Case study: Liquid Nano Urea - A game changer for the Indian farmer

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What is Liquid Nano Urea?

Urea is a chemical nitrogen fertiliser. It is an artificial source of nitrogen and a key nutrient needed by plants.

Nano Urea is urea in the form of a nanoparticle and has been developed to increase crop productivity, decrease soil, water, and air pollution, reduce the burden of urea subsidies, and reduce the unbalanced and indiscriminate use of conventional urea. It is a sustainable option for farmers to practise smart agriculture and combat climate change.

By lowering the loss of nutrients from agricultural fields in the form of leaching and gaseous emissions, which causes environmental degradation and climate change, Nano Urea aids in reducing damage to the environment.

Why does the Indian Farmer need Liquid Nano Urea?

Due to multiple inefficiencies in the urea sector, there are persistent demand and supply mismatches in the market for urea. On the supply side, excessive and unbalanced use of urea is a clear reality. Farmers are using excessive urea as it is cheaper than decontrolled Phosphatic and Potassic fertilisers.

Additionally, the cost of production of traditional granular urea has substantially increased. A bag of 50 kg urea is sold at Rs. 266 while the production cost of 50 kgs of urea stands at Rs. 3,750 with the government bearing the subsidy bill of Rs 3,484 per bag. In comparison, Nano Urea is sold at Rs 240 per 500 ml.

On an average, a farmer in India uses two bags of urea on one acre per crop season, with the quantity varying slightly according to the crop. According to a recent economic survey, the country's annual urea demand is approximately 30 million tonnes while the domestic production is about 22 million tonnes, with the rest being met through imports.

The field demonstrations undertaken by IFFCO has shown that a 500 ml bottle of Nano Urea can replace one bag of conventional urea as it has 40,000 ppm of nitrogen, which is equivalent to nitrogen nutrient provided by one bag of conventional urea.

A more pertinent point which will increase the demand for Nano Urea is the costing. The costing proposition of Nano Urea liquid makes it more favourable over conventional urea as a 500 ml bottle is priced at Rs 240 whereas, a 45 kg bag of conventional urea costs Rs. 267. Use of Nano Urea technology will also bring down the cost of logistics and warehousing significantly.

Apart from bringing down input and storage cost, Nano Urea liquid has been found to increase the nutritional quality and productivity of crops. According to the IFFCO website, "When sprayed on leaves, Nano Urea easily enters through stomata and other openings and is assimilated by the plant cells. It is easily distributed through the phloem from the source to sink inside the plant as per its need. Unutilized nitrogen is stored in the plant vacuole and is slowly released for proper growth and development of the plant."

Dvara E-Registry's experience

Dvara E-Registry's experience with the FPOs and member farmers has highlighted the massive demand and supply gap for Urea. A 45 kg bag of conventional urea is being sold by unauthorized sellers for double the price or even higher in majority of the states thus increasing cultivation cost which inevitably leads to losses for farmers.

Farmers across all FPOs often complain about the acute shortage of chemical fertiliser and the rate at which it is being sold especially during the rabi season. Farmers are unable to source the Urea due to unavailability at the official designated fertiliser dealer shops. Dvara E-Registry have observed that dealers have refused to sell fertiliser to farmers, citing short supply but the same is available for higher the price by unauthorised sellers.

The injudicious application of urea has telling effects on the environment. Excess use of urea is leading to environmental issues and resulting in susceptibility of crops to insects, pests, and diseases. Long term use of conventional urea is also causing excessive foliage growth leading to crop lodging and resulting in deterioration of soil health due to mining of micronutrients.

In November 2021, Dvara E-Registry began promoting Nano Urea to provide a solution to the issue of non-availability of granular urea. Farmers were made aware about the new product, the technology behind it and its benefits and usage. Farmers were apprehensive about the product, but continuous handholding and field demonstrations have resulted in more farmers being open to trying the product on their crops.



