CHAPTER - I
INTRODUCTION
‘Imagination is more important than knowledge.’
- Albert Einstein.

‘I would rather have an open mind by wonder than one closed by belief.’
- Gerry Spence.

‘Many of life’s failures are people who did not realize how close they were to success, when they gave up.’
- Thomas Alva Edison.
CHAPTER - I
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1.a. PREFACE

Industrialization is the most essential requisite for economic prosperity of any country. In the post independence era in India, the policy regime articulated explicitly the objective of rapid industrialization through Industrial Policy Resolution of 1956. Development of Basic industries was the prime objective, as it was widely believed that the growth of basic industries would lead to widespread industrialisation across the country. Truly, the articulation of industrial policy has laid a basis for structured development of Indian industry, under various sectors.

The policy objectives were pursued through the five year plans which followed after 1951. The second V year plan document in 1955, outlined that 'if industrialization is to be rapid enough, the country must aim at developing Basic Industries'. As a follow-up of the accomplishments in the previous plan periods, the draft document of the IV five year plan stated that the 'special feature of industrial development especially since commencement of II plan period in 1956-57, has been growth of production capacities in Steel, Aluminium, Engineering, Chemicals, Fertilizers and Petroleum Products.
It was observed that the Basic and Capital industries became an essential part of the pattern of Industrial development in India. The first three years of the III plan period, the rate of growth has been close to 8% per annum.¹

United Nations Industrial Development Organization (UNIDO) in its Global Report, 1997 observed that investment in manufacturing is deemed to have a stronger relationship with economic growth than investment in other sectors. Fast growing economies tend to have higher growth in manufacturing, which have been the engine of aggregate growth in many developing countries such as East and South east Asian countries and particularly in China. In India, industrial development has been backed by adequate investments at various stages, from all the sectors. In the initial stages, role of public sector in mobilizing the investment for creation of manufacturing facilities has been significant. During 1960s, substantial industrial growth was mainly due to (1) Emphasis on industrialization in Economic policies (2) Heavy industry oriented strategy (3) Huge investments made and capacities created in industrial sector as a follow up action.²

The origin of Indian Phosphatic fertiliser industry can be traced to the year 1906, when M/s EID Parry Ltd., commenced production of Single Super Phosphate in it’s plant at Ranipet, Tamilnadu. However, the production of Phosphatic fertilisers was meagre and the manufacturing facilities were few. The symbolic presence of these units with no further growth, continued till 1960s. One of the factors for lack of adequate growth, could perhaps be the low consumption of chemical fertilisers during that period. In 1951-52, the total consumption of chemical fertilisers was a bare 0.66 lakh MTs, of which around 90% was nitrogenous fertiliser.

At the beginning of the plan period, India imported fertilisers for meeting almost entire agricultural requirements. Between the year 1947 and 1960, the total investment in fertiliser industry was at Rs. 74.70 crores, of which the private investment was 13% at Rs. 9.80 crores.

With the advent of green revolution and the usage of High yielding variety seeds, the consumption of chemical fertilisers gained momentum and in view of total dependence of the country on imported fertilisers and the constraints on the foreign exchange front followed by the World Oil crisis, the necessity of creating a robust fertiliser industry in this country, was felt. In this direction substantial investments were made in the fertiliser industry creating further production capacities, particularly from Public sector till 1961 and on account of growth in demand for chemical fertilisers there after, the private sector investments also increased significantly. However, in the annals of Phosphatic Fertiliser industry, the years 1967 and 1968 were significant as GSFC Ltd., which was promoted by the Gujarat State Government produced for the first time Di- Ammonium Phosphate (DAP) in 1967 and Coromandel fertilizers Ltd., in Andhra Pradesh, which was promoted with American equity participation, produced Urea Ammonium Phosphate in 1968 and the advent of these products stimulated the growth in consumption of the Phosphatic fertilizer, as year after year, new grades of Phosphatic fertilizers were manufactured and promoted among farming community, which enabled remarkable improvement in the demand.

There is phenomenal improvement in Indian fertiliser scenario since 1947, with the consumption and efficiency in fertiliser usage going up every year. However when consumption pattern of Phosphatic Fertilisers is observed, there is noticeable disparity among various states in the country, on account of economic and agronomic factors, influencing each region of the country. This theory excludes some of the states such as Punjab, Andhra Pradesh and Maharashtra, where fertiliser consumption has attained remarkable levels. In contrast to this scenario, in some of
the Eastern and North-eastern states and also in Central India, fertiliser consumption even today is far lower than the desired levels. Government has played a vital role in promoting usage of fertilisers since 1950s, through various policy initiatives.

UNIDO, had rightly commented in its Global report in 1997 on industrial development, about the role of Government in promoting investment. It stated that in an increasingly integrated global economy, the sustained expansion of manufacturing investment is likely to be led by Private sector. Governments are responsible for economic co-ordination, as the role of public policy in the growth of investment remains significant. It stated that the East Asian experience suggests that the state also has an entrepreneur role in achievement of economic growth.

Fertiliser industry in India, has grown over the years with the Government's involvement as an entrepreneur, as a policy maker for regulation of sale of fertilisers and as the apex body determining the Pricing and other financials of fertiliser operations. The investment in this industry, were pioneered by the Government through public sector in the initial two decades after independence. In the later years the Government also promoted the role of Co-operatives in production and selling of fertilisers. The total investment in fertiliser industry which at the beginning of the plan period stood at Rs. 10.8 crores had reached Rs. 25450.8 crores by 2000-2001, and the real growth in investment started from the V five year plan 1974-79, when the Government introduced the Retention Price Scheme. The public sector investment in the total outlay by end of 2000-01, stood at Rs. 7321.50 crores with a share of 28.76%, the Cooperatives with a share of 16.63% at Rs. 4231.5 crores and the Private sector with 54.61% share at Rs. 13897.80 crores.

Though the Industrial Policy Resolution envisaged the growth of Fertiliser industry also among the basic industries, a close look at the past five decades span of this industry would show that the industry has been nurtured to meet the nutrient requirements of Indian Agriculture, particularly in the context of green revolution. The necessity of creating indigenous production capacity was more in the context of
substituting the imports. Unlike in other sectors of Indian industry viz., Steel and Cement, where the growth in capacity was achieved to meet the needs of various customer segments and also for creating export surplus, the fertiliser industry's identity is since viewed from the point of view of Indian agriculture, has, to some extent hampered its growth as it carried all the distinct constraints arising out of adversities in Indian Agriculture. The available capacities as on date do not meet the demand and country is still importing fertilisers to cope up with the consumption. Whereas, the industry has little surplus to export the product as in the case of Steel and Cement, and grow in size attracting further investments.

The constraints arising out of uncertain and un-conducive policy environment, lack of economically viable operating conditions, market constraints and high production costs, is making the industry stagnate and there is investor apathy for the fertiliser sector. Investment is a perennial activity for sustained growth of any industry, for, the capacity additions need not be looked in the context of local demand but should be viewed in the global context. Similarly, fertiliser industry should grow in capacity and viability, to be competitive globally so that the constraints of Indian agriculture or the policy directives of the Government, do not affect the viability of the investment. The import substitution orientation in the Indian development strategy has been derived from the objective of self reliance on the assumption of pessimistic export possibilities for India and it is therefore important to assess the achievements on the import substitution front together with the lost opportunities on the export front.3

Fixed capital investment in case of phosphatic fertiliser units though not very high for mainstream plant, would be substantially high in the case of integrated plants with captive units for production of critical raw materials. The working capital investment also has been high in view of adverse market conditions and other critical environment, specific to phosphatic fertiliser industry.

These long term and short-term investments require extensive financial resources, which the industry has tapped from entrepreneurs, capital markets, Financial Institutions and Banks and other market sources. But the observations of available studies indicate that the current capital structure of the industry is highly geared. Probably the adverse capital market response and promoter financial constraints would have necessitated borrowings by the industry. But in this scenario when the gross profit margin is under strain, capital structure with high financial leverage is not a prudent financial policy.

1.b. NEED FOR STUDY

Phosphatic Fertiliser industry has grown into a reckonable segment of the Rs. 260 billion Indian fertiliser sector and is ranked fourth in the world. Though the major phosphatic fertilisers like DAP and complex grades were produced before 1970's, the impetus in growth of investment and correspondingly higher fertiliser production, was seen only in the post 1979 period. The introduction of unit specific Retention Price scheme in 1979, through which, the Government guaranteed a post tax return of 12% on net-worth to the manufacturers, has made the industry attractive in the investors' perspective and hence there was higher concentration of investment during that period.

The period after decontrol in 1992, has been turbulent, as the industry could not cope up initially with the fall in demand due to increase in prices of phosphatic fertilisers. Though the demand has picked up in the post 1996 period when the Government enhanced subsidy, thereafter, the stringent normated efficiencies prescribed under the current subsidy scheme has made it difficult for the units to carryout manufacturing operations viably. Reducing production cost has become difficult due to dependence on imported raw material. The industry has to depend totally on overseas suppliers for critical raw materials viz., Phosphates in the form of Phosphoric Acid or Rock phosphate, the prices of which are generally controlled by the suppliers. These international suppliers also have huge capacities for production of phosphatic
fertilisers and are exporting them to India, at a much lower price than the cost incurred by indigenous manufacturers. Hence, cheaper fertiliser imports would be a perpetual threat for domestic fertiliser industry.

