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## Can Nanopropel fertiliser reforms?

Subsidies can be done away with if recent advancements replace conventional fertilisers

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Successive governments have not initiated meaningful reforms in the fertiliser sector due to the significant gap between the cost of fertilisers and the price paid by farmers.

Consider this: Currently, the cost of supplying a 45 kg bag of urea, the most widely used nitrogen fertiliser, is Rs 2650, against only Rs 240 paid by the farmer. In the case of diammonium phosphate, or DAP, the cost of a 50 kg bag is Rs 4000, against Rs 1350 paid by farmers. The excess cost over the price of Rs 2410 in the case of urea and Rs 2650 for DAP is paid by the Union Government as a subsidy. The subsidy is given to fertiliser manufacturers and importers. They first sell to farmers at the intended low price and then claim reimbursement of the excess cost as a subsidy.

In this backdrop, let us look at the long-pending reform that was recommended by several committees in the past. In essence, the reforms involve decontrolling fertilisers and allowing market-based prices, with subsidies given directly to farmers. However, the political class has not mustered the courage to implement it.

It fears a backlash from the farmers who will have to pay a high price upfront, this being more or less close to the cost of making fertilisers available, i.e., for urea, Rs 2650 (45 kg bag) and DAP, Rs 4000 (50 kg bag). The backlash could be prevented if the subsidy comes to their account in advance, i.e., before they buy fertilisers. But this won't be palatable to the government's finance managers, who would lose the leeway of releasing subsidy payments, albeit to the manufacturers 'at their sweet will', they enjoy under the existing mechanism.

Hence, successive governments have continued with the status quo. Is it possible to break away from it?

Recent developments in the field of nano-fertilisers may offer such a possibility. Last year, on October 17, 2022, Prime Minister Narendra Modi launched liquid nano-urea developed by the Nano Biotechnology Research Centre (NBRC) of the Indian Farmers Fertiliser Cooperative (IFFCO). Recently, on April 26, 2023, Union Minister for Home and Cooperatives Amit Shah launched liquid nano-DAP, also developed by NBRC. Currently, IFFCO is also working on nano-potash and micronutrients such as nano-zinc, nano-boron, etc.

Nano-urea is urea in the form of a nanoparticle con-

taining nitrogen particles of 20-50 nanometres (nm) in size. Likewise, nano-DAP consists of particles of polymer encapsulated DAP that are less than 100 nm. While nano-urea provides nitrogen to plants in liquid form as an alternative to conventional urea, nano-DAP supplies both nitrogen and phosphate nutrients to plants in liquid form as an alternative to conventional DAP.

The beauty of nano-fertiliser lies in its ultra-small size and high surface area, which enable easy absorption by plant leaves. These particles enter the plant through cuticular pores, or stomata, and then penetrate the cell membranes through endocytosis. Once inside the cell, these release nutrients slowly and ensure full absorption by eliminating waste that normally happens with conventional means. This is what is behind IFFCO's claim that a 500-ml bottle of nano-urea is equivalent to a 45-kg bag of conventional urea. The latter contains 46% nitrogen (N) nutrient, or 20 kg (45x0.46) whereas the former contains 4% N, or 20 grams (500x0.04). Yet, the two are equivalent, which means urea in nanoform with a mere 20 grams can achieve what conventional urea does with 20 kg.

**The advantage lies in its ultra-small size and high efficiency: A 500-ml bottle of nano-urea is equivalent to a 45-kg bag of conventional urea**

It is this monumental difference in efficiency that enables IFFCO to deliver a 500-ml bottle of nano-urea to farmers for Rs 240 without any subsidy support, in contrast to equivalent conventional urea in a 45 kg bag, on which the government has to give a subsidy of Rs 2410 to make available at the same price.

Likewise, a 500-ml bottle of nano-DAP is equivalent to a 50-kg bag of conventional DAP. While the former is available to farmers for Rs 600 without any subsidy support, the latter is made available at more than double this price, or Rs 1,350, and that too with the government giving a subsidy of Rs 2,650.

If all conventional urea and DAP are replaced by nano urea and DAP, the government need not give subsidies, yet farmers won't have to pay more for urea; on DAP, they will pay half of what they are paying currently. That will be the most propitious moment for price decontrol.

However, much will depend on the veracity of the claim with regard to the efficiency of nano-fertilisers when compared to conventional fertilisers and whether full replacement of the latter by the former is possible.

(The writer is a policy analyst.)