

# FERTILIZERS FOR SUSTAINABLE AGRICULTURE





**A**griculture in India has undergone a spectacular transformation from the clichéd begging bowl in the fifties to being the bread basket today. The transformation was the result of years of research and development and trials that eventually made an impact on our food production front that today feeds us and the world. Although several factors played into this, fertilizers were a critical input that considerably raised our production potential. As we moved away from our subsistence level of farming to something more intensive and rigorous, many non-descript varieties gave way to varieties that were more specific in their needs. Fertilizers were a necessity for this system to deliver and hence was made sure that it was available to the farmers unhindered. The subsidy system ensured the access of cheap and quality fertilizers on time. The results that followed justified the rationale of this form of agriculture and what trailed rewrote the history of Indian agriculture.

The years ahead although saw the purpose for which the fertilizers were introduced, soil health started to deteriorate due to the abuse and overuse of chemical fertilizers. The skewed C:N ratio and depleting levels of micronutrients in the soil manifested through multiple ways affecting productivity and yield. The significance of secondary nutrients and micronutrients came into picture and also the relevance of safeguarding the soil health. Fertilizer companies started to introduce fertilizers containing micronutrients and soil health enhancers. Although the trend

is yet to catch up comprehensively across Indian farms, the changes have commenced. The country as such is in search of modes and means to enhance the per capita productivity with minimum resource use. Fertilizers still holds the potential to turn around the current system of farming. Innovation in products and product delivery can make a marked difference in Indian agriculture.

### INDIAN FERTILIZER INDUSTRY OUTLOOK

The Indian Fertilizer Industry has shown tremendous growth in the last five decades and at present ranks third in the world. India is the second largest consumer of fertilizers after China. - India also ranks second in the production of nitrogenous fertilizers and third in phosphatic fertilizers, whereas the requirement





of potash is met through imports since there are limited reserves of potash in the country. According to the Food and Agriculture report world demand for total fertilizer nutrients is estimated to grow at 1.8% per annum from 2014 to 2018. The demand for nitrogenous, phosphatic, and potash is forecasted to grow annually by 1.4%, 2.2%, and 2.6%, respectively, during the period. Over the next five years, the global capacity of fertilizer products, intermediates and raw materials will increase further. The global demand for nitrogenous fertilizers is expected to grow around 5.6% to 119.4MT in four years through 2018, according to the Food and Agriculture Organization of the United Nations. Asian nations, led by China and India, are expected to account for 58% of this increase.

Fertilizer sales, dependent on monsoon performance, this year registered a moderate increase. Total nutrient consumption (N+P<sub>2</sub>O<sub>5</sub> + K<sub>2</sub>O) increased from a total of 25.95 million metric tonnes (million MT) during 2016-17 to 26.79 million MT during 2017-18. N consumption at 17.17 million MT, P<sub>2</sub>O<sub>5</sub> at 6.84

million MT and K<sub>2</sub>O at 2.78 million MT recorded increase of 2.6%, 2.0% and 10.8%, respectively, during 2017-18 over the previous year. Per hectare use of total nutrients increased from 130.8 kg in 2016-17 to 135 kg during 2017-18. All-India NPK use ratio changed from 6.7:2.7:1 during 2016-17 to 6.2:2.5:1 during 2017-18.

The production of total fertilizer nutrients (N+P<sub>2</sub>O<sub>5</sub>) showed a marginal increase of 1.2% in 2017-18 over 2016-17. While the production of N at 13.42 million MT during 2017-18 registered a nominal increase of 0.3% over 2016-17, production of P<sub>2</sub>O<sub>5</sub> at 4.72 million MT recorded an increase of 3.8% during the period. In terms of

product, production of Urea at 24.03 million MT and SSP at 3.91 million MT declined by 0.7% and 9.1%, respectively, during 2017-18 over 2016-17. In contrast, production of DAP at 4.65 million MT and NP/NPKs at 8.24 million MT increased by 7.4% and 4%, respectively, during the period.