Despite decontrolling the Phosphatic fertiliser industry, the Government has continued the price regulations through a concession scheme, to rectify the imbalance in nutrient usage resulted out of price elasticity after decontrol in 1992 and also to protect the domestic industry from cheaper imports. The constraints on the agricultural front and total dependence of the industry on retailers and co-operatives, has caused undue stress on the finances and the operating margins of the industry. The credit period to customers has increased due to adverse market conditions. Higher receivables from customers, coupled with delay in receipt of subsidy from the Government due to stringent procedures, is necessitating higher working capital investment. Low retention of profits by majority of the fertiliser units, is compelling the units to borrow extensively to fund the growing investment needs.

Adequate Return on Investment (ROI) is the premise on which an entrepreneur would undertake fixed capital investment. The Gross profit margins in the context of pricing constraints and market adversities has been very low in Phosphatic fertiliser industry. Given the fact that the industry has high financial leverage in the capital structure and the industry in general is bracketed as a high risk exposure by the lending Institutions and Banks, the cost of capital is generally high as against meagre ROI. Though the Government has played a significant role in attaining the current production capacities, may be the role of the Government as a regulator is no more required and that the Government distances itself from this regulatory approach.

There is every necessity for creation of huge capacity for Phosphatic fertiliser production, beyond the requirements of Indian Agriculture and the Phosphatic fertiliser industry should grow in size to be able to export for achieving synergies. The cost of production can be reduced only by optimising production capacity, but huge production capacity in Indian context could prove to be an idle investment, as
the movement of fertilisers to distant places in the country could only result in higher freight and working capital costs and may not be financially viable. Catering to the markets in proximity could result in idle capacity because of demand limitations.

To achieve this, Fixed capital investment is an imperative and the Phosphatic fertiliser industry should be attractive enough for the entrepreneurs to invest for creation of production capacities. The investment is also required for consequential increase in working capital due to higher production. Confidence of the Capital markets is essential for the Phosphatic fertiliser industry, as capital structure with high financial leverage is not desirable in case of lower ROI. It would be difficult for the industry to source loan funds in the current context as the industry's risk profile is high and the ability of promoters to bring in funds is also constrained.

There are various economic and non-economic factors which are affecting the Indian Phosphatic fertiliser industry from growing in size and also attaining financial viability. Therefore, a comprehensive study of the favourable and unfavourable factors influencing industry's performance and growth, is an imperative. This would enable the industry, to nourish it's strengths further and initiate appropriate remedial measures to eliminate or minimise the weaknesses wherever possible, for attaining a vibrant Phosphatic Fertiliser industry in India.

1. c. OBJECTIVES OF THE STUDY

The essence of investment in industry is to achieve growth in investor value and this applies to each and every unit of the industry. Perennial investment and growth is an indication of vibrancy and life for any industrial enterprise. But, there are innumerable factors both external and internal, which adversely influence the growth and in the long run affect investors interest, and could result in negative growth. It would therefore need a focussed study of the entire environment prevailing in the industry. The current study aims to accomplish the following objectives,
1. To study the growth in investment and production capacity in relation to regulatory framework of the Government.

2. To analyse the role of Public, Co-operative and Private sectors in investment in this industry. Strengths and limitations of each sector in making further investment for industry’s growth.

3. To study the demand pattern and impact of constraints in agriculture sector on growth in demand for Phosphatic fertilisers.

4. To Carry out Investment analysis using capital budgeting techniques and also evaluate the option of investing in captive production facilities for basic raw materials.

5. To analyse and understand the ability of Phosphatic fertiliser units to service debt capital.

6. To analyse the capital structure of the industry and alternatives available for optimum utilisation of resources, and implications of capital market perception about the Phosphatic fertiliser industry.

7. To study the position of international suppliers vis-à-vis Indian Phosphatic fertiliser industry, regarding price and quantity de-regulation.

8. To analyse the cost factors and pricing policies, which determine the profitability and study the ability of the indigenous industry in controlling these factors for profit maximisation.

9. To carry out micro analysis of the working capital cycle and position of liquidity.

10. To study the role of Banks in working capital financing and the regulatory framework applicable for financing Phosphatic Fertiliser industry.

11. To study the fixed capital investment and to suggest changes required in regulatory framework for achieving growth in investment vis-à-vis for growth of industry.
1.d. HYPOTHESES

a. Tested Hypotheses:

1. No major difference between operating profit and pre-tax profit.
2. No significant difference exists in payback based on ROI and IRR.
3. No significant variation between cost of equity capital and debt capital, unlike in other industries.
4. No significant difference between Public & Private Investment and Variation in investment between the years was insignificant after 1979.
5. Fertiliser Companies do not meet the benchmark current ratio of 1.33, set out by Banks.
6. Variation in demand among regions is negligible and Variation in demand between the years is insignificant.

(b) General Hypotheses:

7. Pricing control and regulatory framework by Government is vitiating the investment climate in the industry.
8. No management control on Working capital investment is observed.
9. Demand for Phosphatic fertilisers is price elastic.
10. Investment in Receivables is highest among working capital assets.
11. Industry needs no protection against cheaper fertiliser imports.
12. The capital structure is highly geared and promoters are not inclined to make additional investment.
13. Inappropriate dividend policy is the main cause for adverse capital market perception.
14. Financial Institutions, banks and other agencies in Financial markets are ready to fund the future investments in this industry and are not worried over the current status of the industry.
1.0. SAMPLING DESIGN

The study is based on both primary and secondary data. The current study, since envisages to analyse investment holistically by reckoning the limitations or strengths prevailing in related areas. As regards secondary data, entire 12 years period from 1990-91 to 2001-02 or part thereof, is considered to be representative of the business cycle of the industry as well as, it would cover the pre & post periods encompassing major policy change affecting the industry. Four constituents have been identified for collection of primary data viz. (1) Fertiliser industry which is the subject of the study (2) Farmers, the demand determinants (3) Commercial Banks, the prime sources of finance, particularly working capital finance and (4) Capital Market which is not only significant as a source of capital but also an institution for creation of investor value. Hence, the primary data is collected through a structured survey carried out between the period August'02 to July'03 from the four constituents;

1. **Industry:** The questionnaire seeking responses on various aspects of the subject under study has been sent to senior and middle level functionaries viz., Managing Directors, Vice Presidents or General Managers, Managers in both finance and non-finance functions, working in Phosphatic and Nitrogenous fertiliser units. As the subject involves analysis of investment and industry scenario, questionnaire has been sent to Credit rating agencies and industry related bodies. Since the questionnaire is focussed on the past and also emerging fertiliser industry environment, responses from individuals are collected.

In India there are just over 30 companies producing fertilisers and the subject taken up for study is comprehensively understood by very few personnel at the senior levels. This has made it difficult to adopt random sampling and hence the questionnaire is addressed to people presently available in higher hierarchies in fertiliser organisations and officials who were associated with the industry in the past. One more constraint experienced, as the questionnaire is focussed on Phosphatic fertiliser industry, respondents from nitrogenous fertiliser units have
expressed lack of adequate information and knowledge about Phosphatic fertiliser industry. The questionnaire is common for all categories, and a total of 35 respondents have been touched upon for extracting their perspective on the issues relating to the phosphatic fertiliser industry and also on the objectives of the study.

2. Farmer: Farmer is the beneficiary of the whole gamut of fertiliser operations and policies and the changes in demand for fertiliser takes place on account of events connected to farmers and Indian agriculture. The demand for fertilisers is determined by farmer’s preferences and constraints.

The survey of farmers is restricted to Andhra Pradesh (AP). AP is one of the prime fertiliser consuming states in the country, with widespread demand for all grades of phosphatic fertilisers. Stratified sampling has been adopted for the survey of farmers, aggregating 110 from the following districts and these districts were opted for study based on convenience and representativeness.

(a) West Godavari (b) East Godavari (c) Guntur (d) Prakasam (e) Medak (h) Kurnool and (j) Warangal.

Godavari districts of Andhra Pradesh are one of the most fertile places in the country, and are considered rice bowl of the state. The districts are bestowed with abundant water resources due to which extensive cultivation of Rice is prevalent. Fertiliser consumption is very high, and hence this place is one of the prime markets for fertiliser manufacturers. Guntur district is one of the most prosperous places as in AP, with extensive coverage of irrigation canals and hence water is never a constraint. Apart from Rice, farmers in this district are well known for cultivation of Tobacco and Cotton, apart from others such as Chillis. As in the case of Godavari districts, Guntur district is a prime fertiliser market in view of financial strength of farmers and also the pattern of cultivation.
Agriculture in Medak and Warangal is essentially dependent on rain and the entire stretch of these two districts have no irrigation infrastructure. Bore wells and other forms of lift irrigation is prevalent in this region for carrying out farming. Prakasam district and Kurnool also fall under similar category. The districts chosen for the current study vary in agronomic conditions and status of agriculture, the constraints and strengths are not homogenous and cropping pattern even as a matter of tradition is not similar. The samples from all these districts will certainly reflect a commonality in perception about core problems confronting agriculture and also its impact on consumption of fertilisers.