Activities undertaken by Dvara E-Registry

Dvara E-Registry through its Farmer Producer Organisations have provided Nano Urea as a promotional product to farmers in the states of Rajasthan, Odisha, Manipur, Madhya Pradesh, and Maharashtra. Farmers were educated on the technology, usage and benefits during the various community meetings conducted by Dvara E-Registry. During these meetings, the science underpinning Nano Urea, how it is used, and the advantages farmers will experience once they begin using it was discussed.

Technology

- Nano Urea is applied @500 ml/acre at initial growth stage and before flowering
- When sprayed on leaves, leads to absorption within three hours and it is utilized during photosynthesis based on the plant's need besides avoiding pest attack
- It is translocated and metabolically assimilated as proteins, amino acids as per the need of the plant

Usage

- Farmer must wear mask and hand gloves before using the Nano Urea bottle
- According to crop age and condition, the farmer needs to choose a concentration per litre of water
- For 30-40 days crop, farmers can use 4ml Nano Urea per litre of water
- Farmers are required to mix water and Nano Urea in a spray pump and spray it on crop leaves

Benefits

- Cheaper than granular urea
- Helps in increasing crop production
- Reduction in environmental pollution
- Highly effective
- Reduces unmindful use of urea

Outcome

The intervention is in the nascent stage, but it is a great step towards enhancing agriculture productivity with less impact to the environment. The FPCs affiliated with Dvara E-Registry are selling Nano Urea to mitigate the short supply of urea. The feedback across all regions has been quite encouraging. Majority of the farmers who are using Nano Urea have had good experiences to share. These are some of the testimonies by the farmers who are using Nano Urea.



- "I was not very keen to try the Nano urea in the beginning but when I used it on the wheat crop, the results were astounding, I will be using it in future" ~ Manoj, Dholpur, Rajasthan
- "I am using it for the first time, the good part is that this urea bottle is available in the FPC during the cropping period" ~ Shriram Patidar, Dhar, Madhya Pradesh
- "I have been a farmer for the last 10 years. From the day I remembered, there has always been a shortage of fertilizers in our area. Sometimes we get fertilisers at a higher price, or we are unable to source enough for our crop. Recently one of my neighbours introduced me to a FPO. The FPO provided Nano urea at a price less than the market rate. Initially I had my doubts on whether it will be effective or not. Then I gathered courage and used it in my chilly field. I sprayed one bottle of Nano urea mixed with water i.e., 4 ml in 1 litre of water and sprayed in 1 Sangam as per the requirement. Thankfully, I got results in one week of spraying. I got overwhelmed by the result. I will recommend Nano urea to all the farmers "Less Money and Better Profit" ~Hidam Gunamani Singh, Thoubal, Manipur
- "I used nano urea in both green chilly as well as wheat, the results are in front of you. I have got a very good harvest; I will use Nano urea in the future and will encourage other farmers to use it" ~ Himmat Singh, Dholpur, Rajasthan
- "I used the Nano urea in my green chilly fields, the results are good, and I am going to use it further in other seasons" ~ Bhoblal, Dholpur, Rajasthan
- "Like other fields in the vicinity, my field was also drying up but after the application of Nano urea, my fields are greener, and I have received good harvest of the potato crop. In comparison to old granular urea, this looks better" ~ Ravi Kumar, Dholpur, Rajasthan

- "Two weeks ago, I bought Nano urea from my FPC. I purchased it because I came to know that the government is banning the sale of urea. I have sprayed Nano urea on my cotton and maize crop, though it is early to predict but the results are satisfactory, there is no yellowness is the crop and there is no rust after sprinkling. I am going to use Nano urea in future as it's a good option" ~ SaaiekRamji Yadav, Barwani, Madhya Pradesh

This technology benefits all players in the Agri value chain. Educating the Farmer on the benefits will create more awareness about the technology and help enable "Aatma Nirbharta" in the agricultural sector.

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