Supply of domestic gas to fertilizer plants declined for fourth consecutive year. Domestic gas supply declined from an average of 20.7 MMSCMD in 2016-17 to 18.1 MMSCMD in 2017-18. Share of domestic gas in total gas supply to fertilizer plants declined from 49.0% in 2016-17 to 42.8% in 2017-18. The balance requirement was fulfilled by imported LNG. Increase in share of more expensive imported gas increased the pooled gas price for urea plants.

During 2017-18, import of urea and MOP increased significantly from the level of the previous year. Import of DAP and NP/NPKs, however, reduced during the period. Import of Urea, DAP, NP/NPKs and MOP was of the order of 5.98 million MT, 4.22 million MT, 0.50 million MT and 4.74 million MT, respectively,



during 2017-18.

Availability of fertilizers from opening stock at the beginning of the year, domestic production and imports was adequate to take care of demand for the full year. All-India stock of urea at various points was more than 2 million MT at the beginning of the year. Similarly, inventory of DAP and NP/NPKs together was about 1.5 million MT, SSP 0.56 million MT and MOP 0.54 million MT. In addition, large stocks were also lying with the dealers for which separate data are not available.

The basic retail price of Urea remained unchanged at Rs.5360 per tonne since November 2012. W.e.f. 25th May, 2015, Government of India made it mandatory for all indigenous urea manufacturers to produce 100% neem coated urea of their total urea production. The same policy is applied for imported urea at the port. Gol allowed the manufacturers/ importers to charge 5% extra on the MRP of urea. Therefore, the retail price of neem coated urea (excluding tax) works out to Rs. 5628 per tonne. The retail prices of P & K fertilizers covered under NBS scheme are market driven and announced by the fertilizer companies from time to time.

Most of the raw materials and feedstock for the fertilizer industry are imported. Due to constraints in the availability of gas in the country, which is the preferred feed stock for production of nitrogenous fertilizers, a near total dependence of the country on imported raw materials for production of Phosphatic fertilizers and full import dependence for MOP, joint ventures have become an important exercise of the Indian fertilizer companies. Existing joint ventures, namely Oman India Fertilizer Company (OMIFCO), Oman in Urea and Industries Chimiques du Senegal (ICS), Senegal and Indo-Maroc Phosphor (IMACID), Morocco in Phosphate have given the Country assured sources of supplies of Urea and Phos acid, a critical input for



production of Phosphatic fertilizers.

### MICRONUTRIENTS ELUSIVE TO INDIAN SOILS

Micronutrient deficiency in soils are becoming a big issue in Indian agriculture. Although needed in small quantities, the impact they have on the plant health and yield is significant. With the dawn of green revolution era and the major emphasis being laid on primary nutrient fertilizers containing N,P and K, the micronutrient deficiency deepened. The study – conducted by the Indian Institute of Soil Science (IISS), a key research body of the Indian Council of Agricultural Research – found that the soils of as many as 174 districts across 13 states were deficient in secondary nutrients like sulphur and micronutrients like zinc, boron, iron, manganese and copper. The chemical analysis of 70,759 soil samples collected from Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal found zinc to be deficient by 39.9 per cent and sulphur by 27.8 per cent. The boron deficit was found to be 20 per cent while iron, manganese and copper were deficient by 12.9, 6 and 4.3 per cent, respectively.

Zinc and iron pose critical nutritional issues as their deficiencies cause severe impairment of animal/human health. In human nutrition, deficiencies of zinc and iron occupy 5th and 6th place, respectively among top ten leading causes of illness and diseases in low income countries. A systematic study on zinc in soil-plant-animal/human continuum has suggested a strong link of soil zinc status with grain/seed zinc density and zinc levels in animal/human blood serum. The benefits of micronutrient application on foodgrain crops are enormous. Zinc fertilization alone has a potential of producing additional grains of worth more than Rupees 200 billion .