Random sampling within the geographical strata has been adopted in selection of farmers for survey. The basic objective of studying this category is to understand farmers perception about fertilisers, pricing and subsidy by the Government, infrastructural constraints, which can hamper the growth in demand for fertilisers, particularly in the light of disparities in income level, literacy and land holdings.

3. Capital Markets & Banks: The third constituent is capital markets in the first segment and Commercial Banks as the second segment. The survey in first segment covered the stock brokers, experts on capital market and general investors. In the second segment, Commercial Banks are covered. The survey is restricted to Hyderabad and Secunderabad, as it is felt that the operations of the capital markets as well as the Banks are since integrated with country wide operations, the responses would be representative of the national phenomena. This section covered a total of 70 respondents, 35 from each segment and focussed the perception of the lenders and investors about fertiliser industry and meeting its financial requirements.

Pre-designed questionnaires schedules containing stimuli on various aspects related to the subject under study, are sent by post or in person for obtaining the responses for various stimuli posed. Where-ever, the respondents have found it
difficult to attend, the same was collected through oral responses by meeting them personally.

1.f. TOOLS OF RESEARCH

The study focussed the techniques of financial analysis particularly ratios and capital budgeting techniques, and also contained the appropriate research tools such as Averages, dispersion, Correlation and Regression, time series analysis and parametric/nonparametric tests, for proper analysis and drawing meaningful inferences. Graphs and diagrams are used for reference of data and for drawing immediate attention and quick understanding of the classification of data.

1.g. LIMITATIONS OF STUDY

Phosphatic fertiliser industry in India has attained significant growth in the past four decades. Production facilities for these Phosphatic fertilisers are distributed in various parts of the country and each unit has shown distinct shortcomings both in terms of financial performance and wealth creation. Strong influence of regional factors on each fertiliser unit is observed and makes it difficult to portray a homogenous picture of the industry. However, in the current study, it is endeavoured to touch upon the broad philosophy of the fertiliser policy and some critical issues which could impact all the units in the phosphatic fertiliser industry, so that the issues are brought into focus.

The issues discussed in the current study are of national importance and of critical magnitude, but since this study is done on an individual basis, it would not be possible to go in depth of the causes affecting either the fertiliser industry or the agriculture in India. The threat to the indigenous Phosphatic fertiliser industry from within due to constraining factors and from outside in the form of competitive position of the international suppliers, needs a threadbare study requiring huge financial and infrastructural resources. The aggregate sample size considered for the current study is about 215. In the light of disparities in consumption of fertilisers among various
regions of the country and issues involved in the investment analysis of fertiliser industry are varied, the size of the sample and the scale of the study has to be bigger, but this, being an individual effort the study is carried out with a limited sample, however endeavour has been made to bring out the core issues in proper perspective.

1.h. FURTHER SCOPE FOR STUDY:

Investment analysis of fertiliser industry and the relevance of Government role either in the form of pricing policies or otherwise, should be studied in a bigger way. Government of India has in the past, instituted studies by various committees of the phosphatic fertiliser industry, but were restricted to the point of view of pricing and for laying down of subsidy mechanism. In the light of adverse performance by fertiliser manufacturing units and diverse nature of issues involved in the financial status of the industry, investment analysis cannot be restricted to study of performance of the units alone.

The study should also extensively cover the whole gamut of fertiliser policy, Indian agriculture and constraints, position of international fertiliser industry vis-à-vis the Indian industry, infrastructure constraints within the fertiliser industry. As the ultimate objective is to make the Indian fertiliser industry a financially viable entity, even if the Government dismantles the subsidy scheme, a study of factors operating at macro and micro level is highly desirable. Industry should be able to compete with overseas suppliers in terms of lower costs and supply fertilisers to farmers at affordable rates. Accomplishing this objective in prevailing environment, is difficult and more challenging.

The objective of the current study is to touch upon various financial and other areas of investment analysis and portray a broad and integrated scenario of the Phosphatic fertiliser industry as reflected by the past performance and based on the perception of people involved in this industry either directly or indirectly. The intention of the study is therefore to draw the attention of institutions and research bodies to take the study further in each of the aspects dealt in the current report and also on the other
critical aspects which are not covered in the present study, so that constraints at micro and macro level are eliminated or minimised and the strengths are exploited for attaining the ultimate objective of creating a vibrant domestic phosphatic fertiliser industry. Such a study would also enable the Government to understand and implement policies in right perspective for achieving maximum tangible benefits with minimum stress on the public finances.

1.i. REVIEW OF LITERATURE

Surveys relating to fertiliser industry in India and abroad, conducted by researchers involved in the fertiliser industry and also experts in other related areas, need to be reviewed to fathom the intensity of the subject and to understand the factors associated with the industry. This would also help in identifying the core areas of fertiliser operations, for carrying out a focussed study. The earlier studies to some extent highlighted the critical areas. But constraints do exist in this industry even today and the current study would factor in measures suggested in earlier studies and the extent of implementation and change achieved. The crux of such reviews are detailed below:

**National level reviews:**

1. Shri. U.S. Awasthi, Managing Director, Indian Farmers Fertiliser Co-operative Ltd., New Delhi in his article ‘CHALLENGES TO FERTILISER INDUSTRY’ published in Fertiliser Industry Annual Review, 1999 has stated that the production capacity has increased in the post 1950 period in the fertilizer industry, while the growth trend in growth of Phosphatic fertilizer has been less encouraging mainly due to non availability of raw materials in India, unlike nitrogen based fertilizers. The new capacity additions which have become functional and also are under implementation during the IX five year plan period are expected to yield an additional capacity of Phosphatic fertilizer equivalent to 14.5 lakh MTs of P2O5.
Fertilizer production is highly capital intensive and requires substantial investment. The growth in investment in fertilizer industry during the eighties was phenomenal, but in the post nineties, the growth tapered off mainly due to uncertain policy environment. During 1998-99, four fertilizer projects with a total investment of over Rs. 56 billions are being considered by the Government of India, mainly nitrogenous and no investment in Phosphatic fertilizer industry. The author felt that reduction in Capital cost of the fertilizer plant is challenge and changes in metallurgy of the equipments, improvement in catalysts and an effective project management may possibly lead to capital cost reductions. He felt that Duty on Equipment imports for fertilizer projects towards plant and machinery for revamp and modernization of existing units will lead to substantial increase in project cost and in turn, higher cost of production by way of increase in capital related charge.

The author feels import of fertilizers particularly DAP, has been a necessity in view of fertilizer consumption which is higher than the fertilizer production achieved in the country and constitutes around 19% of total consumption.

It is stated that the consumption of fertilizers in India is very low and not comparable to any of the developed countries. The ideal usage of NPK is in the ratio of 4:2:1, but after decontrol in 1992-93 the consumption ratio was deteriorated to 9.5 : 3.2 : 1 and still continues to be quite wide at 8.1 : 3 : 1 in 1998-99 as compared to 5.9 : 2.4 : 1 before decontrol of Phosphatic and Potassic fertilizer. The author has stated that the realization to the manufacturers is fixed by the Government in the form of Maximum Retail Price and subsidy, and the adversities experienced in fertilizer consumption, as it is stated, is mainly on account of changes in prices by the Government and a viable pricing policy is essential for achieving balanced fertilizer consumption ratio.

He has rightly stated that the increased fertilizer production has also necessitated development of infrastructure to facilitate smooth distribution of material.
modern plants producing between 2500 - 4000 MTs of fertilizer a day require at least one and ideally two railway rakes a day. The Government of India has opened participation from users by introducing "own your wagons' scheme. New investment in fertilizer plants will have to be made in high fertilizer consumption areas or in areas where there is scope for an increase in consumption, if all other factors are favourable to minimize the pressure on railways. The congestion at the ports often leads to berthing delays. Government of India has also to create additional facilities at the major ports in the country.

The other issue relates to storage, because of continuous production and seasonality of the demand, the role of warehousing became critical in fertilizer business. Warehousing allows continuous production at the plants and also strategic preposition of the fertilizer for ready availability. The industry uses the warehousing facility provided by Central and State warehousing corporation and also private agencies. They also act as handling agents for the railway rake and some times also as road transporters for secondary movements. By a rough estimate, there are more than 6600 warehouses having a total storage capacity of more than 32 million MTs. About 40% of the above space is available for storage of fertilizer products. Thus a net space of 12 million MTs is available for the fertilizers. It is estimated that a turnover of three times would necessitate a requirement of 15-16 million MTs of warehousing space by the end of the century for annual handling of 45 million MTs of fertilizer.

The author feels that the growth of fertilizer industry is constrained by uncertain Government policy and has stressed the need for considering industry's view, in policy formulations. Fertiliser consumption in terms of Kg / ha of gross cropped area is still very low and the efficiency of fertilizer used in India is also declining. The concept of balanced fertilizer application therefore has to consider adequate application of all the deficient nutrient elements through any available source. Infrastructure development for cost effective production, transportation and storage is a necessity for the growth of the fertilizer industry.
2. Shri. P. Basu, Managing Director and Madhukar H Majumdar, Additional General Manager (marketing), Gujarat State Fertilisers Co. Ltd. in their Article, 'Policy Support For The Phosphatic Fertiliser Industry In India', published by FAI annual review, presented an emotional perspective of Indian Phosphatic Fertiliser industry with an investment of about Rs. 4000 crores and which ranked fourth in the world and performed to near full capacity utilization till decontrol in 1992, and the issues adversely affecting the growth of the industry.

