-look again at resources like coal and rock phosphate.

Exploitation of indigenous raw materials:

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

13.11 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
- Development of Pre-reformer catalyst

13.12 Medium-Term R&D Proposals

- Development of solution based CO2 removal process
- Development of conventional ammonia technology
- Urea process technology
- Recovery of CO2 from the flue gas
- Development of conventional ammonia synthesis catalyst from Indian magnetite
- Primary reformer catalyst
- Efficient alumina support for steam reforming 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 AlF3.
- 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

13.13 Short-Term R&D Proposals

- Development of software for thermodynamic property generation of urea solution and simulation software for urea plant
- Development of process for urea granulation/prill fattening
- Slow release fertilizers
- Urea dust emission dispersion model
- New Materials for easier bulk handling and transportation
- Requirement of funds
- Sourcing of funds

13.14 MEASURES FOR IMPROVEMENT OF INDUSTRY INSTITUTIONAL LINKAGE

This write-up is fully repeated from the report of sub group IV for 10th five year plan as members felt that it is comprehensive and needs to followed vigorously.

Dr. R. A. Mashelkar, director general of CSIR has quoted, "tomorrow's society will be knowledge society. Tomorrow's market will be knowledge market. Tomorrow's war will be fought not by conventional weapons, guns, missiles and so on, but they will be fought in the knowledge markets with the new thermonuclear weapons called information and knowledge". The seat of knowledge undisputedly belongs to academic and R&D institution.

13.14.1 ADVANTAGES FOR INSTITUTION:

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

13.14.2 ADVANTAGES FOR THE INDUSTRY:

1. 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)
2. Greater professional development of employees, through;
   - Teaching and lecturing opportunities in institution
   - Internal short courses given by academic consultants
3. 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

13.14.3 POSSIBLE APPROACHES OF INDUSTRY-INSTITUTION INTERACTION:

1. Joint projects
2. Consultation
3. Mini courses for R&D scientists of industry on particular subject
4. Consortia: basic research projects jointly sponsored by number of corporations interested in the same field.
5. Commercial testing

13.14.4 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
- Summer employment of students in R&D section of industry

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

13.15 MEASURES FOR ENVIRONMENTAL MATTERS TO BE UNDERTAKEN DURING THE 11TH PLAN

In India standards of emission are different for the plants installed before 01.01.1982 and after 01.01.1982. The Environment Protection Standards for liquid effluent discharge and emission to air in India (See **Annexure 13.1**) and a comparative study of different norms is enclosed in **Annexure 13.2**.

The more industrially developed countries have introduced the limits of combustion production such as NOx and CO (See **Annexure 13.3**).

At a glance, some of the suggested measures may be as follows:

- Recycling/reprocessing/reuse of solid wastes generated in fertilizer plants. For example, waste catalyst, fly ash, phosphogypsum, sulphur sludge etc.
- Development of landfill sites for disposal of hazards wastes
- Promote cleaner production of fertilizer

<u>AMMONIA</u>

- Conversion of naphtha and fuel oil based ammonia plant to NG/LNG
- Direct hydrogen cyanide gas (HCN) in a fuel oil gasification plant to a combustion unit to prevent its release.
- Use purge gases from the synthesis process after washing to remove ammonia and then routing it to fire the reformer, and strip condensates to reduce ammonia and methanol as it will contribute to NOx emission.
- Use those CO2 removal process, which do not release toxics such as mono-ethanol amine to the atmosphere

<u>UREA</u>

- Recover/recycle carbamate gases and/or liquids to the reactor
- Operate the top of the prilling tower at a slight vacuum

- Maximize product recovery and minimize air emissions by proper maintenance and operation of scrubbers and bag houses

AMMONIUM NITRATE

PRILL TOWER

- Reduce microprill formation
- Reduce carryover of the fines through entrainment

GRANULATOR

- Reduce dust emissions from the disintegration of the granules

MATERIAL HANDLING

- For dusty products, use covers and hoods on conveyors and transition points

NITRIC ACID

- Use processes that operate nitrous gas absorption at higher pressure in order to minimize NOx release

PHOSPHATIC FERTILIZER PLANTS

- Maximize the recovery and recycling of dust from rock and product handling
- Minimize the discharge of SO2 from sulphuric acid plant by using the DC/DA process + 5 bed or bed 4 with cesium catalyst and high efficiency demister system.
- Prevent spills and accidental discharges through well bunded storage tanks, through installation of spill catchments and containment facilities
- Minimize the discharge of dust and fluorine from super phosphate plants to the atmosphere by treating off-gases using an efficient wet scrubbing/fluorine recovery system

ESTIMATION OF CO_2 EMISSIONS FROM THE FERTILIZER PLANTS

During the past 10 years or so, the topic of global warming has been heating up. Increased emission of greenhouse gases such as CO_2, CH_4, NO_x etc. to the atmosphere is the cause of global warming. While NO_x emissions has been regulated by different pollution control boards, CO_2 emission is not. There is little doubt that we are generating huge amounts of CO_2. The industry emits carbon dioxide (CO_2) from energy use, from non-energy uses of fossil fuel and from non-fossil fuel sources. Energy related CO_2 emissions from the industrial sector grew from 5.9 Gt Carbon in 1971 to 8.5 Gt Carbon in 2002 (1Gt C = 3.7 Gt CO_2). The mitigation potential and cost in 2030 have been estimated by an industry by industry assessment and also two recent global studies. The industry by industry approach shows that, most of the mitigation potential is located in steel, cement and petroleum refining industry and in the control of non-CO_2 gases. The global studies indicate mitigation potential at 2.5-30 Gt CO_2 equivalents per year (0.7-0.8 Gt C-equivalent per year) in 2030.
(Source: IPCC VIth Assessment Report on Climate Change 2007: Climate Change Mitigation)

Recent figures based on national submission to the UN climate secretariat in Bonn reveal that emissions from 40 industrialized nations climbed by 1.6% overall equivalent to 17.8 Giga tons of carbon dioxide mainly released from power plants, factories and cars in 2004 compared to 2003, even though oil prices were surging.

Today fertilizer production consumes approximately 1.2% of the worlds energy and is responsible for approximately 1.2% of the total emission of the green house gases in the world, consisting of 0.3% of pure CO_2, 0.3% as N_2O and 0.6% as flue gas CO_2 (source: Paper on "Energy Consumption and Green House Gas Emissions in Fertilizer Industry" presented to the International Fertilizer Society at a meeting in London in 2003, proceeding No. 509, IFS by T. K. Jenssen and G Kongshaug, Hydro Agri, ASA, Norway). Increased focus on energy issues during the last 25-30 years has already caused a positive downward trend for both energy consumption and green house gas emissions.

Theoretically, global energy consumption by the fertilizer industry can be reduced by almost 40% and green house gas emission by 60% through implementation of new technology. This is possible in view of the ongoing replacement of old technology and incorporation of energy conservation measures. As on date only two CDM projects have been approved by the Executive Board on CDM of UNFCCC in fertilizer industry. Many more CDM projects could be developed to reduce CO2 emission and also earn carbon credits. (Especially since Indian companies are expected to earn over 14000 crores over the next year through trading of carbon credits. Source: Chemical Weekly, June 27, 2006).

RECOMMENDATIONS

- Industry may contribute 1% of its profits to nodal agency which shall take up R&D projects of interest to fertilizer industry. Govt. of India may also give matching funds for R&D from the subsidy funds.

- Industry can encourage R&D efforts by giving preference/trial to innovations made through indigenous efforts after doing proper risk analysis

- Industry should be ready to take bonafide risks after proper evaluation of indigenous product and such decision shall not be subject to audit scrutiny

- The policy should be long term at least for ten years and it should be explicitly clear that benefits of research will be allowed to be exploited by industry and will not be mopped up under any pretext, then and only then corporate will be more willing to spend on R&D to increase profit

- The institutions/organizations having research facilities can try to continuously upgrade their facilities to remain in forefront at the world level.

