

## Enhancing Wheat Yields: The Importance of Utilizing Nano Urea with Traditional Urea

T. H. Borkhatariya, C. M. Godhani and R. J. Chhodavadiya

Ph.D. Scholars, Junagadh Agricultural University, Junagadh 362001, Gujarat, India

Wheat is a staple crop that feeds billions of people worldwide. To meet the increasing demand for food production, farmers rely heavily on fertilizers like urea to boost crop yields. However, excessive and inefficient use of traditional urea often leads to environmental pollution, reduced soil fertility, and economic loss for farmers. Enter nano urea, a revolutionary advancement in agricultural technology that promises to complement traditional urea and improve wheat production sustainably.

### What is Nano Urea?

Nano urea is a liquid fertilizer containing nitrogen particles at the nanoscale. Unlike traditional granular urea, which has a lower nitrogen-use efficiency (NUE) due to leaching and volatilization, nano urea offers superior absorption and utilization by plants. Its ultra-small size allows for better penetration into plant cells, ensuring minimal nitrogen wastage.

### Why Use Nano Urea Alongside Traditional Urea?

While nano urea is a game-changer, using it in isolation may not suffice for wheat's nutrient demands. A strategic combination of nano urea and traditional urea can offer the best of both worlds. Here's why this synergy is vital:

**1. Enhanced Nitrogen Efficiency:** Nano urea improves NUE by ensuring targeted delivery of nitrogen to plant

tissues. When paired with traditional urea, which provides a steady nitrogen supply to the soil, wheat plants can achieve balanced and sustained growth.

- 2. Reduced Environmental Impact:** Over-application of traditional urea often leads to nitrogen loss through runoff, contaminating water bodies and emitting greenhouse gases like nitrous oxide. Nano urea minimizes these losses, making wheat farming more eco-friendly.
- 3. Cost-Effective Farming:** Farmers can reduce the overall quantity of traditional urea used by supplementing it with nano urea. This reduces input costs while maintaining or even increasing crop yields.
- 4. Improved Grain Quality:** The efficient nitrogen delivery from nano urea enhances protein synthesis in wheat, resulting in better grain quality and nutritional value.

### The Role of IFFCO and Indian Government Agencies in Enhancing Nano Urea Usage

The adoption of nano urea in India has gained significant momentum, thanks to the proactive involvement of the Indian Farmers Fertilizer Cooperative (IFFCO) and various government agencies. Together, they aim to revolutionize agriculture by promoting the efficient and sustainable use of nano urea in farmers' fields.

## IFFCO's Pioneering Role in Nano Urea Development and Promotion:

IFFCO has been at the forefront of developing and promoting nano urea in India. Its initiatives include:

1. **Research and Development:** IFFCO developed nano urea as part of the "Make in India" initiative, ensuring it is tailored to the unique agricultural needs of Indian farmers. The formulation was extensively tested in over 11,000 field trials across 94 crops to confirm its effectiveness and safety.
2. **Production and Distribution:** IFFCO has established dedicated facilities for large-scale production of nano urea to ensure its availability to farmers across the country. It also provides the fertilizer in convenient, lightweight bottles, making transportation and handling easier for farmers.
3. **Farmer Awareness Programs:** Conducting training sessions, workshops, and field demonstrations to educate farmers on the benefits of nano urea and its application techniques.
4. **Collaborating with Krishi Vigyan Kendras (KVKs)** to reach rural areas and promote adoption.

## Government Support for Nano Urea Usage:

The Indian government has extended various forms of support to ensure farmers adopt nano urea effectively:

- (a) **Subsidy on Nano Urea:** The government has included nano urea under its fertilizer subsidy program. This makes it significantly cheaper for farmers compared to traditional fertilizers.
  - A 500 ml bottle of nano urea, which replaces a 45 kg bag of granular urea, costs around ₹240, significantly reducing farmers' input costs.

- By subsidizing nano urea, the government aims to lower dependency on imported urea, saving valuable foreign exchange.

- (b) **Drone Assistance for Application:** To enhance the efficiency and ease of applying nano urea, the government is actively promoting the use of drones in agriculture.

- Subsidies of up to 50-100% are provided for farmers and organizations purchasing drones under the Sub-Mission on Agricultural Mechanization (SMAM).

- Demonstration programs have been launched to train farmers in drone-based spraying of nano urea, ensuring uniform coverage and reducing labor costs.

- (c) **Infrastructure Development:** Support for building nano urea manufacturing units to meet growing demand.

- Financial incentives for startups and private players investing in nano fertilizer production and distribution networks.

- (d) **Partnerships and Collaboration:** Collaborating with agricultural universities, state governments, and private entities to promote nano urea usage.

- Encouraging Public-Private Partnerships (PPPs) to extend the reach of nano urea into remote regions.

## Field Results and Success Stories

Studies and field trials have consistently demonstrated the effectiveness of integrating nano urea with traditional urea in wheat farming. Farmers in India, for instance, have reported up to a 10–20% increase in wheat yields while reducing their urea usage by nearly 50%. Such results highlight the potential of this approach to revolutionize wheat farming globally.

As the global population continues to grow, innovative agricultural practices like combining nano urea with traditional fertilizers will play a crucial role in ensuring food security. Governments, agricultural scientists, and industries must work together to make nano urea accessible to farmers, promote awareness, and provide training on its efficient use.

By adopting this sustainable fertilization strategy, we can not only enhance wheat production but also protect

our environment, conserve resources, and pave the way for a greener future in agriculture.