He stated that the decontrol and de-canalisation of Phosphatic Fertilisers in 1992, resulted in:

i. Increase of about 70-100% in farm gate prices of Phosphatic fertilizers.
ii. Witnessed fall in production from 9.86 million MTs in 1991-92 to 9.10 million MTs during 1993-94 and the capacity utilization also came down drastically.
iii. The consumption was hit badly and it declined.
iv. NPK consumption ratio which was 5.9:2.4:1 in 1991-92 vitiated in the post changed policy period to 9.8:3.01:1.
v. Steep increase in import of DAP and dumping of fertilizers by international suppliers.

He has unambiguously stated that the decontrol of Phosphatic fertilizers and the frequent changes in the pricing and subsidy, vagueness in policy and lack of proper communication with the industry has been traumatic for the growth and performance of the industry. He feels that the current Government policy would only lead to untimely death of the industry and feel there is an urgent necessity for policy propositions that can rejuvenate the industry's financial performance. The current policy environment does not help in augmenting further investments in this industry.

He feels that there is immediate need for policy changes and some of the alternatives could include:

i. Continuation of Ad-hoc subsidy
ii. Canalisation of DAP through DAP manufacturers.
iii. Imposing customs duty on imports of DAP and finished Phosphatic products.
iv. Providing capital subsidy to newly commissioned plants and reducing high incidence of prices of feed stocks, power, utilities and also lowering interest rates, taxes etc.

He has highlighted the role of the Government and it's policies since 1992, as the single factor which has derailed the prospects of this industry and his opinions spelt out in this article reflect the dependence of this industry even now, on the Government, for a conducive policy as an effective tool for future growth.

3. Shri S. P. Bharadwaj and Shri R.K. Pandey in their article “Growth of Fertiliser Industry in India” (Published in the book 'Industrialisation in India' by Dr. Rama Shankar Singh. Pages 426-437) stated the fertilizer industry in India occupies an important place in the economy owing to its size and value addition and also is essential in the context of development of agricultural sector. The nation has always been a net importer of fertilizers as the demand has been in excess of domestic production. India occupies a prominent place, ranks 4th after USSR, USA and China, among fertilizer producing countries of the World and has a share of about 7.1% of the global production of 126.7 million MTs and in consumption terms, it ranks 4th in the world.

It is observed that though the production of fertilizer in this country started in 1933 on a modest note in the private sector, the development in the post 1965 period, when the Government of India announced a fertiliser policy, was rapid. The policy also aimed at minimizing the imports by supplementing it with indigenously produced fertilizers and also to attract private sector investment. During this period the production of Phosphatic fertilizers increased form 1.19 lakh MTs to 2.28 lakh MTs. Fertiliser production progressively increased during the decades of 1970s and 1980s. If the combined growth of nitrogenous and phosphatic fertilizers is looked at, it registered a growth of 23.10% in early 1960s, 39.50% during Late 1960s, 18.30% during 1970s and 20.5% during 1980s. Both the government and private sector took initiative in investment for creations of additional capacity, but the trend is distinctly visible in the case of private sector
investments which are concentrated in the Phosphatic fertilizer segment and the public sector investment in the nitrogenous sector.

Inadequate fertilizer production has been one of the main reasons for import of fertilizers. The gap which was at around 1.49 lakh MTs in the first plan period, widened in the subsequent years to about 69.74 lakh MTs in the fifth plan period. The pattern of imports over the years indicate an increasing trend in the case of nitrogenous fertilizer, whereas, in the case of phosphatic fertilizer no definite pattern was observed. The author feels, in the context of strain on foreign exchange reserves, the ultimate option may be is to increase indigenous production of fertilisers.

The author observed that the investments in the fertilizer industry gained momentum in the late 1960s and the financial outlays has been Rs. 54.10 crores in the first five year plan and the same during Sixth five year plan period was enhanced to Rs. 1613.10 crores. The trend in past investment indicates that public sector units received major part of outlay as compared to the private sector, moreover the outlays in the co-operative sector increased since the fifth five year plan.

4. Shri. T S Bhinder, Executive Director, IFFCO & Technical consultant Hindusthan Dorr-Oliver, New Delhi in his article ‘Fertiliser Industry Growth in India – Challenges’ published in the ‘Fertiliser Industry Annual Review – 1999, referred to the low productivity of the land in this country is due to usage of inadequate fertilizers and lack of irrigational facilities, despite being second largest in the world in terms of arable land with 1625 lakh hectares. Investments in the fertiliser industry started pouring in after 1950 from both Public and Private sectors for creation of production capacities.

The selling prices of all fertilizes have been controlled by Government as a fundamental principle of Fertiliser policy, at a low and affordable level ever since
the mid 50's, only to increase the consumption of fertilizers for higher farm productivity. Until the end of 1960s, though the fertilizer demand was less, the realization from sale at controlled price was adequate to cover the reasonable cost of production and distribution. The stable and conducive environment attracted substantial investment both in public and private sectors, and this was the period when production and consumption went up by 2.89 times and 2.44 times respectively.

The author stressed that growth of domestic fertilizer industry is vital for meeting the increasing demand for major agro-nutrients and that the need for ensuring the viability and a fair return on investment was the prime concern and addressing this problem, the GOI introduced the Retention Price scheme in 1977, ensuring a fair return to the manufacturers. Because of the Retention price scheme, the installed capacity and production of Phosphatic fertilizers in P2O5 terms increased from 8.41 lakh MTs to 20.51 lakh MTs during 1980-81 and 1990-91, with an addition of 523 units of NPK/DAP and SSP producing units and the investment of Rs. 6865 crores in this sector during that period, was an all time high. The author inferred that for achieving growth in investment in fertilizer industry, the Government should ensure a fair return on investment to the manufacturers and also a viable fertilizer policy, which can attract substantial investment into the industry.

The major policy changes pertaining to Phosphatic Fertiliser industry, announced by the Government in 1992, adversely affected the retail pricing and consequently resulted in fall in demand. This paradox led to increase in production by 1% as against new capacity addition of 7.87%. The author feels that the installed capacity should be fully utilized and for the plants operating at high levels of efficiency should be able to generate reasonable level of profitability. Appropriate incentives should be provided for increase in efficiency and penalty for inefficient operations. Due care should be taken with regard to factors such as feed stock, plant size, vintage, location, technology which can lead to unavoidable inter plant differences
at reasonable cost of production and distribution while expecting high levels of efficiency from the operators.

The fertilizer policy should recognize the imperative of giving reasonable attractive return on investment, not only to attract fresh investment but also, to ensure that units already in operation stay in business. In the emerging era of liberalization, new and more attractive opportunities are unfolding, tempting existing producers to diversity into other areas, inducing potential Local and foreign investors away from fertilizers.

Since new investments in this sector would be un-viable at the recommended prices (based on HPC report) , the policy package does not meet the test of protecting the viability of majority of the existing units including the newly commissioned plants. Its implementation will have serious adverse effect on the health and growth of the industry and can lead to about 60% loss in production and correspondingly increasing dependence on imports. The net result will be a decline in fertilizer consumption and in turn the food grains.

5. Shri. B.C. Biswas, Soumitra Das and S.H.K Sharma of Fertiliser Association of India, in their article “Fertiliser Use in Non-traditional Sector for Food Security and Balanced Diet” (Published by FAI in it’s Fertiliser news, December 1999, Vol. 44(12), pp. 107-121) observed that the 50% of the gain in food grains productivity is due to fertiliser use and hence fertilisers are the key input in achieving food production goals. They observed that Indian Agriculture is predominantly rain depended with 63% of gross cropped are of 188 million hectares constituting the rain fed area. Fertiliser use in rain fed crops is very low compared to irrigated crops and also considerably less than the crop requirement. Bulk of fertiliser nutrients consumed in the country, are applied to irrigated crops and high value crops in rain fed areas. On unit area basis, fertiliser usage in rain fed crops is less than a third or fourth of the usage on the irrigated lands under same crops.
The authors observed that uncertainty in water availability coupled with insufficient nutrient availability has severely affected the productivity of rain-fed crops, which is 2-3 times less than that of the irrigated crops. It is also stated that inadequate rain water storage structures and poor water management practices at the farm/watershed level are the major constraints for the expansion of fertiliser use. Since fertiliser is a costly input and most of the farmers are poor, inadequate financial resources constrain the usage of fertilisers.

6. Shri. H Chandra Sekhar in his article 'Dry land Agriculture - Problems and Prospects' stated that the land use in general and agricultural production in particular under dry land conditions, mainly depends on quantum of rainfall received and it's distribution. The Arid and Semi-arid zones are characterised by low and also highly erratic rainfall. Though efforts were made for development of rain fed areas since 1930, the focus on this issue was intense during the IV and V plan periods. The Government of India implemented watershed programmes particularly during 1980s and afterwards implemented watershed projects of the size 25 to 30 thousand hectares each in some states and envisaged to cover more than three million hectares during the VIII plan period. The availability of water at the right time either through irrigation projects or thorough rains is imperative for agriculture. The inability of expanding irrigation to non irrigated areas, and vagaries in the onset of monsoon in the recent years has been impinging the economics of the cultivators in this country.