A variety of micronutrients carrying fertilisers are available in the country. These include 17 straight micronutrient fertilisers, 23 fortified fertilisers with zinc and boron, 30 crop- and area- specific customized fertilisers, 204 state-specific micronutrient mixtures, and a number of 100% water soluble mixtures of fertilisers with secondary and micronutrients. Sulphate salts of zinc, iron, manganese and copper; borax and sodium/ammonium molybdate are the major micronutrient carriers. Zinc sulphate (available both as hepta



Mexico (210,000) being the second and third largest organic producers, respectively. However, it has been observed that when it comes to the area under certified organic cultivation, India contributes only 2.59%, i.e., 1.5 million hectares of the total organic cultivation area of 57.8 million hectares. Thus, amongst the regions with the largest areas of organically managed agricultural land, India ranks 9th.

Several states in India are converting their farm lands to organic farms. Sikkim became the first organic state in the world with all its farmlands being certified organic. Sikkim was awarded UN Food and Agriculture Organisation's (FAO) Future Policy Gold Award (Gold Prize) for its achievement in becoming the world's first totally organic agriculture state. Mizoram has also passed the legislation to go fully organic by becoming the first in the country to legislate for turning its entire agricultural produce organic. It passed the Mizoram Organic Farming Act, 2004 on July 12, 2004. Many states such as Gujarat, Kerala, Karnataka, Andhra Pradesh, Madhya Pradesh, Himachal Pradesh and Nagaland have come forward pledging their allegiance to organic cultivation.

However, there are several grey areas that need to be addressed to

and monohydrate) consumption is maximum (188,300 tonnes in 2015-16) followed by 21,200 tonnes of iron sulphate and 20,000 tonnes of borax.

Encouraging the production and use of fertilisers fortified with micronutrients is the ideal strategy to overcome the problem of micronutrient deficiencies in Indian soils. Inadequate extension and promotional activities continue to be the number one constraint in popularizing micronutrient use in India. Quality research, aggressive extension and promotional activities, and availability of quality products are below par. One of the reasons for the state of affairs is lack of conducive policy environment. A multipronged approach should include research, technology transfer through extension, sampling and testing facilities and pricing policies of the government to address the issues at hand. Better partnership among all the stakeholders i.e. scientists, industry, government and farmers is the need of the hour to address the problem of micronutrient malnutrition in soil-plant-animal human system.

### CULTIVATING THE ORGANIC WAY

The deteriorating soil health had steadily pointed towards our destructive form of soil management. The excessive reliance on chemicals for crop production and crop health

managements left behind residues harmful to both environment and humans alike. This necessitates a rethinking of our methods of agriculture and many farmers decided to revisit our traditional methods of farming which involved less or no chemicals at all.

Commonly called as Organic farming, India is slowly opening to this chemical less method of cultivating crops. According to the World of Organic Agriculture Report 2018, India has the largest number of organic producers in the world. With over 835,000 certified organic producers, it is home to more than 30 percent of the total number of organic producers (2.7 million) in the world. Uganda (210,352) and