- Various research institutes may develop systems for better co-ordination with each other so as to avoid duplication of work and optimally use the meager resources

- Government should think of providing more incentive (other than Income Tax benefit) for R&D efforts

- Proper recognition and reward policy need to be adopted to encourage young talents to opt for carrier in industrial research and development.

- Industry has reached a stage where it is necessary to keep in mind long-term vision. It is recommended to develop world-class indigenous process technology for Ammonia and Urea production (represents 85% of nutrient produced in the country) in next 10 years. The target should be to achieve specific energy consumption for manufacturing ammonia at energy level of 6.0 Gcal/MT from the current technological level of 6.7-7.0 Gcal/MT available internationally. The recommended research to achieve this goal are;
    - Development of membrane based carbon di-oxide removal system
    - Development of primary reformer, high temp shift reactor and low temp shift reactor catalyst which can work efficiently on high pressure of 60-70 kg/cm2A and modified process conditions
    - Development of synthesis catalyst, which can work efficiently at lower pressure of 30-80 kg/cm2A
    - Development of solid oxide Fuel Cell for captive power generation

- Industry must prepare itself to be able to use indigenous raw materials. Suitable technology/methods shall be developed so as to use indigenous rock-phosphate and coal to reduce dependence on imports of feedstock.

- A pilot plant shall be set up based on latest technology claiming to be suitable for high ash coal to check its suitability for indigenous coal to be used for generation of synthesis gas for the production of fertilizers.

- 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.

- A fertilizer research institute may also be established on similar lines as of the central road research institute, coal research institute, steel research institute, cement research institute etc. which shall take up R & D projects of interest to the fertilizer industry. The Govt. of India would give budgetary support and other sources of funding could also be explored in consultation with the industry.

- R&D efforts need to be initiated in the area of development of better material for different equipments.

- Development of better techniques/equipment to achieve efficient unit operations at low cost may be encouraged.

- New and cost effective alternate products like bio-fertilizers, slow release fertilizers should be developed which can replace conventional product with ease

- The fruits of the R&D efforts may be made available to entire industry free of cost.

- The relationship between industry and institution is to be best to achieve best result. It is recommended that industry should identify and sponsor the projects to the institution.

- A forum may be created to encourage interaction and exchange of information and personnel between R&D institutions and the industry.

- Eminent personalities from R&D institution may be invited by the individual industry to deliver talk on specific subject so that its own officers remain abreast with the latest development even in the field of fundamental science

- Pollution standard may also include the method of measurement to be adopted. Unrealistic and unachievable standards should not be set.

- There should be one common standard applicable to entire India.

- R&D efforts in all pollution related areas are required to develop indigenous technologies taking care of not only the current requirement but also likely emerging requirement in next 10 years.

- Efforts need to be made to develop technology for recycling, reprocessing, re-use of solid matters generated in fertilizer plants.

- Various states may expeditiously identify and develop landfill sites and methods for disposal of hazardous wastes.

- The incentive like custom duty, free imports for pollution related technology and machinery might be allowed till the time indigenous capabilities catch up with the world standards.

- Government of India may take immediate steps to get Indian Boilers (Amendment) Bill passed from the parliament.

- Low analysis fertilizers should also be treated at per with other fertilizers on nutrient value basis.

- It is recommended that proper regulations may be formulated for the sale of new products like plant growth regulators.

- Department of fertilizers need to be strengthened technically as it can play an important role in promotion of the productivity in the new economic environment through R&D efforts.

- Even the well-defined products take very long time to be notified in FCO. It is recommended that mechanism needs to be developed to expedite inclusion of such product in FCO for the benefit of the farmers.

Annexure-13.1

Different Standards of emissions

S. No.	Production Process	Emission		EFMA		USA	India
		Parameter	**units**	**Existing**	**New**		
1	Ammonia	NOx as NO2 at 3% O2	mg/NM^3	200-400	150	-	no standard
			kg/te of Product	0.9	0.45	-	no standard
2	Nitric Acid	Nox as NO2(excluding N2O)	ppmv/with SCR	200/400 max	100	-	-
			kg/te of 100% HNO3	1.4	0.65		1.3 kg/te weak acid
3	Sulphuric Acid	SO_2	kg/te 100% H2SO4	1.5-3.9 (DCDA)	1.0-2.6 (DCDA+5 bed+bed 4Cs)	2.0	4.0
		SO_3 + H2SO4	kg/te 100% H2SO4	<0.1	<0.1		
		Acid Mist	mg/NM3			0.075 kg/te 100% H2SO4	50 mg/NM3
4	Phosphoric Acid	Fluoride	mg/NM3	30	5		25
			kg/te P2O5	-	0.04	10 gm/te P2O5	
		Dust	mg/NM3	150	50		150
5	Urea						
	(Granular)	Urea Dust	mg/NM3	70-80	50		
			kg/te product	0.35-0.4	0.25		
		NH_3	mg/NM3	130-165	50		
			kg/te product	0.65-0.83	0.25		
	(Prill tower)	Urea Dust	mg/NM3	100-150	50		50 (plants after 1.1.82)/ 150 (plants before 1.1.82)
			kg/te product	1-1.5	0.5		0.5(plants after 1.1.82) / 2.0 (plants before 1.1.82)
		NH3	mg/NM3	65-100	50		
			kg/te product	0.65-1.0	0.5		

	vents	NH_3	kg/te product	0.75	0.06		
6	ammonium nitrate	NH3	mg/NM3	10	10		150
	(granulator/ prill tower)	Particulate Matter	mg/NM3	15	15		
	neutraliser/cooler/drier	NH_3	mg/NM3	50	50		
		Particulates	mg/NM3	30	30		
7	CAN	NH_3	mg/NM3	50	50		
		Particulates	mg/NM3	50	50		
8	NPK (Nitrophosphates)	NH_3	mg/NM3	60	60		
			kg/te product	0.2	0.2		
		Nox as NO2	mg/NM3	500	500		
			kg/te product	0.2	0.2		
		Fluoride	mg/NM3	5	5		
			kg/te product	0.02	0.02	0.03 kg/te P2O5	
		Dust	mg/NM3	50	50		
			kg/te product	0.2	0.2		
9	NPK (mixed acid)	NH_3	mg/NM3	60	60		
			kg/te product	0.2	0.2		
		Nox as NO2	mg/NM3	70	70		
			kg/te product	0.2	0.2		
		Fluoride	mg/NM3	5	5		25
			kg/te product	0.02	0.02	0.1 kg/te P2O5	
		Dust	mg/NM3	50	50		150
			kg/te product	0.2	0.2		
	Liquid Effluents						
1	Ammonia	NH4-N	mg/l	150	5		
			kg/te product	0.1	0.0025		
2	Urea	Urea	mg/l	150	1		
			kg/te product	0.1	0.005		
		NH4-N	mg/l	150	5		50(plants after 1.1.82)/ 75(plants before 1.1.82)
		TKN	mg/l	0.1(kg/te product)	0.0025 (kg/te product)		150 (plants after 1.1.82)/ 100 (plants before 1.1.82)