7. Shri. T Haque in his book 'Sustainability of Small Holders Agriculture in India' (book based on author's research work) stated that small and marginal holdings in India account for 78% of the total operational holdings, operating 32% of the total area and he observed that this segment would continue to grow. He quoted that Dantawala(1992) has rightly pointed out, the most difficult problem confronting Indian agriculture is to evolve policies and operational system to make small farm economy efficient so that it may provide a decent income to those who depend on it for lively hood, but also meet the national requirement of food and raw material.
He quotes that the studies in this regard of Shri Acharya and Verma (1990) from various regions that although our marginal and small farmers are efficient as the large farmers, they do not generate sufficient income to sustain. This is particularly more, in the case of marginal farmers in dry and backward regions.

Shri Haque says the size of operational holding has no relevance as the experience of countries like Japan and Korea has proved that if proper technology is adopted, the size of the holding is not a constraint. He also referred that the studies of Shri. Parthasarathy (1987) and Shri CHH Rao (1975) show that, when the new technology are introduced, large farmers invest more in modern inputs per unit of area and the productivity shows no significant relationship to farm size, despite higher irrigation and cropping intensities on small farms. Since small farmers have relatively less access to modern inputs such as HYV seeds and Fertilisers, and hence small and marginal farmers are slow to adoption of new technology.

The research findings of Shri T Haque are as follows:

i. Cropping pattern:

There are large scale inter state variations in cropping pattern, yields and factor productivity of crops in India. It is observed that though changes in cropping pattern in favour of high value cash crops should form an essential strategy of small farm development, the relatively higher yield of cereal crops like Rice and Wheat in Punjab suggests, if there is access to technology, infrastructure and institutional credit facilities, even cereals have high potential. Small farmers prefer to grow cereals and pulses.

ii. Profitability of Crop Enterprise:

By and large, based on the analysis of data on cost of cultivation, there has been declining trend in the net profitability of various crops over the years. This is primarily due to rising prices of farm inputs like labour and fertilisers. The gross and net returns from Rice in AP, Assam, Bihar, MP, Orissa, UP and West Bengal
were comparatively lower than that of non traditional rice growing states of Punjab and Haryana, besides there was lot of instability in rate of return.

The farm level survey revealed, in Andhra Pradesh due to low size of holding, annual net return per marginal and small farm were comparatively low in both developed and under developed villages of the state. In Bihar small and medium holdings had relatively higher returns than marginal farmers. The survey concluded that without adequate access to land, technology and institutional facilities of credit and market, crop based small and marginal farmers would be forced to live below the subsistence levels.

iii. Variation in Cost of cultivation:

Labour cost has found to high and the increase is attributed to hike in wages of farm labourers. The other costs particularly fertilisers have varied marginally due to price changes.

8. M/s ICRA Ltd., a premium credit rating agency in India, in its study paper on Fertiliser industry observed, that, material costs constituted a major portion of the cost structure of the industry which in 1995 was 47% and then escalated to 53% in 2001. Similarly Power and fuels costs had gone up from 13% to about 16%, depreciation and interest formed around 10%. During the same period, the average operating margins of the industry declined from 21.4% in 1995 to 11.9% in 2001, with a median of 11.8%. The average net profit margins declined from 12.7% in 1995 to 3.3% in 2001, with a median of 3.4%. Profit margins of phosphatic fertiliser particularly that of DAP, was affected by variable cost intensity and that of nitrogenous fertiliser by capital cost intensity. The impact on the profit margins has been across categories ie., Private, Public & Cooperative sectors.

The Return on Capital employed (ROCE) also declined from an average of 20.1% in 1995 to about 9.5% with the median of 8.9% in 2001. The fall in net operating
margins and fixed capital investments on a continuing basis by the industry because of capital intensity, had affected the ROCE. In the case of private sector, the Capital work in progress as a ratio of Net fixed assets has been 30.2% in 1995 and in 2001 it was 37.5%, though in between it went down to about 2.8% in 1996 and 14% in 1998. The industry recorded an average CWIP to NFA ratio of 12.4% in 2001 as against 21.2% in 1995. Investment in fixed capital has also affected the ROCE. Fixed capital investment will put pressure on the internal resources of the units. As regards the stability in ROCE, it is observed by ICRA, that the fertiliser companies which have diversified into other business, show certain stability vis-à-vis non-diversified fertiliser companies.

The Return on Net-worth (RONW), also declined on the lines of ROCE, from 17.7% in 1995 to 5.3% in 2001, with an industry median of 5.1%. In the case of private sector core fertiliser companies RONW came down from 19.4% to 4.9% by 2001, whereas, in the case diversified private sector companies, it came down from 20.6% to 6.7% indicating that these companies have earned higher income in non-fertiliser business ventures. Despite the Government guaranteeing a return of post tax 12% on net-worth, paradoxically the industry's RONW does not reflect the objectives of the schemes being implemented by the Government.

In view of capital intense nature, the fertiliser projects involve huge fixed capital investment and since the fixed costs account for about 24% of total costs, large production capacity is a necessity for optimising fixed costs. In the case of phosphatic fertilisers, DAP, the project cost for manufacturing facility with captive phosphoric Acid production is substantially higher than for a down stream plant alone. Given the high project cost, financing becomes crucial in determining the profitability of the project.
High financial leverage could impact the project cost with high interest capitalization and also the profitability in initial years due to high financing cost. The location of the plant and availability of power and fuels, also determines the project cost as company has to make provision for captive power units and transportation infrastructure, involving higher capital cost.

It is stated that the industry is working capital intensive in nature, and the two main reasons for this is the (I) Seasonal nature of the fertiliser consumption make for a long inventory holding period and (ii.) peculiarities in administration of concession scheme. It is observed by ICRA, that the inventories and debtors in this industry in 2001, comprised of 27.8% of the asset base. The ratio of Networking capital to Operating income of the fertiliser industry in 1995 was 29.9% and the same in 2001 was 32.4% indicating a marginal increase in retention of profits. As regards the inventory, the conversion time has been 83 days cost of sale in 2001 as against 108 days in 1995, indicating some improvement. The debtors including subsidy receivables from the Government, is high in excess of two months indicating higher credit on fertiliser sales. The conversion time of debtors in 1995 for the industry was at 74 days and in 2001 the same was 73 days, indicating no improvement in the position and delay in receipt of subsidy from the Government is one case for this.

The capital structure of the industry is stated to be moderately leveraged. The equity capital which was around 17% of the total liabilities in 1995, came down to 10% in 2001, with Reserves at 34% in 2001. The debt component increased from 34% in 1995 to 40% in 2001, which shows that the industry has sourced more debt finance in the subsequent years for funding investment. ICRA feels that the gearing in the capital structure of the industry has stabilized now. As against the growth in Net Fixed Assets (NFA) of about 9.6% CAGR between the years 1995 and 2001, the growth in debt was at 12.4% CAGR during the same period. With in the industry the average gearing of the public sector in 2001 was lower at 0.48 as against the average of 1.25 for the private sector. This could be on account of lack of investment in the public sector in the recent years, whereas, in the private
sector companies have either invested in the grass root plants or expanded the production capacities.

9. Shri U.S. Jha, Chairman and Managing Director, Madras Fertilisers Limited, Chennai in his article "Future Outlook of Fertiliser Marketing in India" (presented in the Seminar by FAI on 'Fertiliser And Agriculture' in December 2001, pages SIV 2/1 to SIV 2/7) stated that the fertilizer industry grew in a conducive policy environment created by the Government, particularly under the Retention price scheme implemented by the Government. The author feels, in the context of decontrol of Phosphatic fertilizers, the challenges of liberalized regime, also under the WTO will make the future marketing environment in fertilizer sector highly competitive.

It is stated that the adhocism in fertiliser policy, resulted in fall in consumption of phosphatic fertilizers by 12.2% in 2000-01 and the fertiliser industry now is in a price war among the units, leading to erosion of bottom line. The author felt that outlook for fertiliser marketing in India should factor 1. Demand -supply equation within the country and outside 2. Prevalent policy dispensation.

In his opinion, though the demand estimates for the 10th plan period is not finalized, it is expected that there would not be wide gap in supply and demand and the international demand supply position also correlates with this perception. He feels that the easy access to world fertiliser surplus due to WTO would keep the supply equilibrium with the demand in India.

The logistical needs of fertilisers in the context of widely dispersed consumption, is met by Railways and in 1999-2000, 79% of total fertiliser was moved by Railways. In the context of skewed consumption pattern with distinct peak demand in each season, warehousing near railheads and rural places need in large numbers. This is met by CWC and SWC apart from private storage points. For speedy distribution, Cooperative societies and Private dealers are extensively used and there are about 2.07 lakh private fertiliser dealers and 0.73 lakh co-
operative societies in the country catering to the needs of 105 million farmers in about 6 lakh villages.