## FERTILIZER AND POLICIES

“The nutrient-based subsidy (NBS) scheme which was introduced by the Government on 1st April 2010 had the core objectives to contain fiscal subsidy which had increased dramatically after 2006-07 and to speed up balanced nutrition by balanced use of fertilizers to improve soil health i.e. improving the fast deteriorating NPK consumption ratios and promoting balanced nutrient consumption. NBS certainly did not lead to any decline in subsidy on fertilizer. It did, however, led to worsening of soil nutrient quality, along with shortages and price increase in all three types of urea, namely nitrogenous, phosphoric and potassic fertilizers. The subsidy on fertiliser, which was Rs.61,264 crore in 2009-10 immediately before the introduction of NBS, increased subsequently to Rs.72,969 crore, which has been budgeted for this fiscal (2015-16). & Rs.70079.85 crore for 2018-19 leading the government to rethink the subsidy model for fertilizers. Considering that fertilizer subsidy is the second-biggest subsidy after food subsidy, the inaction on the part of the government is not only affecting the fiscal health of the economy but is also upsetting the soil health of the country. Since fertilizer prices follow the trend in international petroleum prices, the only way to reduce the subsidy bill is to reduce the dependence on imports and increase domestic production. While rationalizing fertilizer subsidy across nutrients may be the short-term and immediate solution to the problem, the need of the hour is to have a policy framework that incentivizes domestic production of fertilizers. In nitrogen sector, Govt did take initiatives by revival of few plants eg Gorakhpur & Sindri of FCIL and HFCL, Ramagundam plant etc. & new capacities for company like Chambal. NBS Scheme could not improve Soil fertility as on one side we have urea available at Rs.5360 per tonne, whereas potash and phosphate fertilizers recently touched above Rs. 28000 per tonne. An undesirable outcome has been the change in fertilizer mix. As against the recommended Nitrogen (N): Phosphorous (P): Potassium (K) ratio of 4:2:1, the NPK ratio in 2013-14 was 8.2:3.2:1. After years of improvement in the NPK ratio, it

had reached 4.3:2:1 in 2009-10, quite close to the recommended ratio. While the worsening of the NPK ratio at the all-India level is a matter of concern, the fact that this has reached alarming proportions in some states should be a cause for worry for the health of soil and its nutrient content. For example, NPK ratio in 2015 in Punjab was 61.7:19.2:1; in Haryana, it was 61.4:18.7:1; in Rajasthan, it was 44.9:16.5:1; and in Uttar Pradesh, it was 25.2:8.8:1. The

deterioration in fertilizer mix will not only have an impact on productivity of crops but also on long-term soil health. No wonder, over the years, there has been a decline in the fertilizer response ratio.

Another important policy that had an impact on the fertilizer segment was the nationwide implementation of GST. The scheme implies value addition at each stage of production and supply chain with the set off benefits accruing from the producer's/service provider's point up to the retailer's level. The final consumer will thus bear only the GST charged at the last point of supply chain. Though there had been minor advantages & disadvantages, on a long term, it will definitely bring more transparency & will be in the best interest of all - customer or company. Also, it is really good that there had been periodic reviews & suitable modifications to make scheme more effective & efficient but at present it has 2 major implications.

1. The interstate movement of fertilizers from lower tax states to the higher tax states has almost stopped.

2. There is a significant pressure on Fertilizer companies for expensive working capital which eats away profitability due to long delays in reimbursement of GST input credits.”



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make this movement successful. During the transition period, productivity on an average dips by 6.7 per cent in the first year, and the government needs to have a plan in place to support farmers during this period. To ensure marketing of organic produce, connecting farmers with the domestic and global supply chain is extremely important. The existing certification systems are not only cumbersome and time-consuming, but also expensive. It is important to eliminate confusion over multiple certification systems and multiple ministries regulating organic production and sales.

### **POLICY SUPPORT**

In India, the government keeps a close eye on the fertilizer sector. To an extent, the Fertilizer Industry is highly regulated and monitored by the Government of India. The government supports the farmers in the form of fertilizer subsidies. Except urea, all the decontrolled fertilizers are sold at MRP fixed by the manufacturers. Urea on the other hand enjoys subsidies.

Nutrient Based Subsidy (NBS)

policy was introduced by the Government to encourage the use of decontrolled fertilizers. W.e.f. from 1st April 2010, certain decontrolled fertilizers namely DAP, MAP, TSP, DAP Lite, MOP, SSP, Ammonium Sulphate and 15 grades of complex fertilizers are provided to the farmers at the subsidized rates based on the nutrients (N, P, K & S) contained in these fertilizers. Additional subsidy is also provided on the fertilizers fortified with secondary and micronutrients as per the Fertilizer Control Order such as Boron and Zinc.

In 2015, New Urea Policy was introduced with the main purpose to ensure the maximum production of indigenous urea by promoting the use of energy efficient feedstock which will help rationalize and bring down the subsidy burden. The Union Government also subsidizes the urea manufacturing units for the cost of transportation to facilitate the availability of urea at the same maximum retail price all over the country.