		NH3-Free	mg/l				4
4	Ammonium Nitrate/CAN	N	kg/te product	0.2			
			mg/l	100			
		NH4-N	mg/l				20
5	NPK (Nitrophosp hate)	phosphate as P	mg/l				5
		NH4-N	mg/l				50
		NO3-N	mg/l				20
		TKN	mg/l	0.2 kg/te NPK			150 (plants after 1.1.82)/ 100 (plants before 1.1.82)
		Fluoride	mg/l	0.03 (kg/te NPK)			10
6	NPK (mixed acid)	NH3-Free	mg/l				4
		phosphate as P	mg/l				5
		NO3-N	mg/l				10
		TKN	mg/l	0.2 (kg/te NPK)			150 (plants after 1.1.82)/ 100 (plants before 1.1.82)
		Fluoride	kg/te NPK	0.03			10
Source:		EFMA BAT Limit, 2000; UNIDO Manual, 1998					

Annexure-13.2

Ambient air (from combustion source) quality standards in some of the industrially developed countries

Country	Start Year	Furnace capacity (heat release) (mmBtu/hr)	Nox (ppm)		CO (ppm)		Particulates mg/Nm3	
			Gas	Oil	GAS	Oil	Gas	Oil
France	1998	>170	171	219	-	-	5	50
UK	1998	Any	146	219	-	-	-	115
	1999	Any	97	171	-	-	-	80
Germany	1996	<170	-	122	-	-	-	80
E. Europe			-	219	-	85	-	50
		<340	97	-	50	-	5	-
	TALuft	170-1020	171	219	25	87	5-100	50
			97	171	25	87	5-100	50
	Market	All light oils	39	73	-	-	5	50
	Demand	Heavies	-	171				
Italy	1992	170-1020	171	219			5	50
USA	-	All	30-100					

Source : Nitrogen & Methanol March-April, 2001

Annexure-13.3

Salient Features of Commercially proven coal gasification Technologies

Item	**Lurgi**	**Kopper-Totzek**	**Winkler**	**Texaco**	**Shell**
Gasifier Type	Fixed Bed	Entrained Bed	Fluidised Bed	Entrained Bed	Entrained Bed
Operating Pr., Ata	20-30	Atmospheric	Atmospheric/Pressurised	Pressurised (20-85 Bar)	20-40 ata
Operating Temp, C	600-750	1600	800-1000	1250-1300	1400-1600
Coal size	5-50 mm	90% below 90 micron	2-10 mm	Ground coal as 65% by wt.	Ground coal, 90% less than 100 micron
Form of Feed	Dry	Pulverized	Dry	Slurry	Dry
Feedstock Flexibility	▪ Non & weakly coking coal from Anthracite to Lignite ▪ Fairly high level of ash can be accepted i) Lurgi dry bottom gasifier- no limitation of ash ii) British Gas Lurgi BGL & Lurgi MPG Gasifier- < 25% ash preferred iii) Lurgi CFB & HTW Gasifier- No limitation of ash	▪ Anthracite to Lignite ▪ Upto 40% ash in coal can be processed ▪ Moisture below 1% to avoid feeding problem	▪ Lignite and more reactive non-coking coal ▪ Ash content of 4-46% can be tolerated with high ash softening temp ▪ Moisture upto 12% can be tolerated	▪ Insensitive to coal properties such as particle size, moisture level, reactivity and coking ▪ Ash content max. 25% preferred	▪ Design ash content of 17% gives above 80% process efficiency ▪ Fairly high level of ash content in coal can be handled (up to 30-32%) ▪ There is no generation of NOx ▪ Very low CH4 is produced ▪ (H2+CO) content in gas generated is the maximum amongst all processes

	▪ High moisture levels can be accommodated				
Ash Disposal	▪ Ash disposed at base through ash-lock system ensuring it does not clinker	▪ Ash is mainly removed in liquid form at the bottom	▪ 30% of ash leaves via bottom balance separated from overhead gas by cyclones	▪ Removed as molten slag at the bottom	▪ Molten ash flowing down to bottom of gasifier will be quenched and discharged after steam generation
Advantages	▪ Greater operating experience	▪ Favours hydrogen formation without methane ▪ High degree of conversion of coal to gas (97-100%) ▪ Thermal efficiency insensitive to coal rank	▪ Reliable operation with Lignite	Relatively insensitive to coal properties ▪ Gasifier having no moving parts, maintenance is simple ▪ Short residence time ▪ High pressure operation eliminate compression ▪ Higher through put ▪ Avoid Nox and Sox, purer raw gas ▪ Direct quench of raw gas eliminates WHB problems ▪ Efficient heat recovery ▪ Ash disposal in slag relatively easier	▪ Best suited for synthesis gas generation for ammonia plants ▪ Highest degree of conversion of coal to gas (98.0-100%) ▪ Thermal efficiency around 92% ▪ Recently many plants in China and around World has been built ▪ Steam requirement for gasification of coal is less ▪ Cold gas efficiency (80%), high compared to others

Disadvantages	▪ Raw gas contains significant quantities of tar, fines and methane ▪ Ash level fluctuations lead to operating problems ▪ Operating temp range is limited to avoid clinkering of ash ▪ Excessive fines in coal lead to channeling and uneven distribution	▪ Higher oxygen usage contributes to high production costs ▪ With high ash fuels, slagging may take place with substantial heat loss ▪ High refractory ash type of fuel requires fusing agent to ensure easy removal of ash.	▪ 50-80% gasification efficiency with lignite ▪ Higher rank coal requires higher operating temp with the attendant risk of ash fusion	▪ Coal needs testing for properties including ash characteristics for proper design of gasifier ▪ Preferred ash content 25%	▪ Oxygen requirement for coal gasification is higher than other processes
Number of plants	14	17	2	20	12 (including 2 plants to be commissioned in 2007)

Source : Based on information provided by M/S PDIL

CHAPTER – XIV

PROFESSIONALISATION OF MANPOWER FOR FERTILIZER SECTOR

14.1 The fertilizer industry employs sophisticated technologies in production of fertilizers. The operating conditions are hazardous both in terms of chemical environment, high pressure and temperature. The operation and maintenance of fertilizer plants require skills of the highest order. Consumption of fertilizers takes place in the hinterland of the country. The mechanism for reaching fertilizers to all the farmers in every nook and corner of the country requires special knowledge and experience of operation in rural areas. Farmers being consumers of the fertilizers, they need to be imparted knowledge regarding appropriate use of fertilizers and other farm inputs for optimum farm productivity. Industry employs specialist in the areas of agriculture and rural marketing to carry out these duties.

14.2 As on 01-10-2005, the major fertilizer companies have a manpower strength of around 32556. The sector-wise break-up in given in the following Table.

Sector	**Manpower**
Public	15734
Cooperative	6902
Private	9920
Total	**32556**

14.3 Additional employment generation in the Fertilizer Sector will be around 1350 in the three expansion projects considered during Eleventh Five Year Plan.

14.4 Initially, Fertilizer Corporation of India (FCI) and Projects & Development India Ltd. (PDIL) had dedicated facilities for training of new entrants in the technical and commercial areas. The new entrant underwent rigorous training for two years. This system of training of manpower created a pool of trained manpower for the sector. The tremendous expansion of the fertilizer industry during the 1980's was possible because of availability of trained manpower from FCI and other old companies. At present there is no consolidated activity for the manpower development in the sector. Fertilizer Association of India (FAI) is carrying out the activities for human resource development in a limited way. FAI is organizing a large number of training programmes every year in various parts of the country varying in duration from 1 to 6 days in various disciplines. According to FAI these programmes were attended by 143 engineers. 530 personnel engaged in marketing and extension activities and 50 persons in the area of information technology during 2005-06. These programmes are designed for the specific requirement of the sector. In addition, fertilizer companies arrange a number of in-house programmes and also sponsor their employees to programmes arranged by other agencies.

14.5 In view of the GDP growth of more than 8%, there is competing demand for trained manpower from all sectors of the economy. Fertilizer companies are already having difficulty in retaining the trained manpower. In view of high turn over of employees, need for training becomes even more important. Therefore, there is a need for centralized institute for training of new entrants as well as refresher courses/retraining of existing employees. A training and manpower development institute can be established for the purpose. The institute may be established under the aegis of FAI. An allocation of funds from the 11th Five Year Plan should be made for establishment of such an institute.

