



## Liquid Nano Urea

**For Prelims:** Liquid Nano Urea, Indian Farmers Fertiliser Cooperative Limited

**For Mains:** Significance of Liquid Nano Urea over Conventional Urea

### Why in News?

Recently, the Prime Minister inaugurated the **first [Liquid Nano Urea \(LNU\)](#) plant at Kalol, Gujarat.**

- It is **Indigenous Urea**, introduced firstly by the **[Indian Farmers Fertiliser Cooperative Limited \(IFFCO\)](#)** for farmers across the world.

### What is Indian Farmers Fertilizer Cooperative Limited?

- **About:**
  - It is one of India's biggest cooperative societies which is wholly owned by **[Indian Cooperatives](#)**.
  - Founded in 1967 with just 57 cooperatives, today it is an amalgamation of over 36,000 Indian Cooperatives with diversified business interests ranging from General Insurance to Rural Telecom apart from its core business of manufacturing and selling fertilizers.
- **Objective:**
  - To enable Indian farmers to prosper through timely supply of reliable, high quality agricultural inputs and services in an environmentally sustainable manner and to undertake other activities to improve their welfare.

### What is Liquid Nano Urea?

- **About:**
  - It is urea in the form of a nanoparticle. It is a nutrient (liquid) to **provide nitrogen to plants as an alternative to the conventional urea.**
    - Urea is a **chemical nitrogen fertiliser, white in colour, which artificially provides nitrogen**, a major nutrient required by plants.
  - It is developed to replace conventional urea and it can curtail the requirement of the same by at least 50%.
    - It contains 40,000 mg/L of nitrogen in a 500 ml bottle which is equivalent to the impact of nitrogen nutrient provided by one bag of conventional urea.
- **Developed At:**
  - It has been indigenously developed at Nano **[Biotechnology Research Centre, Kalol, Gujrat](#)** in line with **[Atmanirbhar Bharat](#)** and Atmanirbhar Krishi.
    - India is dependent on imports to meet its **[urea requirements](#)**.
- **Objective:**

- It is aimed at reducing the unbalanced and indiscriminate use of conventional urea, increase crop productivity, and reduce soil, water, and air pollution.

▪ **Significance:**

◦ **Improves Plant Nutrition:**

- It has been **found effective and efficient for plant nutrition** which increases production with improved nutritional quality.
- It will boost a balanced nutrition program by reducing the excess use of Urea application in the soil and will make the crops stronger, healthier and protect them from the lodging effect.
  - Lodging is the bending over of the stems near ground level of grain crops, which makes them very difficult to harvest, and can dramatically reduce yield.

◦ **Improves Environment:**

- It will also have a huge positive impact on the quality of underground water, a very significant reduction in global warming with an impact on **climate change and sustainable development**.

◦ **Increase Farmers' Income:**

- It is easy on the pocket of farmers and will be effective in increasing farmers' income. It will also significantly bring down the cost of logistics and warehousing.

## How is the LNU better than the Conventional Urea?

▪ **Higher Efficiency:**

- While conventional urea has an efficiency of about 25 %, the efficiency of liquid nano urea can be as high as 85-90 %.
- Conventional urea **fails to have the desired impact on crops** as it is often applied incorrectly, and the nitrogen in it is vaporised or lost as gas. A lot of nitrogen is also washed away during irrigation.

▪ **Targeted Supply of Nutrients to Crops:**

- Liquid nano urea is sprayed directly on the leaves and gets absorbed by the plant.
- Fertilisers in nano form provide a targeted supply of nutrients to crops, as they are absorbed by the stomata, pores found on the epidermis of leaves.

▪ **Economical:**

- A bottle of the nano urea can effectively replace at least one bag of urea.
- The liquid nano urea comes in a half-litre bottle priced at Rs 240, and carries no burden of subsidy currently.
- By contrast, a farmer pays around Rs 300 for a 50-kg bag of heavily subsidized urea.

## UPSC Civil Services Examination, Previous Year Question

**Q. With reference to chemical fertilizers in India, consider the following statements: (2020)**

1. At present, the retail price of chemical fertilizers is market-driven and not administered by the Government.
2. Ammonia, which is an input of urea, is produced from natural gas.
3. Sulphur, which is a raw material for phosphoric acid fertilizer, is a by-product of oil refineries.

**Which of the statements given above is/are correct?**

- (a) 1 only  
 (b) 2 and 3 only  
 (c) 2 only  
 (d) 1, 2 and 3

**Ans: (b)**

**Exp:**

- The Government of India subsidizes fertilizers to ensure that fertilizers are easily available to

farmers and the country remains self-sufficient in agriculture production. The same has been achieved largely by controlling the price of fertilizer and the amount of production. **Hence, statement 1 is not correct.**

- Ammonia ( $\text{NH}_3$ ) has been synthesized from natural gas. In this process, natural gas molecules are reduced to carbon and hydrogen. The hydrogen is then purified and reacted with nitrogen to produce ammonia. This synthetic ammonia is used as fertilizer, either directly as ammonia or indirectly after synthesis as urea, ammonium nitrate, and monoammonium or diammonium phosphates. **Hence, statement 2 is correct.**
- Sulfur is a major by-product of oil refining and gas processing. Most crude oil grades contain some sulfur, most of which must be removed during the refining process to meet strict sulfur content limits in refined products. This is done through hydrotreating and results in production of  $\text{H}_2\text{S}$  gas, which is converted into elemental sulfur. Sulfur can also be mined from underground, naturally-occurring deposits, but this is more costly than sourcing from oil and gas and has largely been discontinued. Sulfuric acid is used in the production of both Mono ammonium Phosphate (MAP) and Diammonium Phosphate (DAP). **Hence, statement 3 is correct.**
- Therefore, option (b) is the correct answer.

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