The author rightly observed that in this competitive environment, fertiliser industry should endeavour to cut cost of production, transportation and marketing costs. Synergies do exist in consolidation through mergers and acquisitions for economies of scale. But in view of emerging scenario, in which fertiliser is shedding its commodity character and assuming the brand feature, there would be intense competition among fertiliser companies. It is therefore necessary to review fertiliser marketing in the following perspective:

1. **Focus on customer relation:** It is necessary to gain customer loyalty and companies have to invest in imparting education to farmers on fertiliser use and agriculture, Soil testing, water management and help him in optimising the cost of nutrients. This involves significant investment.

2. **Logistics:** Rail wagons for movement to far off places and loading/unloading equipment is a necessity. Since transportation cost constitutes about 60% of marketing costs which have to be minimized, the companies may have to develop captive logistic arrangements such as own wagons/trucks, requiring investment. Since warehousing needs are growing, and the space available with CWC, SWC and Private enterprises is limited, companies may have to develop own warehousing infrastructure.

3. **Credit Risk:** Since fertiliser is a buyers market now, 70% of the fertiliser sale is on credit and year after year it is going up. Since this is highly risky proposition, proper credit rating of dealers should be done. This is putting considerable pressure on working capital of the fertiliser companies.

4. **Collaborative Marketing:** In this competitive environment, fertiliser companies as in the case of sectors like Steel and Cement should have a collective approach to production and marketing of fertilisers. This should cover Price discipline, Information on dealers profile, credit risk management, product exchange and fertiliser imports.
He concludes, that to survive and grow, Companies will have to cut costs, and change fertiliser marketing with focus on farmer’s needs in the changing economic environment. This will necessitate a paradigm shift in all facets of fertiliser marketing.

10. Shri. S. Lakshminarayana, Agro-input Marketing Strategist, in his article “Fertiliser Industry - Strategic Planning” (Published in Fertiliser news, FAI seminary, December 2001) felt that apart from the HYV seeds and irrigation and rural credit, Fertiliser has played a dominant role in the growth of agricultural production. The industry played a pivotal role in increasing fertilizer consumption base by supplying indigenous fertilisers through an enlarged distribution network.

The author feels that the industry at present is passing through trying times on many fronts particularly profit margins, and is aptly reflected by the Fertiliser share price index and lack of investor confidence. He singled out the policy ambiguity as the main cause for the current state of affairs. He felt that the challenge before the industry calls for strategic planning to:

a. Improve profitability and ensure growth.

b. Increase demand to match improved domestic availability and imports

c. Overcome threat from international suppliers.

It is stated that the growth in demand for fertilizers has slowed down between 1998-99 and 2000-2001. With the literacy levels increasing and retailers pushing different brands at different times depending on competitive terms, the brands are becoming generic. He observed that the fertilizer distribution channels have not expanded in real terms and since all Companies tap the same market source, there is higher credit risk and pressure on competitive terms.
On the pricing front, there is war among companies and despite offering competitive terms, the fertilizer consumption has in fact registered a decline in 2000-01. Escalation in marketing overheads, Transportation and handling charges, Ware housing charges are pushing the marketing costs to un-manageable levels. Credit exposure to dealers/retailers has become highly risky proposition. The author has therefore felt that it is time now, to review the strengths and weaknesses of the industry for improving the financial performance in the current context.

In his opinion the industry’s strengths are mainly: 1. It is an essential commodity 2. Politically sensitive 3. Government understands the necessity of domestic industry 4. Production efficiency among best in the world 5. Largest pool of technical man power. Industry’s weaknesses are 1. Escalating costs and inadequate sales realization 2. Un-healthy competition within the industry 3. unable to adapt to change in economic, political and policy environment. The author hence feels that the industry should explore strategic options aiming at Market penetration, Market development activity to expand consumption base, improvement in productivity, Diversification, manpower development and training and product variations and packaging. In the context of sweeping changes in global economic environment and changing priorities of the Government, the industry should redefine it’s approaches to fertilizer production and marketing.

11. Dr. K N Prasad in his work on 'Land Utilisation in India' (Four decades of Indian Agriculture), observed that over the years as the urbanisation progressed, non-agricultural uses of land has increased. He stated that the irrigation projects set up by the Government have helped in turning un-cultivated pastures and grazing lands into crop lands. Despite this, the net area sown has increased by only 4%. Due to limited availability of land, the net area sown increased by 5% during 1950s and 1960s and between 1970-1980, it almost remained static. Net area sown could increase if all lands not fit for cultivation were reclaimed and those lands not cultivated at present are cultivated. The area used for multiple cropping (more
than once) is indeed small on account of deficiency of moisture and insufficient application of fertilisers.

The gross cultivated area increased between 1950-51 to 1984-85 from 46.45% to 57.8% of the total reported area. This increase is due to increase in net area sown and also area sown more than once, which is why intensive cultivation is more important than extensive cultivation. The increase in gross cropped area between 1950-51 to 1970-71 was higher at 8% and thereafter at around 3.2%. In respect of cultivated area, the increase was 1.7% during 1951-52 to 1964-65 and then dropped sharply to 0.6% during 1965-66 to 1980-81. The increase in cultivated land was the result of increase in irrigation facility, reduction of fallow lands, and adoption of improved methods of cultivation. Technically this is horizontal growth of agriculture under which the cultivated land is extended, as contrasted with vertical growth, under which the productivity of land is increased. He observed that, the area suitable for agriculture has already been brought under cultivation and the scope for extending the cultivated area has become remote. The possibility of bringing fresh land under cultivation is very limited partially because the area of cultivable waste land is very limited.

12. Mr. Shashanka Bhide, Associate Director, National Council of Applied Economic Research, in his Paper “Financing Growth of Fertiliser Industry: Some selected issues” observed that two way strategy of increasing the usage and also the production of fertilizers has been successfully followed, by the Government which has helped in growth of fertilizer industry, particularly with the use of improved seeds and spread of irrigational facilities. To sustain the increased use of Fertilisers, domestic production also would have to increase and hence the production capacity. It is known that the cost of creating additional production capacity has gone up substantially over the years, 4 times more (approx.) than in the 1960s. The author rightly pointed out that increased capital costs have implications not only to problems related to raising of capital for the industry but
also to the cost of production. The cost of production and expected return on investment (ROI) have relevance to raising of capital in the capital markets.

The Fertiliser industry comprising of public, joint, private and co-operative sectors has financed its capital requirements from all the major sources viz., Government budget for public sector investment, domestic capital markets, internal resources of the Companies and international credit, NRI equity participation and borrowing. In view of pressure on availability of funds, the fertilizer industry has to optimise the capital outlay and as the fertilizer industry is capital intensive in nature requiring huge fixed capital investment and also the funds are scarce, optimising outlay is a necessity. The factors which determine the quantum of capital cost and the investment are generally the location of the plant, choice of the technology, price of capital goods, timely implementation of the project, cost of capital and various duties and taxes levied by the government. The performance of the fertilizer industry reflected in the cost of producing fertilizers, determines the attractiveness of the industry for investors.

To study the impact of increase in infrastructure price on select macro variables and fertilizer subsidy and also the impact of withdrawing the subsidy on select macro variables, the author used macro economic model developed at NCAER. Some of the findings indicate that in all the non-agricultural sectors, the output is demand determined, whereas in the food - agricultural sectors output is defined as a function of relative price of fertilizer. The summary of the findings of this study by the author are:

1. Reduction in fertilizer subsidies through raising of farm level fertiliser prices would have negative impact on agriculture output, agricultural income and GDP, unless off-set adequately through non-price or output price policies.

2. Fertiliser subsidies are sensitive to administered infrastructure price changes and hence, the increase in subsidies is largely on account of infra-structural price increases and also on account of increased levels of fertiliser consumption.
3. Continuation of fertilizer price policy ensures fair return to investment and would still have relevance in order to attract capital into this sector. The author has rightly observed that the order of capital requirements for additions to production capacity is quite large and therefore his suggestions in the context of his study of fertiliser industry are mainly:

1. Optimisation of capital cost.
2. Investment in fertilizer industry should be attractive in the capital market.
3. Optimal location of plant, technology, duties and taxes.
4. Continuation of fertilizer pricing policy by the Government for protecting the farm output and ensure fair return on investment.