Recently the government has made it mandatory for all the urea

producers in country to produce 100% of their total production of subsidized urea as Neem Coated urea. Urea in this form has been found to increase crop yield. Neem coating of urea was introduced so it could save a substantial chunk of the Rs 55,000 crore subsidies given on urea fertilizer every year. Since NCU cannot be used for industrial purposes, illegal diversion of subsidized urea to non-agricultural use would not be possible. By curbing this illegal diversion of Urea for non-agricultural purposes, the government aims to prevent subsidy leakages as subsidized urea from India was also getting transported illegally to other nearby countries. This initiative has fostered rural employment amongst women who help in picking up the neem leaves and help in the production of the neem oil and neem cakes.

Gas Pooling for the Fertilizer (Urea) Sector would help provide natural gas at uniform delivered price to all Natural gas grid connected Urea manufacturing plants. The cost of gas, which is the most important component for production of urea,

varies from plant to plant owing to differential rates at which imported LNG is contracted as well as cost of transportation. The move would help bring down the cost of fuel. This move will help save about Rs. 1550 crores in subsidy and help urea manufacturing plants focus on their core business operations.

The introduction of Direct Transfers Benefit (DBT) was another reform that was long pending in the fertilizer sector. Under the DBT scheme, the subsidy will be released to the fertilizer companies instead of the beneficiaries, after the sale is made by the retailers to the beneficiaries. The DBT scheme should help curb the issues relating to diversion and smuggling of urea.

'Soil Health Card' scheme was also a landmark reform that was introduced in the Indian agricultural scene. According to the scheme, Soil Health Card with information on macronutrients and micronutrients will be generated for all the 14 crore landholdings in a cycle of 3 years. Besides, it also provides an advisory on soil test based use of fertilisers and amendments. Uniform soil sampling procedure will be adopted by the State for rainfed and irrigated areas. The scheme will provide assistance to State Governments to issue soil health cards periodically every 3 years, to all farmers of the country,

so as to ensure that farmers apply the required amount of nutrients to their crops. Soil Health Card data can always be cross-checked with the Geo-referenced points used for preparation of soil fertility maps.

### INDUSTRY WOES

Subsidies have always remained a bone of contention between the government and the fertilizer industry. The industry has felt that the budget allocations was less this year and the unpaid subsidy dues carried forward from one year to the other has added to their woes. Unpaid subsidy at the end of 2017-18 was estimated to be Rs.32,053.21crore.

Indian urea sector, on the other hand, has continued to suffer from non-payment of increased fixed cost, unreasonable reduction in energy consumption norms, unfavourable policy for production beyond 100% of re-assessed capacity and discriminatory policies for naphtha based plants.

The industry voices concerns on some of the issues of P & K sector which need to be addressed that includes, i) to dispense with furnishing of half yearly cost data, ii) to notify criteria for reasonable MRP and iii) higher import duty on raw materials compared to finished fertilizers. The major issue of SSP industry which remains unaddressed

is non recognition of freight subsidy. There is need for either merging freight with product subsidy under NBS as per the approval of CCEA or making provision of freight subsidy for SSP industry as well.

Another major issue raised by the industry is regarding the GST on fertilizers and raw materials that was implemented from 1st July, 2017. GST rate on finished fertilizers was brought down at 5% from initially announced 12%. Following several representations by the industry and follow up, rates for phosphoric acid and sulphur were also reduced to 5%. However, rates of GST for naphtha, ammonia and sulphuric acid still remain at 18%. Rate of IGST on imported urea and MOP for manufacture of complex fertilizers was attracting 18%. GST council has clarified that the fertilizer supplied for use in the manufacturing of complex fertilizers for agricultural use will attract 5% IGST w.e.f 27th July, 2018.