14.6 For development of professional manpower in the sector, specialized training may be given to selected manpower in the sector. The broad area of training may include:

- Agromony (cropping Pattern, Soil Characteristies, fertilizer Usage)
- Promotional Activities for increase in Fertilizers usage
- Distribution Logistics of fertilizer transport
- Latest Developments in Technology fronts
- Plant Maintenance techniques

CHAPTER – XV

RECOMMENDATIONS

15.1 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. A technology mission on fertilizers may be constituted comprising of experts from agricultural research institutes and agricultural universities to study the changes in pattern in usage of fertilizers in years to come.

15.2 PROJECTION OF DEMAND

Notwithstanding the best of the models/ tools/ techniques used for the medium to long term projections of demand by various national and international organizations of repute, there is always a variation between the projected demand and the actual consumption of fertilizers due to a variety of unforeseen factors, including weather aberrations, policy changes, etc. The actual consumption of total nutrients (N+P+K) deviated from the target by about 16% at the end of 7th Plan, 22% at the end of the 8th Plan and 13% at the end of 9th Plan. The deviation at the end of the 4th year of the 10th Plan, i.e. (2005-06) was about 7%. Therefore, it is preferable to adopt a methodology which has the minimum degree of variation from the actual. There is also the need for mid-term review of the results and updating the figures, if need arises.

An attempt has been made to estimate the consumption of fertilizer for 11th Plan based on various model based methodologies. The projections of fertilizer nutrients based on various models show a range of demand figures of total nutrients between 25 and 29 million tonnes for the terminal year of 11th Plan. Keeping in view the plausible growth of 4.1 per annum on the estimated base level consumption of 22.05 million tonnes in 2006-07, the total nutrient consumption for 2011-12 is envisaged at 26.9 million tonnes. In view of the changing cropping pattern, increase in irrigated area under cultivation and balanced fertilization, reassessment of fertilizers requirement has to be made after 2 years.

15.3 ROLE OF STATES IN DEMAND ASSESSMENT

It is felt that the role of States in demand assessment has to be more scientific and realistic. While assessment of requirement is one area that has to be fine tuned, preparation of month wise demand pattern is another area where significant progress is to be made. It is observed that the sale patterns are significantly off the assessed demand patterns leading to complications in logistics planning. This problem has been further accentuated as movement and distribution of fertilizers has become significantly de-controlled. States may have to inculcate scientific planning/ monitoring process into this exercise, use highly calibrated simulators/ models. Use of IT may have to be made mandatory.

15.4 DEMAND AND SUPPLY POSITION OF UREA IN THE COUNTRY

Over and above the present installed capacity of 213.52 LMTPA of urea (197 LMT from 28 domestic units plus 16.52 LMT from OMIFCO), additional capacity is expected to come in the next Plan Period as follows:

a) 25.186 LMT from additional production from existing units

b) 33.50 LMT from 3 brown field expansion projects and 11.55 LMT from one green field project.

c) About 50 LMT from revival of seven urea units of HFC and FCI in Eastern India based on natural gas/LNG/CBM/Coal Gas as feedstock.

d) About 20 LMT from JV projects abroad based on cheap gas/ LNG, which may come up in the countries which have abundant reserves of gas with a buy back arrangement for urea so produced by these JV projects.

The above projects should be taken up for building the capacity of Urea in the country. The supply should be 15% above the demand keeping in view buffer stock and supply in pipeline. With the increased capacity in fertilizer production, India will not only become self-reliant in fertilizer production but also a world leader.

MEASURERS FOR ATTRACTING INVESTMENT IN THE FERTILIZER SECTOR

To increase the capacity of urea by about 12 million tonnes to a total of 31.5 million tonnes by 2011-12, India will need to invest at least Rs.36,000 crore in the sector at current capital costs.

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. New look has to be given to LRAC policy, 2004.

15.5 DISTRIBUTION OF FERTILIZERS

It is also observed that equitable and timely distribution of fertilizers at all locations within the States is often found to be wanting even when the availability is as per the assessed requirement of the State. There is no uniformity in planning and monitoring in a district wise format which is leading to such an anomalous situation. A uniform composite system of planning and monitoring encompassing States and the Centre in a seamless structure would greatly help in fine tuning the distribution setup of fertilizers. The recent efforts by the D/o Fertilizers in setting up of the Fertilizers Monitoring System (FMS) are a step in the right direction. The fertilizer industry as also the state governments need to be pro-actively involved in this effort to make it 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.

15.6 REVIEW OF FERTILIZER PRICING POLICY

The group based New Pricing Scheme (NPS) for urea units, which came into existence from 1.4.2003, replacing the unit-specific Retention Price Scheme encouraged the efficiency and cost competitiveness in manufacture of urea during Stage-I & II of NPS. During Stage-III of NPS, the urea pricing policy should pursue the following objectives:

(i) Achieve self sufficiency in urea at the end of 11^{th} Five Year Plan

(ii) Promote further investment in the urea sector including technological upgradation

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

(iv) Incentivise additional urea production

(v) Encourage investment in Joint Venture Projects abroad

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

vii) Ensuring availability of urea in the remotest corners of the country.

15.7 REVIEW OF OUTGO OF SUBSIDY/CONCESSION ON VARIOUS TYPES OF FERTILIZERS AND SUGGEST MEASURES FOR THEIR REDUCTION OR RATIONALIZATION

As the weighted average cost of production of urea of gas based units is only Rs. 6280/MT as compared to present IPP of Rs. 12500/MT, it is necessary to strengthen the domestic production capacity of urea, which is not only cost competitive but would also help in attaining self-sufficiency in production of urea which is of utmost importance in the interest of food security. Furthermore, non-gas based units are also required to switchover to NG/LNG.

15.8 FREIGHT SUPPORT FOR TRANSPORTATION OF FERTILIZERS TO HILLY AND DIFFICULT AREAS

Freight support for transportation of fertilizers to hilly and difficult areas of Jammu & Kashmir, Himachal Pradesh, North Eastern States is also being provided under the scheme from 1.4.1997 onwards. These special arrangements have helped ensure availability of fertilizers in these remote areas and may be continued for the 11th Plan period also.

15.9 PRICING OF PHOSPHATIC

The Government has already implemented the interim recommendations of the Expert Group set up under Prof. Abhijit Sen to look into the pricing issues of phosphatic fertilizers. This has partially integrated the indigenous phosphatic industry with the international industry, wherein the international prices of various raw materials/intermediates will form the basis of actual delivered price of indigenous fertilizers. The need, therefore, is to further integrate the indigenous industry with international phosphatic industry to service the capital employed by them and the indigenous industry should, be provided with a tariff differential regime, to cushion the impact of volatile international prices. The industry also needs to mature and invest in strategic locations, which can form the basis of their survival and growth in future.

15.10 POLICY ON PRICE OR FREIGHT SUBSIDY

Policy on price or freight subsidy should be such that the quantum of subsidy and the market price is not a determinant of the intensity of use of a particular type of fertilizer. The mix of nutrients to be used should be determined by soil conditions and the need for particular type of crop and not the relative prices of different types of fertilizers.

15.11 POLICY ON TRANSPORTATION COSTS

A realistic policy which either provides for transportation costs on actual basis or alternatively provides for price decontrol needs to be put in to place immediately to ensure supply of fertilizers products, particularly decontrolled fertilizers, to the consuming area.

15.12 FEEDSTOCK REQUIREMENTS FOR UREA

Fertilizer companies should get in touch with prospective gas supplying companies both in the public and private sector to tie up the additional domestic gas becoming available from 2008-09 onwards before it is tied up by other competing consumers.