13. Shri M L Sharma in his book “FERTILISER INDUSTRY IN INDIA” carried out an exhaustive study of the fertilizer industry. His observations were:

a. Term wise classification of financial resources reveal that 82% of the total assets of the industry have been financed by long term financial resource comprising of net-worth and long term borrowed funds. Purely manufacturing concerns have higher long-term borrowed funds, than the concerns simultaneously engaged in trading activities.

b. Debt servicing capacity revealed by the interest cover is not satisfactory as the interest cover has been of 2.57 times only and it deviates from the traditional norm of 5 to 7 times. Repayment capacity’s long term borrowed funds is within a period of 5 to 6 years.

c. As regards fixed assets, the industry has been employing more than half of its funds in fixed assets.

d. The position of negative working capital has also been observed in cases where losses have been recorded or the gestation period was not over. Small concerns in the private sectors have failed to maintain sufficient working capital due to their limited financial resources.
e. The ratio of long term debt to working capital in the industry is higher than the desired level.

f. The profitability in the fertilizer industry has been very low at an average of 2.64%, mainly on account of the selling price which is controlled by the government.

g. A comparative study of thirteen companies, in eight industries of the country, is summarized below:

i. Average collection period of debtors is 1.2 months in fertilizer industry as compared to the highest of 1.7 months in other basic industrial chemicals and the lowest of 0.20 months in the sugar industry.

ii. Current ratio is the highest in fertilizer industry which is 167.1% as compared to the lowest of 97.80% in the Jute textiles industry.

iii. Sundry creditors to current assets is the second lowest in fertilizer industry after other basic industrial chemicals. It is 20.9% as compared to the highest of 48.8% in jute textiles and the lowest of 20.6% in other basic industrial chemicals.

iv. Sundry creditors to net working capital and total outside liabilities to net worth in fertilizer industry is lowest. They are 44.3% and 95% respectively in this industry as compared to the highest of 219.3% and 314.7% respectively in Jute textiles.

v. Debt to net worth in fertilizer industry is 20.2% as compared to the highest of 53.6% in cotton textiles and the lowest of 14% in Jute textiles.

vi. Fixed assets turnover is 284.8% in fertilizer industry as compared to the highest of 1319.5% in vegetable oils and the lowest of 189.7% in paper industry.

vii. Current assets turnover is 186.7% in fertilizer industry as compared to highest of 576.3% in vegetable oils and the lowest of 1545 in sugar industry.

viii. Total net assets turnover in fertilizer industry is 128.35 as compared to the highest of 379.35 in vegetable oils and the lowest of 87.9% in Paper industry.
ix. Operating profit before interest to total net assets in fertilizer industry is 10.6% as compared to the highest of 15.3% in other basic industrial chemicals and the lowest of 7.5% in Sugar.

x. Operating profit before interest to net sales in fertilizer industry is 13.5% as compared to the highest of 15.45 in other basic industrial chemicals and the lowest of 2.8% in vegetable oils.

xi. Cash flow to net sales in fertilizer industry is 5.5% as compared to the highest of 9% in Paper industry and the lowest of 1.5% in Vegetable Oils.

xii. For internal funds to total funds no information is available in fertilizer industry. The ratio is highest of 88% in Paper industry and the lowest of 33.8% in Sugar Industry.

14. Shri. Srinivasa Gowda and Susheela Subrahmanya in their book 'Studies in Agricultural Development', stated that the Agriculture in India is besieged with problems such as illiterate and unskilled labour, lack of irrigation, transport and communication facilities, are the major factors. Modern inputs, irrigation HYV seeds and fertilisers are the crucial factors for increase in agricultural production. They observed that the fertiliser consumption in developing countries was much less as compared to developed countries. The authors quoted Sreekant Subramani (Rapporteur's Report, 1982, pages 285) that the main reason for low consumption of fertiliser in India, is on account higher prices, hence the farmer cannot buy. The author says that fertiliser prices in India was a major cause for low consumption of fertiliser and hence the low production in agriculture.

15. Tariff Commission, Government of India in it's 'Report on Cost Price Study of Di-Ammonium Phosphate And Muriate of Potash' submitted to the Government of India in February, 2003, observed as follows about the financial performance of '9' DAP producing companies in India, consequent to the study carried out based on two financial years 1999-2000 and 2000-01;
## Performance Indicators;

### Rs. in crores

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<td>i. Avg.Cap. Employed</td>
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<td>ii. Sales</td>
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<td>PAT as % of NW</td>
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<td>Avg.Cap. Employed</td>
<td>231</td>
<td>218</td>
<td>457</td>
<td>396</td>
<td>2127</td>
<td>2237</td>
<td>810</td>
<td>636</td>
</tr>
<tr>
<td>Avg. Net worth (NW)</td>
<td>112</td>
<td>146</td>
<td>339</td>
<td>387</td>
<td>325</td>
<td>260</td>
<td>272</td>
<td>219</td>
</tr>
<tr>
<td>PBIT as % of;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Avg.Cap. Employed</td>
<td>15</td>
<td>19</td>
<td>18</td>
<td>Loss</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>ii. Sales</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>loss</td>
<td>8</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>PAT as % of NW</td>
<td>31</td>
<td>25</td>
<td>7</td>
<td>Loss</td>
<td>9</td>
<td>6</td>
<td>loss</td>
<td>11</td>
</tr>
</tbody>
</table>
The commission noted that:

a. The profitability of all units with an exception of MCFL has deteriorated during 2000-01 over the levels achieved in the year 1999-2000.

b. Share of DAP sale in total activity has declined in all the Companies except IFFCO, where it has doubled mainly on account of expansion of capacity.

c. Major DAP producers like GFCL and PPL have reported losses in 2000-01.

d. In the case of MCFL, reported profit is due to change in management and major financial restructuring undertaken in the previous year.

15. Shri. Vasant Desai in his book "Indian Industry - Profile and Related Issues" dealt about the Fertiliser Industry at length and observed that efforts have been made to promote the consumption of chemical fertilizers during the five year plans and the real momentum in consumption came in late 1960s with the introduction of dwarf and high yielding varieties of wheat and rice. In his observation the consumption of fertilizers has steadily increased in the Kharif season and by 1984-85, the share of Kharif season in total consumption of fertilizers has been more than that in the Rabi season. He felt that in view of mismatch in the fertilizer demand and supply of indigenous fertilizers, import of fertilizers is inevitable, however the quantum may vary depending on the growth in indigenous production.
In his view, there is urgent necessity to correct the extremely skewed distribution of the fertilizer consumption in the country, as can be observed from the historical pattern that Uttar Pradesh, Punjab, Andhra Pradesh and Maharastra account for over 55% of the total consumption. The second issue relates to promote efficiency in use of fertilizers for realizing optimum benefit from each application. The author's findings in this regard are that the Government of India has used fertilizer pricing and support prices for agricultural produce as an instrument for promotion of usage, but, the consumption has not registered an even growth throughout the country. A study by NCAER indicates that the levels of fertilizer consumption are very low in the central and eastern regions of the country and that the small farms dominate in the areas with low fertilizer use. He observed that about two thirds of the total consumption of fertilizers is on Rabi crops, which cover only one third of the total cropped area in the country.

The Production of fertilizers significantly increased during the plan period with investments for capacity additions coming in from Private, Public and Cooperative sectors and in terms of capacity, the Public sector's share was 49.7%, 32.9% by the private and 17.4% in the Cooperative sectors. The significant feature has been growing importance of private sector and their multi-national collaborations and countries which figured prominently are USA, UK, Japan and Germany. The author observed that the capacity utilization also has improved in fertilizer units, particularly in the case of Phosphatic fertilizers, it improved from 34.5% in the year 1975-76 to 70.5% in the year 1983-84 as against 65.8 % in the case of nitrogenous fertilizer units. One of the factors which caused problems in capacity utilization has been the ageing factor, the vintage plants needed investment for replacement.

An analysis of solvency ratios such as Acid test ratio and Current ratio of the industry in comparison to other major industries indicate that, the fertilizer
industry had a Acid test ratio of 0.76 to 0.94 as against 0.53 in case automobile industry, 0.42 to 0.48 for Cotton textiles, 0.21 to 0.22 for Cement, 0.61 to 0.66 for electrical goods, 0.58 to 0.62 for chemicals and 0.33 to 0.36 in the case of Paper and Paper products. It has been observed that in 1982-83 among 16 industries, the top five industries in terms of Acid test ratio were Chemical Fertilisers, Electrical goods, Tyres and Tubes, Other chemicals and Aluminium, while in 1983-84 the top five were Chemical Fertilisers, Electrical goods, Other chemicals, Tyres and Tubes and Engineering and others. This indicated that fertilizer industry carried sizeable liquid assets and hence the solvency of the industry was healthy.

As regards the current ratio, of the 100 giant companies for 1982-83 and 1983-84, the ratio was in the range of 2 to 1. The current ratio improved between 1982-83 and 1983-84 in case of automobiles from 1.6 to 1.7, 1.5 to 1.6 for Cotton textiles, for Cement from 1.1 to 1.2, Chemical fertilizers 2 to 2.1, Electrical goods from 1.5 to 1.6, Man made fibres from 1.1 to 1.5 and in the case of Pharmaceuticals from 1.5 to 1.6. In the case of Paper products, tea plantation, aluminium and engineering, the ratios have been relatively static. Fertiliser industry has ranked among the top companies with healthy current ratio. The solvency ratios ie., Current ratio as also the acid test ratio observed among Indian Industries, indicates the healthy state of fertilizers industry in terms of ability to meet short term obligations in time.

16. Shri. Vasant P. Gandhi of Indian Institute of Management, Ahmedabad, in has paper on India’s Fertiliser Industry and Agriculture under WTO Free Trade Regime" (Paper in FAI Seminar in 1999, published by FAI in 1999) dealt about the necessity of protection under the free trade regime. His observation was that, the fertiliser consumption increased by about 3 times between 1980-81 and 1997-98, particularly after 1995. The GATT/WTO was signed in April 1994 and there was a positive growth in fertiliser consumption in the post treaty period.
Under the WTO, the Aggregate measure of Support (AMS) has been fixed at 10% for Indian agriculture and after this the pressure to bring down subsidies got diluted. In fact the AMS to agriculture in India under non-product specific category has been far less than 10%. The author feels that in view of the regulated environment in the country, the rivalry amongst the existing firms has been kept at minimum and in case there is change into free regime, the rivalry may increase pushing down the profits of some units. The WTO obligations may not necessitate a change in subsidisation scheme of various agricultural inputs, but the budgetary pressures of the government may necessitate liberalization and reduction in subsidies.