Government of India rolled out the DBT scheme for fertilizers in all states between 1st September, 2017 and 1st March, 2018. But under the DBT scheme for fertilizer sector, subsidy is not transferred directly into the accounts of the beneficiaries as is done in case of LPG. Fertilizer subsidy continues to be routed through the industry. Entitlement of subsidy takes place after sales are made by the retailers through the POS machine. However, there are several policy and operational issues in regard to implementation of DBT for fertilizer sector which are delaying or even denying subsidy on products sold under new scheme. This also requires further clarity.

Fertilizers are important for the sustenance of agriculture. However, guidance should be provided to farmers regarding the quantity and the time of application. Soil health should be the focus and fertilizers used must add to the soil health. Sustainability and conservation of resources should be the cornerstone of any future agriculture interventions.





# 'There is no life without Zinc'

The International Zinc Association (IZA), created in 1991 by a group of leading zinc producers, is guided by the principle of undertaking actions that positively influence the market and image of zinc. The Association's primary goal is to deliver value to its Members through innovative programs in its strategic focus areas of Environment and Sustainable Development, Technology and Market Development and Communications. IZA provides a forum for the zinc industry to analyze and anticipate issues affecting zinc globally and to ensure a timely and appropriate response. IZA coordinates initiatives good for zinc that are best done collectively, undertaken either directly or through involvement and support of customer groups and related stakeholders on the local, regional and global levels. In an interview with Agriculture Today, Dr. Soumitra Das, Director, South Asia - Zinc Nutrient Initiative, International Zinc Association discusses the relevance of zinc in agriculture and how their inclusion can increase the plant and human health.



## What is the role of micronutrients in enhancing crop yield?

As we are aware, micronutrients are essential for crop growth and development and play an important role in balanced crop nutrition. They include eight essential elements, namely, zinc (Zn), boron (B), iron (Fe), manganese (Mn), copper (Cu), molybdenum (Mo), chloride (Cl) and nickel (Ni). It is not that the micronutrients are less important than the macronutrients to crop nutrition, but they are needed in small (micro) quantities by the crops, and hence known as micronutrients.

## What role does zinc play in plant and human nutrition?

Zinc plays many vital roles in plants as well as human beings. In plants, it plays a key role as a structural constituent or regulatory co-factor

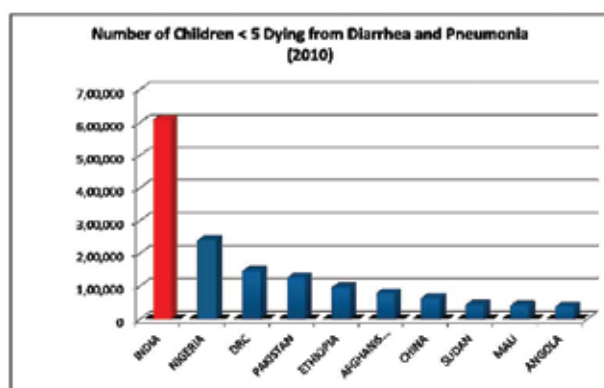
of a wide range of different enzymes and proteins in many important biochemical pathways. These are mainly concerned with carbohydrate metabolism, both in photosynthesis and in the conversion of sugars to starch, protein metabolism, auxin (growth regulator) metabolism, pollen formation, maintenance of the integrity of biological membranes and resistance to infection by certain pathogens. Zinc in balanced fertilizer use ensures better yield and quality of crops.

Zinc is vital for many biological functions in the human body. The adult body contains 2-3 grams of zinc. It is present in all parts of the body, including: organs, tissues, bones, fluids and cells. It is vital for more than 300 enzymes in the human body, activating growth - height, weight and bone development, growth and cell division, immune

system, fertility, taste, smell and appetite, skin, hair and nails, vision. Some of the reported symptoms due to zinc deficiency in humans, especially in infants and young children, are diarrhoea, pneumonia, stunted growth, weak immune system, retarded mental growth and dwarfism, impaired cognitive function, behavioural problems, memory impairment, problems with spatial learning, and neuronal atrophy.