15.13 SUPPLIES OF RAW MATERIALS AND INTERMEDIATES TO PHOSPHATIC 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.

15.14 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. This has led to substantial increase in prices of MOP, which has approximately doubled over the last 2-3 years. The country is paying heavily for lack of potassic resources in the country and its heavy demand for sustenance of Indian agriculture. The Government needs 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 only provide a certain level of comfort to this highly dependent sector. Long-term buy-back arrangements with present suppliers can also be an alternative strategy to control the present trends of price increases.

15.15 ROADMAP FOR PHOSPHATIC & POTASSIC SECTOR

Since the country is completely 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 or control over the forces 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. The optimisation theory, which is the essence of a world trade order, also necessitates that the value addition in a weight losing industry takes place at the point of resource.

15.16 ROADMAP FOR SSP

The other 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 half-yearly 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. This has definitely had an impact on the quality of the SSP being manufactured but there is still scope for further improvement. The Government can examine the feasibility of ensuring 100% sale of SSP through the major and established fertilizer manufacturers/importers, who can be held accountable for ensuring quality of product that they would be marketing.

The SSP sector in the country is largely dependent upon the indigenous rock phosphate, which is of inferior grade and is not suitable for production of phosphoric acid. Substantial amount of rock phosphate needs to be imported to also cater to the SSP sector. There are large deposits of inferior grade of rock phosphate in the country, which is not suitable for producing FCO grade SSP with 16% water-soluble P_2O_5 content. The Government can provide for other grades of SSP with lower water-soluble P_2O_5 content under the FCO as also the Concession Scheme so that the unutilised low grade rock phosphate in the country can be gainfully utilised for manufacture of SSP and provide another source of phosphatic nutrient to the farmer.

Since the Government of India is paying concession on sale of SSP, it may also examine the feasibility of announcing selling prices of SSP for various states in the country after examining the location of various SSP industries in the country. This will provide a great degree of coordination between the selling prices and the concession paid on the sale of SSP, and help ensure that delivered cost reimbursed to manufacturers are rational and remunerative.

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.

In the past SSP used to contribute over 15% of the P requirements and was more in line with other countries e.g. China (37%), Brazil (29%) Australia (25%). The sector has been declining primarily due to inadequate concession compared to proportionately applicable to DAP, MRP fixed by the State Governments and complaints of poor quality provided by some SSP manufacturers. The latter problem has now been nearly fully resolved with only specified grades of rock being used and regular PDIL audits. The Government can examine the feasibility of marketing of SSP produced by small manufacturers through established fertilizer manufacturers / importers who will be responsible for quality under FCO/ECA.

In order to allow healthy growth of SSP sector with a corresponding reduction in DAP imports, it is essential SSP be treated like other fertilizers with MRP fixed by the Central Government, concession given in proportion to P in DAP and quarterly escalation / de-escalation linked with DAP. This will result in improved crop yields, less inputs of DAP and the right step towards balanced fertilization.

15.17 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 focussed research.

15.18 RENOVATION, MODERNIZATION, REVAMP AND EXPANSION OF UREA FERTILIZER INDUSTRY IN INDIA

Renovation, modernization, revamp and expansion of urea units should be undertaken as these measures would not only result in better energy efficiencies bringing down subsidy outgo substantially but would also result in augmenting indigenous urea capacity reducing dependence on imports which will check price of urea in international market.

15.19 MEASURES FOR INCREASING ENERGY EFFICIENCY OF UREA PLANTS

Fuel Oil / LSHS based Plants and Naphtha based plants are mainly operating at very high energy levels. Once the non-gas based units are converted into gas based units, the energy figures for these plants will be reduced significantly. By undertaking certain additional revamp / modernization measures after undertaking the study for each plant, the energy efficiency of these plants can be further increased to bring them to a respectable level. Capital assistance scheme for conversion of FO/LSHS plants to gas has to be expedited.

15.20 NEED FOR REVIVAL OF CLOSED PSUS

Closed urea units of HFC and FCI should be revived as these units have excellent existing infrastructure in the shape of residential colonies, coal and electricity tie-ups, water filtration plants, Railway sidings and a very sizeable area of land. Liquidating this infrastructure would be a colossal national loss of valuable resources. Then there is the question of demand-supply gap vis-à-vis domestic production of nitrogenous fertilizers. Further, revival of closed units would strengthen domestic urea production capacity to fulfill the demand-supply gap for food security as also to reduce dependence upon imports.

Following possible modes can be explored for revival of these units:

(a) To explore the possibility of hiving off individual units to existing profit making fertilizer PSUs or invite ‘Expression of Interest’ for Joint Ventures in a transparent manner for revival, without infusion of capital or guarantee being sought from the Government.

(b) Setting up of a new Joint Venture project with the public/private equity participation in non-fertilizer sector, such as petrochemical complex or power plant etc.

(c) Setting up of sector specific Special Economic Zone with the fertilizer production as a necessary activity.

(d) Any other suitable/viable model, keeping in view that fertilizer production should be a necessary activity in the model, along with any other viable economic activity.

15.21 EXPLORING SETTING UP OF JVS ABROAD OR SOURCING FEEDSTOCK, RAW MATERIALS AND INTERMEDIATES FROM ABROAD

As the cost of gas in countries, such as Kuwait, Iran, UAE, Nigeria, Egypt who have large reserves of gas, is less than US $ 1/MMBTU as compared to APM NG price of about US $ 2.5-3.0/MMBTU and PLL's RLNG of about US $ 8/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 Kuwait, Saudi Arabia, Nigeria, Iran, Algeria where JVs can be set up or from where supplies of feedstock can be tied up.

15.22 INDIGENOUS PRODUCTION & IMPORT OF FERTILIZER

Due to the complete 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

15.23 INVESTMENT IN MINING ABROAD

The world rock phosphate production will increase from 177 million MT in 2005 to 195 million MT in 2010. China alone will account for one-third of this growth. The rock phosphate production (excluding China) is forecast at 136 Million MT in 2010. 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.

15.24 PLANNING FOR CAPACITY ADDITION

AMMONIA - The present ammonia production capacity in India is 13.466 million MT and the production in 2004-05 is 12.801 million MT. More than 95% of this production goes for urea production in the country. The production capacity will increase after the debottlenecking plans of various indigenous manufacturers are implemented. However all the new ammonia capacities created will be utilized for urea production leaving little additionality for production of complex fertilizers. Hence the present import demand for ammonia as well as future requirements will have to be met through imports.

15.25 SUSTAINED INCREASE IN PRODUCTIVITY IN AGRICULTURE THROUGH BALANCED USE OF FERTILIZERS

The growth in consumption of fertilizers during the 10^{th} plan period over the last year of 9^{th} plan period has been 19.55 % in P and 38.51% in K nutrients, upto the penultimate year of the 10^{th} plan period. During the 10^{th} plan period the P_2O_5 consumption per hectare has steadily increased from 23.03 kg in 2001-02 to 27.53 kg in 2005-2006. The K_2O consumption per hectare during the same period increased from 8.76 kg to 12.13 kg. Inspite of above, the per hectare consumption of P&K fertilizers in the country continues to be below world average and needs to be further increased to achieve higher productivity. 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.

Fertilizer use in India is inadequate, imbalanced and is skewed in favour of nitrogen, which has resulted in emergence of multinutrient deficiencies in Indian soils. The integrated nutrient management which involves the combined use of chemical fertilizers, organic manures, and bio-fertilizers should be encouraged to improve soil fertility and crop productivity. New fertilizer materials with value addition/ fortification with secondary and micronutrients should be encouraged to promote balanced fertilizer use. There is an urgent need to progressively move towards a nutrient based subsidy and pricing mechanism from the present product based subsidy and pricing mechanism. The pricing of value added/fortified fertilizers can be left to the market forces.

