

Benefits of Nanofertilizer over Conventional Fertilizers

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ARTICLE ID: 012

Introduction-

The word “Nano” means one billionth, so it refers to materials that are measured in a billionth of meter(nm).

Nano fertilizers- are defined as materials in the nanometer scale, usually in the form of nanoparticles, containing macro and micronutrients that are delivered to crops in a controlled mode . Some are naturally existent like zeolite minerals and some are chemically synthesized in lab like nano ammonia, nano urea, nano zinc , nano copper.

Conventional fertilizer are nothing the traditionally used fertilizer by farmers.

Benefits of Nano fertilizer over conventional fertilizer-

It is a way to increase the nutrient efficiency instead of scattering the whole fertilizer on an agriculture field, apply these on the root of the crop. By this, we save our fertilizer and productivity will also increase. If we merge this with nano- technology, their productivity will increase. Size is nanofertilizers are smaller than the size of a plant cell. Nano-fertilizers are also reported to deliver nutrients through plasmodesmata. Plasmodesmata are nano-sized channels of approximately 50–60 nm size used to transport ions between cells. Carbon nanotubes and silica nanoparticles are useful tools for transporting and delivering cargoes (nutrients and other important biochemicals) to plants’ target site. Wherever we apply i.e. on roots or leaves, plant cells absorb this, by this, using less fertilizer we maximize productivity. Two tissues are found at the root zone i.e. Xylem(carry water) and phloem (carry nutrient material). Nanofertilizers absorb through root and mover upward, due to size is small, they absorb easily. If we apply the fertilizer on leaves also, it absorb easily. Nanoparticles of these improve soil quality, water holding capacity and microbial activity that increase plant productivity and health, by this environmental quality increases. But if we use conventional fertilizers excessively, then soil acidity increases, fertility reduces and plant toxicity increases.

Why it is in news?



The govt. has said that it will tread cautiously in accepting the industries demand to allow nano-zinc and nanocopper.

How nano fertilizers help in Agriculture-

Now outburst of world population is a major concern. In upcoming period, when climate changes, it directly impact on agriculture sector. Negative impacts like food security. We can not increase the land or area for this, we have to mainly focus on productivity. The commercial is of nanourea was allowed in November last year that may help to improve crop yield by 18-35%. Also loss of nutrients minimized because if we use conventional fertilizers, how much we apply but that can't fulfil the requirements of crop and can not reach the root zone of crop properly by this nutrient loss, input loss and production cost also increases.

Apart from raising crop yield, it may also help the country cut import of urea, estimated to be about 9 million tonnes in 2019-20. Farmers use 30-32 million tonne of urea per year to grow their crops. E.g- For instance, if farmers are using 2 bags of urea in 1 acre, instead of this they may use 1 bag and 1 bottle of nano urea. By this cost reduced. Experts said that nano urea has the potential to cut overall urea consumption by half. Micronutrients like zinc play a major role in improving the quality of grains, fruits and vegetables as plants absorb them easily.

To strengthen the backward linkages such as infrastructure up gradation of soil texture, creation of awareness amongst relevant stakeholders, policy redesign, and most importantly the research and development that gets deployed into creation of micronutrient fertilizer.

Nanofertilizers promotes growth and reduces environmental pollution. Excessive use of conventional fertilizers causes environmental pollution by leaching, denitrification, and volatilization of chemical fertilizers. Nano-fertilizer offers a slow and gradual release of nutrients for a more extended period. Nano-fertilizers also reduce the crop cycle period and increase crop yield. For example, the amendment of nanoparticles carrying NPK (nitrogen, phosphorus, and potassium) to wheat showed an increase in grain yield and reduced the crop cycle of wheat by 40 days. Similar results were obtained in the maize cropping system.