

Fertilizer Sector – Vital for Agricultural Production

Agriculture is one of the core sectors of Indian economy. It contributes about 18% to GDP. Quite a large number of Indian rural population depends on it for their livelihood. Agriculture also provides raw materials to various agri-based industries. Population of the country has reached a level of about 143 crore and the same will continue to rise. To meet the growing needs of the burgeoning population in terms of food, feed, fiber and fuel, the growth in agriculture is necessary on sustainable basis.

Fertilizer is the most important input in agriculture. There exists a direct correlation between fertilizer use and agricultural production. Fertilizer has played and will continue to play significant role in enhancing agricultural production. The testimony of the fact is that use of fertilizer in 1951-52 was hardly 65,000 MT in terms of NPK nutrients which has increased to 29.8 million MT in 2022-23. The corresponding gain in food grain production has been from 52 million MT to 329.7 million MT. There has also been remarkable increase in production of oilseed, sugarcane, cotton, fruit, vegetable crops, etc. during the period.

There are certain myth being created at certain quarters that use of chemical fertilizers is harmful to the environment. The reality is other way round. To call fertilizers a chemical is misnomer as they are manufactured from the natural resources such as natural gas (hydrogen), atmosphere (nitrogen), rock phosphate (phosphorus) and potash (potassium). Farmers also acknowledged that it is not possible to enhance crop productivity without use of fertilizers. Out of the two breads we eat, one is fertilizer borne. The question arises, whether should we allow 50% of the population to go hungry or nourish them for their healthy life? Numerous examples from all over the world have underlined the importance of fertilizers in enhancing farm productivity.

Fertilizer industry has been playing a pioneer role in making fertilizers available to more than 14 crore farmers through indigenous production and import by adopting meticulous supply-chain strategies

across the country. The use efficiency of applied nutrients is low. Therefore, the farmers need to be encouraged to make use of the scheme of distribution of soil health cards of Government of India in the right fitness for their benefits. Modern tools and technologies such as remote sensing, artificial intelligence, drone technology, variable rate technology, crop modelling, site specific nutrient management, leaf colour chart and mobile applications can help farmers make informed decisions about better nutrient management, reduce waste and minimize environment footprints.

The objective of PM-PRANAM notified by the Government of India is to restore fertility of the Mother Earth. The scheme is to promote balanced and sustainable use of fertilizers along with organic manures, alternative fertilizers, nano fertilizers, bio-fertilizers, etc. Introduction of sulphur coated urea (SCU) will help to improve the nitrogen use efficiency and provide sulphur in sulphur deficient areas. Conversion of retail outlets to Pradhan Mantri Kisan Samridhhi Kendras will enable the farmers to purchase fertilizers under one roof and also benefit from the farm advisory services being rendered through these centres.

The country is import dependent to a great extent to meet its fertilizer demand. In case of urea, import dependence for urea has been showing a path of decline due to commissioning and production from new urea plants. However, in case of feedstock *i.e.* LNG, being used for production of urea, the import dependence is about 80% at present. For phosphatic fertilizers, more than 90% of the demand is sourced through import either in the form of finished products or raw materials. Country is 100% import dependent on MOP. Arranging import is an uphill task. However, the industry has always ensured import of finished fertilizer products and raw materials used for production of fertilizers even during COVID-19 and geopolitical conflict periods so that agricultural production is not affected in the country. As a result, production of food grain increased from 297.5 million MT in 2019-20 pre-COVID to 329.7 million MT in 2022-23.

Sustainable growth in agriculture is necessary and for that use of fertilizer is indispensable. Meticulous strategies are being adopted by the fertilizer industry to make fertilizers available to more than 14 crore farmers across the country.

Growth of Indian fertilizer industry has kept pace with development in the agriculture. To meet the increasing demand of plant nutrients of high yielding varieties evolved in late 1960s, number of plants were put up after the first large scale nitrogenous fertilizer plant setup in 1951 at Sindri. The policies of the government helped in adding up the capacities consistently till late 1990s. In between, the closure of a number of urea plants based on coal and naphtha were also witnessed. Additional 4.0 million tonnes of urea capacity was unlocked by revamping of the existing plants. New investment policy 2012 encouraged commissioning of a brownfield urea plant after a gap of almost 17 years. Thereafter, five more urea plants were commissioned, and one more urea plant based on coal gasification is under commissioning.

The ammonia-urea plants are highly energy intensive. Indian ammonia-urea plants have achieved high level of energy efficiency comparable to the best plants in the World. The energy efficiency of ammonia and urea plants have improved by more than 35% over last 36 years thereby reduction of 44% of carbon dioxide emission during the period. This was result of concerted efforts of the plants in continuously implementing energy saving schemes and change in feedstock from fuel oil and naphtha to natural gas; driven by urea pricing policy. Having achieved a high level of efficiency, there are further challenges to reduce carbon footprint. Government policies are under development for transition toward greener production of fertilizer. Substitution of import based grey ammonia with green ammonia may be the first step. Technologies for utilization of green hydrogen in the existing ammonia plants have been proposed by the technology providers. However, there are challenges

with respect to steam and energy balance, constraints in the existing layout, requirement of long turnaround time and availability of renewable energy round the clock. Besides, the solutions are capex intensive resulting in higher cost of green ammonia. The viability of such projects needs to be ensured.

Another challenge with India is that it is heavily dependent on import for various raw materials. The indigenous rock phosphate available is of low grade. Chemicals based technologies are now available for beneficiation of low grade rock. These may be explored for augmenting indigenous rock phosphate resources. The capacity utilization of a complex fertilizer plants is not yet fully utilized due to various factors. These include high cost of raw materials, competition from imported fertilizer products, taxation and other policy issues. However, the productivity of complex fertilizer plants can be improved by identifying the bottlenecks affecting the performance with collaborative efforts with plant process licensors and in-house expertise.

In the FAI Annual Seminar 2023 with the theme 'Innovations in Fertilizer and Agriculture Sectors', various areas related to the subject were deliberated. The Seminar was inaugurated by the Hon'ble Union Minister of Chemicals & Fertilizers and Health & Family Welfare on 6th December, 2023. More than 1500 delegates from India and abroad participated in this event. In all 18 papers were presented by eminent speakers. These presentations covered the topics related to policy intervention in fertilizer sector, innovations for sustainable agriculture, transforming fertilizer production and innovations in Marketing. The unique feature of this year Seminar was a special session on Fertilizer Use – Myth and Reality (Interaction with Farmers and Media) chaired by Member, NITI Aayog. In the session, good numbers of farmers and media personnel participated. Current issue of 'Indian Journal of Fertilisers' contains the proceedings of inaugural function, resume of technical sessions, valedictory session, and conclusions & recommendations emerged from this Seminar. We hope that all those concerned with development of agriculture and fertilizer sectors will find this issue of IJF highly useful. ■