With the objective of promoting balanced fertilisation and encouraging development of crop and location specific fertilizers, a system with quick approvals of various grades of complex/ granulated/customised fertilizers in FCO is a must. The industry should be enabled to undertake extensive soil testing and recommend scientific use of fertilizers. Extension systems should be rejuvenated and reoriented with focus on the poor farmers and low fertilizer consumption areas in mission mode with the ultimate aim of increasing farm profitability. Fertilizer sale points should be upgraded to agro-input sale cum service centres by equipping them with diagnostic facilities (soil and water), bringing all agri-inputs under one roof and providing linkages with banks for credit.

15.26 AGRO SERVICES

The industry also needs to move away from the production-oriented mindset to a service approach. The fertilizer companies, taking advantage of their close links with the farmers, could transform themselves into agro-service companies providing a package of agro inputs, insurance and marketing facilities to the farmers. These services are already being provided by some of the leading fertilizer companies like IFFCO, KRIBHCO, Tata Chemicals Ltd., Coromandal Fertilizers Ltd., etc. In this manner, the fertilizer industry can facilitate informed input procurement by the farmer, help him achieve higher productivity and improve his returns and harness the increased purchasing power for even higher sales of fertilizer nutrients thereby creating a virtuous cycle for farmers, fertilizer companies and the country as a whole.

15.27 ROADMAP FOR DAP

The import of DAP has risen sharply in 2005-06 and the trend is likely to continue in 2006-07 with a total import of 2.5 million tones of DAP. The import of DAP during the 11th 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 tones in 2011-12. However, if there is no further addition to indigenous production, the imports can go up further to 3.9 million tones by 2011-12.

The international trade of DAP is approximately 12.4 million tones per annum and the Indian import constitute approximately 20% of the trade. Any increase/decrease in Indian demand has a major impact on the DAP prices as India is the leading importer of DAP in the world. The world trade of DAP is not expected to significantly increase in the next 5-6 years and, therefore, it is necessary that our demand for P2O5 in the country should not be highly dependent upon imported DAP. At best, it can continue at present level with efforts to bring it down to approximately 1-1.5 million tones of import every year.

15.28 JVS FOR PHOSPHORIC ACID

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 tones of phosphoric acid (as P_2O_5), India imports more than 2.5 million tones 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 P2O5 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 P2O5, will lead to sharp increase in international prices due to tight supply position.

15.29 BUFFER STOCKING

The connotation of buffer stock had changed from that of stock that is used to deal with ‘exigent’ situations to the stock that is used to address the ‘emergent’ demand –supply gap. There is a vast difference in both these scenarios, and needless to say, buffer stocking being used to address policy deficiencies, rather than exigent situations leads to an inherently unstable condition. This issue needs a thorough review.

To ensure adequate availability of phosphatic & potassic fertilizers in all parts of the country during the peak demand period, the Government has pursued the policy of buffer stocking of DAP/MOP on Government account, in most of the states. This has minimised shortage of the main phosphatic fertilizer, i.e., DAP from any part of the country. Due to the uncertainty of imports by private players, this special arrangement has helped to cushion the impact of sudden spurt in demand of these fertilizers in any part of the country and may be continued for the 11^{th} Plan period also. Till such time as private enterprise is able to fully meet the demand of phosphatic fertilizers all over the country, the buffer stocking operations should be continued. The state institutional agencies need to be involved in this operation and state governments should be encouraged to pro-actively participate in the gap-filling effort between assessed demand and availability in each season

15.30 INFRASTRUCTURE CAPACITIES AT PORTS

Low cost investments for upgradation/ modernization of the mechanical equipment can however, provide an additional 25% throughput in the existing capacity due to improved performance. Although, the fertilizer companies situated near the port area are using mechanical facilities created at Paradeep, Cochin and Vizag for unloading of captive cargo, the use of these facilities is however not permitted (for handling of fertilizers) by others. Thus the available capacity at port is being underutilized. Corrective action in this direction needs to be taken urgently. Most ports are severely constrained to handle high volumes on sustained basis. Excepting Mundra port, no other port, currently is able deal with panamax vessels. With the sea movement from CIS countries and US gulf increasingly being taken up through these large vessels, accepting and handling them at Indian ports has become a severe limitation. While paradeep port has the draft to handle panamax vessels, it is 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.

15.31 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. Ennore port near Chennai proposed to create deep draft berths to accommodate panamax vessels carrying fertilizers during the Xth Plan period and was expected to be operational in 2003-04

Following are some additional suggestions to improve port handling:-

a) New Mangalore and Cochin ports should ensure working of all three shifts and also augment the warehouse capacity.

b) Chennai port should address the problems relating to frequent shifting of vessels between berths to improve the performance and also avoid berthing of fertilizer cargo in a contaminated jetty.

c) Use of deep water port at Kakinada port needs to be opened up for fertilizers to improve the handling capacity at this port.

d) The minor ports performance needs to be upgraded on acquiring self propelled barges/ boats in good numbers supported by good storage and evacuation facilities.

e) Widening of National and State Highways with proper matting to reduce transit time and transportation cost.

f) Warehousing capacities and Evacuation by the Railways are to be matched with the unloading capacity at each port.

g) Coastal Shipping/Inland Water transportation needs encouragement for movement of fertilizer by providing liberal assistance. The following needs to be addressed for effective use of Inland Waterways:

   → Development of infrastructure facilities for loading and unloading terminals.
   → Competitive water freights.
   → Integration of Inland Water Transportation with coastal shipping.
   → Night navigation facilities.
   → Round-the –year navigability.

15.32 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.

15.33 PORT RAILWAYS FACILITIES AND PORT-RAIL CONNECTIVITY

Port Railways facilities and port-rail connectivity need to be strengthened significantly during the Plan period if timely availability of fertilizers has to be ensured.

15.34 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.

15.35 ROAD TANKERS

Road tankers of 10-12 tonnes capacity are recommended for transportation of liquid fertilizers.

15.36 WAREHOUSING INFRASTRUCTURE

In view of competing demands for a number of agro-products, it will be desirable to strengthen the warehousing infrastructure to meet the requirement during the Eleventh Five-Year Plan. This is more so because fertilizer demand has a definite peak and non peak distribution of demand and is not amenable to 'just in time' inventory planning.

15.37 COMPUTER BASED INVENTORY MONITORING SYSTEM

The Department of Fertilizers being the apex-monitoring agency, manufacturers/importers should be linked to it through an on line computer based inventory monitoring system. Besides such connectivity needs to be extended to consumption centers and districts so that fertilizer demand can be met expeditiously and in a timely manner.

15.38 HANDLING OF FERTILIZERS

The rate at which our fertilizer consumption has been increasing makes it imperative to bring about certain structural changes in the handling of fertilizers. Such a change is necessary not only from the point of view of speeding up movement by rail transport but also from the point of view of putting the logistics of fertilizers distribution on a firmer footing.

15.39 INNOVATIVE PACKAGING

Apart form sophisticated automatic arrangements for weighing a predetermined quantity of fertilizers (50 kgs) in the bags at the plants/main distribution centers, simpler arrangement for volumetric packing has been designed by Norsk Hydro (Norway). There is a small silo on top with a valve arrangement through which a predetermined quantity of fertilizer drops into a lower chamber and the valve closes automatically. A screen is provided on the top of the silo to prevent jumps coming down. Thereafter, the bag is placed below the nozzle and through another valve, when operated manually; the fertilizers in requisite quantity drop into the bag from the lower chamber. There is a small adjustable belt conveyor arrangement through which the bags can be loaded directly on the road trucks. These machines can be effectively used at the ports/nodal points.

