



Nano Fertilisers

For Prelims: Nano urea, Macronutrients, Lodging effect.

For Mains: Significance of Nano Fertilisers, Indian Farmers Fertiliser Cooperative Limited.

Why in News?

The **Department of Fertilisers** conducted an audit which **revealed a variation of 25-50% in the reduction of nitrogen use** after the application of [nano urea](#).

- The use of nano urea can help the government save approximately **USD 3 billion (around Rs 24,687 crore) in subsidy bills** annually and **reduce** [India's dependence on urea imports](#).

What are Nano Fertilisers?

- **About:**
 - Nano fertilisers are highly efficient types of fertilisers that provide nutrients like **nitrogen to crops through fine granules**.
 - [Nitrogen is an essential macronutrient for plant functions](#), and urea is one of the most concentrated nitrogenous fertilisers.
- **Nano Urea Liquid:**
 - [Nano urea liquid](#) was developed in 2022 by [Indian Farmers and Fertiliser Cooperative \(IFFCO\)](#) to replace conventional urea and **reduce its requirement by 50%**.
 - The government has heavily promoted the use of nano fertilisers since its development.
- **Significance:**
 - **Reduce Losses:**
 - Nano fertilisers exploit the **nanoscale porous domains on plant surfaces to deliver nutrients**, improve the **effectiveness of nitrogen delivery**, and **reduce losses to the environment**.
 - **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**.
 - A small bottle of 500 millilitres nano urea spray is said to be a substitute for a full bag of 45 kilogrammes urea.
 - **Making Crops Stronger:**
 - It will also reduce the excess use of Urea application in the soil and will make the **crops stronger, healthier and protect them from [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.
- **Challenges:**

- **Cost:** The **cost of producing nano-fertilizers is higher than conventional fertilizers** due to the advanced technology and production methods used.
 - This has made them **unaffordable for small farmers** and resulted in limited access to this technology.
- **Quality Control:** The production of nano-fertilizers requires strict quality control measures to ensure their effectiveness and safety.
 - However, the **lack of standardized regulations for their production** and distribution has resulted in poor quality control and inconsistent results.
- **Environmental Concerns:** There are concerns about the potential environmental impact of nano-fertilizers, such as their **long-term effects on soil health, water quality, and ecosystem balance.**
 - These concerns must be addressed through proper testing and regulation to ensure their sustainable use.

What is Indian Farmers Fertiliser 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 fertilisers.
- **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.

Conclusion

Nano fertilisers have the potential to improve crop yields, reduce input costs for farmers, and save the government on subsidy bills and urea imports. However, long-term effects on the nutritional quality, bio-safety, efficacy, and reliability requires **further research and thorough audit of field trials** to establish the **effectiveness and safety of using nano fertilisers on crops.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

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 (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 H_2S 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 Monoammonium Phosphate (MAP) and Diammonium Phosphate (DAP). **Hence, statement 3 is correct.**
- **Therefore, option B is the correct answer.**

[Source: DTE](#)

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