In case of free imports there should be protection from dumping and all along India has opted for domestic production to fertiliser imports. The threat of new entrants particularly foreign firms in the form of supplies to Indian market is more in case of open markets as mandated by WTO. For this, it is very important that efficiency rises in the Indian fertiliser industry to prove competitiveness.

17. Shri. Vijay Bharani, Analyst and Anuj A Sheth, Member Mumbai Stock Exchange, in their article 'Phosphatic Fertiliser Manufacturers- The Fertile Ones' in the publication of the Equity research group, Mumbai, dealt about the investment opportunities in the Phosphatic fertilizer industry. The authors have aptly articulated the argument that the policies pursued by the Government in respect of the fertilizer industry particularly the Phosphatic fertilizers, has been a biased one as regards the pricing which is very critical. After the decontrol of Phosphatic fertilizers in 1992, the Government has failed to achieve equilibrium in fertilizer pricing particularly the nitrogenous fertilizer Urea, the price of which has been kept at same levels, due to which the consumption ratio of Nutrients has deteriorated to 8.5:2.5:1 as against the desired ratio of 4:2:1 i.e., unduly tilted towards nitrogen and has led to crop yield.
The author observed that the Government’s fiscal compulsions have its influence on the policy framework and the authors feel that, though the Government enhanced the subsidy on Phosphatic fertilizers, it may not help the Phosphatic Fertiliser industry as the consumption bias would continue. It is emphatically stated by the authors that Government should enhance the price of Urea for better price parity and then there would be improvement in consumption of nutrients. Their argument has more validity in view of the observations of the Working group on Fertiliser policy, constituted by the Government, which has stated the anomaly in the pricing of Phosphatic and Nitrogenous fertilizers as one of the reasons for imbalance in usage of nutrients.

With regard to investment opportunities in Phosphatic Fertiliser industry, the authors felt that presently the industry is passing through trying times, particularly after decontrol in 1992, and as the Government rectifies the price anomaly by increasing the price of Urea, the Phosphatic fertilizer industry would pick up not only in terms of demand but also in terms of better realization and profits. They have therefore felt that the best time to buy a commodity stock is when the industry is at the bottom of the cycle and looking up for a turnaround, and hence it is also the case with Phosphatic fertilizer industry.

International Reviews:

1. Mr. Manfred Jeebe, Team Leader, ESCAP/FAO/UNIDO Fertiliser Advisory Development and Information Network for Asia and the Pacific (FADINAP), United Nations Building, Bangkok, Thailand, in his Technical Paper “Fertiliser Subsidy And Price Policy In Asia: Objectives And Achievements” observed that during the last few decades Asia has achieved considerable progress in attaining self-sufficiency in food production. The Per capita cereal production in Bangladesh, Pakistan and India has been steady between 190-250 kg per person, where as China achieved a strong growth between 1960 -1985 of almost 350 Kg.
Per person, so also in the case of Indonesia and Vietnam with a production of about 300 kg. Per person. The highest production of cereals has been achieved by Thailand at more than 400 kg. Per person. One of the critical factors which contributed to this growth is improvement in fertilizer consumption in these countries over the years.

The author states that the situation of the fertilizer markets in developing Asia during the last few decades was mainly determined by the strong increase in demand, so also with the production. He observes the role of the respective Governments as an effective instrument for growth in food production and also fertilizer production, through special support policies as pursued by most of the Governments in Asian Countries for promotion of fertilizer use, though with different emphasis depending on the priorities in various countries.

He feels that the Government support could be as a part of; Industrial Policy which is mainly targeted at

i. The development of a healthy fertilizer industry in support of creating an industrial basis with a good return on investment.
ii. Providing jobs for growing labour force.
iii. Import substitutions.
iv. Utilization of natural resources.

An Agricultural policy seeking to achieve:

i. Increased agricultural production and a high degree in self sufficiency in food production.
ii. High farm income (poverty alleviation and reasonable land town movement)
iii. The supply of low priced food for the urban population.

A subsidy policy by the Government is normally related to fertilizer price policy, where in the Government would fix the retail or the farm gate price. In principle, subsidies bridge the difference between the production cost or, in countries without domestic fertilizer production, the import price and the low government fixed retail price of fertilizers. In this way an artificially low fertilizer retail price to
farmers can be maintained with positive effect on farm income and at the same
time lower prices for farm products. There are various arguments for subsidizing
the fertilizer as an agri-input perhaps to compensate for the escalation in output
price and for promoting use of advanced agricultural techniques.

The author seeks strong case for intervention of the Government in pricing policy,
by extending subsidies even in the future, as it has been observed that with drawal
of subsidy had affected the fertilizer consumption, which is vital for maintaining
high agricultural production, for food security. In the case of Sri Lanka, where
subsidies were withdrawn in 1990, fertilizer consumption declined by 15%. Rice
production which had shown considerable upward trend until 1990, fell by about
6% and recovered only very slowly during the following years.

The study infers that withdrawal of subsidies will have a serious impact on
domestic fertilizer industry and the extent of negative impact will depend on the
support to the industry before abolishing subsidies. Smaller companies with
higher production costs will face difficulty in surviving since capacity utilization
will decrease. How far the higher fertilizer prices can compensate for the losses
depends on the market conditions of each country. In summarizing the effects of
abolishing fertilizer subsidies, it can be said that the effects will be easier, if the
markets for agricultural products are un-controlled since, increase in product
prices can compensate partially for the fertilizer price hike. The author concludes
that through subsidy policy only Governments in many countries of the Asian
region initiated the use of fertilizers and the intensification of agricultural
production successfully, though of late due to fiscal, economic and environmental
concerns, many countries are in the process of reviewing the subsidy which is
essentially a pricing policy.

2. Mr. K. Isherwood, of International Fertiliser Association (IFA), Paris, in his
technical paper "Fertiliser Subsidy Policies in Regions Other Than Asia And The
Pacific" reiterated the role of the Governments in African and Countries other
than those in Asia, in promotion of Fertilizer consumption thorough a subsidy
policy. Growth in indigenous Fertilizer production and also Consumption are looked into from the perspective of agricultural development and food security and the subsidies on fertilizer were in explicit form such as exemption of taxes and subsidizing the feed stock, and the implicit subsidies overhauling exchange rates so that the imported fertilizers are cheaper as done by some of the Sub-Saharan African countries.

Three universally applicable stages of Fertiliser usage has been identified viz.,
1. Creating awareness among farmers about necessity of fertilizer use at which time, there is necessity of supplying heavily subsidized fertilizers.
2. Extension and Promotion to increase per hectare consumption and usage efficiency.
3. Mature stage when the private sector may be encouraged to cater to the fertilizer needs of the farmers and subsidies can be withdrawn in a phased manner.

The author quoted from the FAO/FIAC Regional Seminar on “Fertiliser Pricing Policies for Africa” held in Nairobi in January 1986, which concluded in respect of the fertilizer subsidization that:

1. Green revolution has been successful in Asia because of the combination of subsidized fertilizers, improved seeds and concessional credit.
2. Subsidies encourage fertilizer usage, particularly among small farmers.
3. Fertiliser subsidies benefit not only farmers but also ultimately the consumers through lower food prices.
4. Fertiliser subsidies provide and incentive to farmers to increase food production.

The author quotes Mr. J W Couston, who after examining the date for the periods 1971/72 and 1979/81, observed that fertilizer use in countries with subsidies increased at a much higher rate than in those without. This is summarized as follows:
Fertilizer Use in Countries with and without subsidies:

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Africa</th>
<th>Asia</th>
<th>Near East</th>
<th>Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Subsidy</td>
<td>16.2</td>
<td>19.6</td>
<td>11.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Without Subsidy</td>
<td>8.9</td>
<td>10.2</td>
<td>6.9</td>
<td>7.8</td>
</tr>
</tbody>
</table>

(Source J W Couston, FAO "Implications of Crop and Fertiliser Price relationship in developing countries", IFA Annual Conference, Munich, 1985.)

The author states that fertilizer subsidies in fact are just one of many subsidies accorded to agriculture worldwide and need to be considered in this wider context. He states that the average effective level of subsidy in the Organization for Economic Cooperation and Development Countries (OECD) as a % of value of domestic production increased from 30% to 50% during 1980s and in terms of Producer Subsidy Equivalent (PSE), which is the combined estimate of benefits from all relevant policies into a single factor, Switzerland was the highest with a PSE of 82% in 1994, Norway 75%, Japan 74% and Iceland 73%. Austria, Sweden and Finland had 62%, 51% and 67% respectively. New Zealand had a PSE of 3% and Australia 10%. Withdrawal of subsidy by Government of New Zealand had adverse impact on agriculture and it took seven years to begin to recover. The author sees fertilizer subsidy as an instrument of fertilizer promotion for higher agriculture production.