15.40 BULK TRANSPORT OF FERTILIZER

At present fertilizers are moved in conventional wagons, covered as well as open. Our dependence on the general service wagons has at time resulted in a serious constraint in the availability of wagons on account of unbalanced pattern of traffic as well as utilization etc. If specially designed wagons for handling of fertilizers are introduced they would work in closed circuit between the loading and consumption centers, as in case of petroleum tank wagons and thereby ensure guaranteed availability.

While efforts have to be made as mentioned above, in the short term there is a need to improve the usage of wagons that are currently available on the Indian railways. Design and standardization of covers to the open BOX wagons would greatly enhance the versatility of usage of existing railway stock and greatly improve the availability of rail wagons for fertilizer transportation. Mechanized bagging facilities with capacity corresponding to discharge rates in each port need to be set-up on priority. Bulk transport of fertilizers requires large capital investments for the terminals, and the rolling stock. Large volume of transportation and certainty of such transportation are necessary pre-requisites . However, to save costs, the industry, the ports and the railways can jointly explore the feasibility of introducing this concept in some nominated circuits.

15.41 PROFESSIONALISATION OF MANPOWER FOR FERTILIZER SECTOR

There is a need for centralized institute for training of new entrants as well as refresher courses/retraining of existing employees. A training and manpower development institute can be established for the purpose. The institute may be established under the aegis of FAI. An allocation of funds from the 11th Five Year Plan should be made for establishment of such an institute.

15. 42 INDUSTRIAL CONTRIBUTION TO R&D

Industry may contribute 1% of its profits to nodal agency which shall take up R&D projects of interest to fertilizer industry. Govt. of India may also give matching funds for R&D from the subsidy funds.

15.43 USE OF INDIGENOUS RAW MATERIALS

Industry must prepare itself to be able to use indigenous raw materials. Suitable technology/methods shall be developed so as to use indigenous rock-phosphate and coal to reduce dependence on imports of feedstock.

15.44 COORDINATION GROUP FOR R&D

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.

15.45 FERTILIZER RESEARCH INSTITUTE

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. which shall take up R&D projects of interest to the fertilizer industry. The Govt. of India would give budgetary support and other sources of funding could also be explored in consultation with the industry.

15.46 ALTERNATE FERTILIZERS

New and cost effective alternate products like bio-fertilizers, slow release fertilizers should be developed which can replace conventional product with ease

15.47 MATTERS RELATED TO POLLUTION

Pollution standard may also include the method of measurement to be adopted. Unrealistic and unachievable standards should not be set. There should be one common standard applicable to entire India.

R&D efforts in all pollution related areas are required to develop indigenous technologies taking care of not only the current requirement but also likely emerging requirement in next 10 years.

Efforts need to be made to develop technology for recycling, reprocessing, re-use of solid matters generated in fertilizer plants.

Various states may expeditiously identify and develop landfill sites and methods for disposal of hazardous wastes.

The incentive like custom duty, free imports for pollution related technology and machinery might be allowed till the time indigenous capabilities catch up with the world standards.

Government of India may take immediate steps to get Indian Boilers (Amendment) Bill passed from the parliament.

15.48 LOW ANALYSIS FERTILIZERS

Low analysis fertilizers should also be treated at per with other fertilizers on nutrient value basis.

15.49 REGULATION FOR SALE OF NEW PRODUCTS

It is recommended that proper regulations may be formulated for the sale of new products like plant growth regulators.

15.50 TECHNICAL STRENGTHENING OF DEPARTMENT OF FERTILIZERS

Department of Fertilizers need to be strengthened technically as it can play an important role in promotion of the productivity in the new economic environment through R&D efforts. A Technology Mission may be set up to analyze related issues.

FERTILIZER PRICING AND SUBSIDY

A Technical Note

Introduction

There have been numerous committees on various aspects of Fertilizer Policy. Over the decades more than one committee has been set up to advise on the same issue. Yet the issue has defied solution, perhaps because the transitional solutions are converted into permanent ones before a new committee is appointed. As the sector is riddled with distortions, starting from pricing and supply of the basic inputs-feedstock, to plant-wise and group-wise prices/subsidies and ending in user subsidies, it is very easy to get lost in the details. It is therefore useful to start with a broad perspective to define the main issues.

Analysis: Urea

The most important issue is to clearly define and separate out the input, producer and consumer subsidies (or tax if negative). For this we need benchmark prices for inputs, primarily natural gas & naptha , and benchmark prices for output - Urea.

Benchmark

The standard benchmark prices in an open economy and a globalised World are the international prices of various items. There are two complications here. As oil price is controlled by the oil cartel and national oil resources are often controlled by national governments the oil price is not determined in a competitive market. In the case of natural gas, though this problem is diluted, it is compounded by the large economies of scale/sunk costs in transportation often result in bilateral monopoly/oligopoly. In the case of Urea fertilizer, it is sometimes asserted that the large potential demand from India would convert the market into oligopoly. The presumption is that at that point prices would rise and become higher than the price at which we could have continued to produce.

We can define a benchmark that is either the import price of urea (P_w) or the cost of the most efficient domestic producer (P_{de}) assuming free imports of inputs and/or domestic supplies at international prices. The fears expressed that if India became too dependent on imported urea, a monopoly/oligopoly situation could develop, imply that at that point, $P_{de} < P_w$. The appropriate benchmark in this case would be the efficient domestic price. Therefore in general, the benchmark is given by

$$P_b = \mathrm{Min}\ (P_w , P_{de})$$

Conditional Prices

The cost of the most efficient domestic producer (P_{de}), assuming free imports of inputs and/or domestic supplies at international prices can be written as,

$$P_{de}\,(|P_o) = \mathrm{LRMC}(|P_o\,),\ P_o= P_{ow} = P_{od}$$

P_w , the international price of urea (landed cost with zero duty) is conditional on the oil price (P_o). And P_{de} is the long run marginal cost of fertilizer given the international prices of natural gas, LNG, naptha etc. when the price of oil is P_o . In other words whenever we refer to international prices of oil and gas and related products, it should be understood to be at some given price of oil (international and domestic).

Input Prices & Subsidy

If input prices are controlled and quantities rationed, the long range marginal cost is the (hypothetical) one that would prevail in a free pricing scenario. It is an article of faith that the most efficient way to produce urea is by using natural gas or LNG. The LRMC would therefore be the cost of producing urea through a new gas based fertilizer plant, where the gas is assumed to be priced at international price and is freely available at that price (P_g).

$$P_g = P_{gw}\,(|P_o\,)$$

If the domestic price of gas is controlled below the international one, the implicit tax on the domestic supplier of the gas is then given by,

$T_g = P_{gw} - P_{gd}$

Which is equal to the subsidy (S_g) for the fertilizer producer getting the domestic gas at the controlled rate,

$S_g = P_{gw} - P_{gd}$

Producer Subsidy

If the cost of the most efficient potential producer in India is higher than the import price, $P_{de} \geq P_w$, then we can define a competitive import duty t as,

$P_{de} = (1+t) P_w$

And the producer subsidy can be defined as,

$S_p = S_g + t P_w = t P_w + P_{gw} - P_{gd}$

Cross-Subsidy

There are three types of domestic producers: (a) The ones with new, gas based plants, falling into the efficient category, (b) Those with old, depreciated plants, which for this reason have a retention price lower than the cost of production of the plants in (a) and (c) Those using other feedstock besides gas, whose cost of production is higher than (a).