## How significant is the link between zinc deficient soils and malnutrition?

There is no life without zinc. Zinc is an essential nutrient for human health. There is a high degree of correlation between zinc deficiency in soils and that in human beings. It is estimated that about one-third of the world's population suffers from



Deaths from diarrhea and pneumonia in children under five (Source: UNICEF, 2012)

zinc deficiency. Recently, zinc deficiency - especially in infants and young children under five years of age - has received global attention. Zinc deficiency is the fifth leading cause of death and disease in the developing world. According to the World Health Organization (WHO), about 800,000 people die annually due to zinc deficiency, of which 450,000 are children under the age of five.

The widespread zinc deficiency has led to zinc malnutrition in the humans, especially in the developing nations, like India. The country-wise deaths from diarrhoea and pneumonia in children under five depicts that the casualty due to zinc deficiency in India is alarmingly high, even higher than the Sub-Saharan African countries or the neighbouring countries. This has drawn the attention of the government and policy makers in India and generated the awareness on the critical role of zinc in human health.

### Are you satisfied with the government's policies and approach in identifying the micronutrient deficiency and particularly zinc deficiency in Indian soils?

India's fertilizer policies are mainly skewed towards the primary nutrients, NPK. But, under the Nutrient Based Subsidy (NBS) Scheme, the role of micronutrients, specially, zinc and boron has been specially targeted through additional subsidy for fortification. In addition, the Government of India is promoting the use of micronutrients under the National Food Security Mission (NFSM). Nevertheless, it is continued to be a major disappointment that GST rates on micronutrient fertilizers have been levied at 12% or higher, whereas the bulk fertilizers are enjoying a reduced rates of 5%, discouraging the farming community to practice balanced fertilizer use in the country. In addition, the pricing policy of the Zincated-Urea should be approved by the Government, which has been already included in the Fertiliser Control Order

(FCO) way back in 1990s, but due to a minor price disparity, it is not being produced or marketed by the fertilizer industry in India. It is also expected from the Government that Urea, which is at present out of the gambit of NBS Scheme, should be considered to include in the same, so as to encourage the balanced fertilizer use. What to talk about the micronutrients, even the nutrient ratio within NPK is highly distorted due to price disparity!

### What are the immediate measures that you want to see to address this problem?

I would like to flag here the key policy measures to address the challenges in popularizing micronutrients, specially zinc in balanced fertilizer use:

- GST rates on micronutrients should be reduced and made at par with the bulk / NPK fertilizers at 5%.
- Zincated Urea pricing policy should be approved by the Government
- Urea should be included in the gambit of Nutrient Based Subsidy Scheme.

### Is India equipped to deal with zinc deficiency in soils?

If we look at the trend of zinc fertilizer consumption in India, there is a significant increase, more than 50% in consumption in the last a couple of years. The latest report released by the ICAR - AICRP on Micronutrients says that the zinc deficiency in soils in India has improved from 48.8 to 36.5% today. This could be mainly attributed to the increased use of zinc fertilizers, as a result of increased demand of zinc fertilizers due to increased awareness level of the stakeholders, specially the farmers in India. India is, therefore, fully equipped to deal with zinc deficiency in soils, animals and humans, if well supported by the micronutrient fertilizer policy of the Government.

### Are there any organic fertilizers that can address the problem of zinc deficiency?

In fact, almost every organic sources of plant nutrients, like FYM, compost, vermicompost etc. are having micronutrients, may be in trace amount. Hence, it is strongly recommended that the farmers should practice integrated nutrient management, including organic, mineral and biological sources of plant nutrients to address the problem of micronutrient deficiency. I am sure, the Government of India will take a favourable policy decision to encourage the farmers in practising balanced fertilizer use, after the success of the 'Soil Health Card Scheme', to realise the bigger dream of the Hon'ble Prime Minister, Shri Narendra Modi's 'Doubling Farmers Income by 2022'.