If the retention price system is abolished two things follow: (1) the cross-subsidy currently provided by the plants in category (b) will be lost. (2) The plants in category (c) become uneconomical and would become unprofitable. Some of them would however continue to run as long as the benchmark price plus the producer subsidy defined above is greater than the variable cost. Consider the plants in category (c). Let the retention price of the plant i in this category be P_i. Then the discounted value of the subsidy that would be provided (forever) at the current cross-subsidy rate is,

$S_{ki} = (P_i - P_{de}.)/r = (P_i - (1+t)P_w)/r$ if $P_w < P_{de}$, i in (c).

Where r is the interest rate on government's borrowing. Thus government could abolish the retention price system by giving producers in category (c) a one time capital subsidy S_{ki} , to switch over to an efficient gas based plant without being any worse off. There can also be an argument for limiting this subsidy to the loss incurred L_{ki}. by junking the current plant. In any case it should not exceed the cost of anew plant.

The producer and farmer subsidies given above would however continue. The incentive structure for the industry would however, be completely transformed.

There would also be a loss of the implicit tax T_{ki} collected from depreciated plants in category (b):

$$T_{ki} = (P_{de} - P_i.)/r = ((1+t)P_w - P_i)/r \quad \text{if } P_w < P_{de}., \quad i \text{ in (b)}$$

Farmer Subsidy

The efficient user/consumer price P_c, given the benchmark price P_b can be written as,

$$P_c = P_b + C_{dist} ,$$

where C_{dist} is the cost of distribution.

If the government desires that farmers receive urea fertilizer at the farm gate at a subsidised price, P_f, then the farmer/user subsidy is,

$$S_f = P_c - P_f = P_b + C_{dist} - P_f$$

$$= P_w + C_{dist} - P_f \text{ if } P_w < P_{de}.$$

The farmer subsidy could for example be provided either through the urea producers and importers or through a Social Security Smart Card of the kind recommended in Planning Commission Working paper No. 2006-1 and being fleshed out by the 11th Plan Working Group on "Integrated Smart Card."

Illustrative Numbers

Table 1 illustrates very sketchily some of the subsidies involved. Thus at the oil prices prevailing in June 2004, Gas based urea producers were providing a cross subsidy of 983 crores, while the Naptha and fuel oil based urea producers were getting a subsidy of Rs. 3100 crore and 1139 crores respectively. Of the total "fertilizer subsidy of 7680 crore, only Rs. 4425 crore or 58% was going to farmers. In addition to this 42% non-gas based fertilizer producers got a cross-subsidy from gas based producers equal to 13% of the total subsidy outlay.

Table 1: Oil Prices and Subsidies

	Prod Share	Prices World	Price/cost Domestic	Subsidy Rate	Subsidy Amount
Inputs*		*USD*	*USD*	Rs./ton	Rs crore
Oil					
Gas		$2.7	$1.7		
LNG		$4.9			
Naptha		$9.5			
		MMBTU	MMBTU		
Output: Urea		*Rs.*	*Rs.*		
Producer	1.00	6600		1302	3256
Gas based	0.63		5976	-624	-983
Naptha	0.27		11192	4592	3100
FO/LSHS	0.10		11156	4556	1139
Consumer					
Farmer			4830	1770	4425
Total					7681
Note:* Date for prices		Jun-04	Jun-04		

These numbers need to be urgently updated based on the latest oil prices and the corresponding prices of LNG, Naptha, Urea etc.

Recommendation

Given the history of non-reform in this sector, the best course would be to make the entire system of subsidies connected with oil and gas production transparent. This can be done by pricing all oil and gas based products at international market prices and defining a complete system of subsidies and cross-subsidies. To start with the latter could take the status quo as given and merely put a transparent system firmly in place. What is to be done to reform the system can then be worked out in a rational manner taking account of all socio-economic arguments.

Fertilizer Policy

Fertilizer policy must be benchmarked to import parity pricing, rejecting the cost based approach comprehensively and must be integrate different types of fertilizer. This makes it possible to separate farmer subsidy issues from the issues/problems of fertilizer production, subsidy and cross-tax subsidy and deal with each separately and independently, without holding one hostage to the other.

Numerous committees headed by eminent public personalities, scholars and retired officials have given their recommendations on fertilizer policy reform over the past two decades. Implementation has however, repeatedly been stymied. The challenge is to work out a simple, pragmatic policy and ensure its implementation. The key elements of this approach can be the following:

1. Import prices to be used as a benchmark for all types of fertilizers (and oil, coal and other inputs into their production) for estimating and evaluating subsidies and cross-subsidies. Adjustments can be made to this benchmark (for instance for predatory pricing or temporary global shocks), but unless such adjustments are accepted by all concerned and formally approved, import parity will remain the benchmark.

2. Based on these benchmark prices, subsidies and cross tax-subsidies currently received by all categories of fertilizer producers and type of fertilizer must be calculated. The subsidy currently received by farmers on each type of fertilizer (Urea, Phosphatic, Potash etc) will also be an output of this exercise. The taxes-subsidies inherent in controlled supply of inputs will also become clear during this process.

3. Producers of all types of fertilizers will have the right to a subsidy set at the peak non-agricultural tariff (NAT) rate. The reasoning for this conferment of a ‘right’ is that fertilizer producers deserve as much protection as the producer of any other manufactured good, but this general ‘protection’ is better provided by a subsidy so as to keep fertilizers to farmers at international levels. As the current ‘peak’ non-agricultural tariff rate is 12.5%, producers of all types of fertilizers will have the right to a subsidy of 0.125 Pw (Pw = import parity price per unit of fertilizer) on every unit of fertilizer produced and sold in India. If the peak tariff rate is reduced in the 2007-8 and subsequent years this subsidy rate will also decline.

4. Central and State indirect taxes paid on inputs purchased by fertilizer producers would be in principle refundable to them (even though the CENVAT and State VATs do not currently allow for this. The normal process by which Vat paid on inputs is offset against VAT charged on output is not possible as there is no VAT on fertilizer output). These should be estimated and announced. As these refunds can be justified by the principles of VAT they have some economic rationality/legitimacy.

5. These economically justified protection and refund (3 & 4 above) should be subtracted from the implicit subsidies at import parity pricing calculated in 2, to determine the ‘producer subsidies’ being provided to each category of fertilizer producer. The ‘producer subsidies’ so calculated should be capped at the end of the current financial year, and be phased out during the 11^{th} five year plan (as per pre-determined, announced schedule to be put on the web). This would give producers sufficient time to change technology (e.g. from coal/naptha to gas), expand/contract output enter into long term contracts for gas/raw material supply and to set up joint venture plants in gas surplus countries or phosphate/ potash rich countries.

6. The difference between the current price paid by farmers and the import parity price is the ‘farmer/consumer subsidy’ (calculated in 1). First the unit subsidy for each type of fertilizer should be calculated. Second the rate of consumer subsidy

should be equalized for different types of fertilizer within the same total subsidy. Based on some norms for the use of different types of fertilizer (NPK) per hectare and the number and average size of small and marginal farmers' holdings the amount of subsidy per small and marginal farmer should be determined. The rate of subsidy would be adjusted if oil prices fall.

7. This Integrated smart card, should have a fertilizer subsidy module (in addition to the PDS module, a cash/credit module etc.) that entitles each small & marginal farmer to collect a subsidy per unit of fertilizer bought for each type of fertilizer up to a pre-determined total subsidy value limit (determined as in 6). Alternatively each eligible farmer the subsidy amount calculated in 6 can be given in the form of credit in bank account or smart card, which (s)he can use for any purchase (farm inputs etc.).

8. If the number of small and marginal farmers entitled to the fertilizer subsidy is determined for each State the subsidy entitlement of each state's farmers could be transferred to the States for distribution through their own administrative machinery (this is similar to the pattern followed currently with respect to poverty based PDS entitlements and distribution) or State specific Smart cards. States could also be given the option of giving the subsidy in the form of cash/credit in the bank account or smart card.