



POLICY BRIEF



National Dialogue: Innovations for promoting balanced application of **Macro and Micro Nutrient Fertilizers in Indian Agriculture**

Funded by



**BILL & MELINDA
GATES foundation**

Partners



The application of fertilizers that do not meet the nutrient requirements (i.e. balanced nutrient application) of target crops is a widespread problem in India. Farmers overuse urea (N) and seldom apply secondary nutrients (Sulphur, Calcium, and Magnesium) and micro-nutrients (like Zinc, Iron, Copper, Boron, Molybdenum and Manganese) in their plots. This imbalanced application of nutrients affects both long-term health of the soil as well as farmers' own net incomes from agriculture. How do we deploy scientific research, business innovations, and public policies and programs to help promote balanced use of fertilizers in Indian agriculture?

As part of the [Cereal Systems Initiative for South Asia \(CSISA\)](#), the [International Food Policy Research Institute \(IFPRI\)](#) and the [International Plant Nutrition Institute \(IPNI\)](#) organized a National Dialogue on “Innovations for Promoting Balanced Application of Macro and Micro Nutrient Fertilizers in Indian Agriculture” on December 12, 2018, in New Delhi, India, to discuss practical answers to these questions. Farmer leaders, representatives from fertilizer cooperatives, private companies and the Fertilizer Association of India (FAI) participated in the dialogue along with state officials, researchers from national research institutions, CG centers, the World Bank and Indian think tanks to share their ideas and experience and explore new strategies.

This dialogue initiated conversations on three themes: a) policy changes and other innovations needed to accelerate the development of new fertilizer blends; b) ways to develop a soil intelligence system for India, and c) changes in extension and communication of soil health information to farmers to enable the adoption of scientific recommendations.

The introductory session provided the necessary background and the context for the deliberations that followed. Avinash Kishore of IFPRI presented evidence on the myth of farmers being highly sensitive to changes in fertilizer prices. Using plot-level data from a large nationally representative sample of farmers, he showed that farmers' demand for DAP and Potash did not change significantly, even after a steep increase in prices after a change in subsidy policy in 2011. Avinash contended that removal or rationalization of subsidies alone will not be enough to promote balanced use of fertilizers. Scientifically informed extension efforts would still be needed.

Andrew McDonald of CIMMYT emphasized the need to develop a soil intelligence system for India and shared CSISA's ongoing work on developing such a system for Andhra Pradesh and Bihar. In both states, scientists are working to combine the rich data already collected under the Soil Health Cards (SHC) program with spectroscopic measurement of soil properties and remote sensing images to create a rich array of information on soil and plant nutrition requirements customized to the specific needs of farmers and policymakers at a landscape level.

Dr. T. Satyanarayana of IPNI highlighted the importance of micronutrients in promoting balanced fertilization of soils and innovative methods that exist in determining soil health for appropriate action. Mr. Ajay Vir Jakhar, chairman of Punjab Farmers' Commission, highlighted the need to strengthen the public extension system to bring scientific information to farmers.

Director General of FAI, Shri Satish Chander, averred that while approval of new fertilizer blends in India is slow and cumbersome, it is not the main hurdle to move innovation in India's fertilizer sector. The Fertilizer Control Order (FCO) has undergone reforms over the years. While more reforms in the FCO will be helpful, price control and heavy subsidy on Urea, a large share of which, he said, goes to international fertilizer companies and not farmers, was the big problem in India's fertilizer sector.





Innovations in the fertilizer sector

This first session on innovations in the fertilizer sector aimed to discuss the proposed direct-benefit transfer (DBT) scheme of the Ministry of Chemicals and Fertilizers and challenges affecting the production of customized fertilizer blends. Further, the current policy requires renewals every three years and the involvement of multiple departments and ministries, and separate sanction from each state government. This process is cumbersome and discourages investment in developing and launching new fertilizer blends due to the risk of non-renewal of permission to sell the licensed products after the first three years. The following key insights emerged from this session:

i. Fertilizer companies support the implementation of DBT of fertilizer subsidies to farmers. However, the true DBT of subsidy is yet to be implemented. At present, the government is implementing Aadhar-linked sales of fertilizers to reduce leakage. In the current system, fertilizer companies get subsidy payments from the government only after the fertilizer is sold to farmers. The resulting delay is creating working capital problems for private companies that need to be addressed.

ii. Microsave has been monitoring the implementation of DBT for fertilizers in several states. They found that poor connectivity is a problem for Aadhar-linked sales of fertilizers as the Aadhar-linked sales can take several minutes. In the peak season, retailers often sell fertilizers without swiping the Aadhar card to save time.

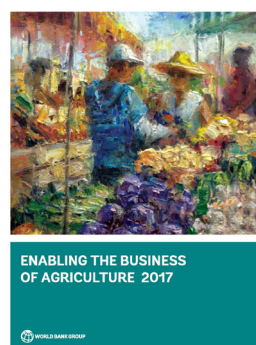
They enter the Aadhar data later. The plan to link Aadhar with land records and fertilizer recommendations in Soil Health Cards has not worked at all. Farmers need information well in advance. Giving them information right when they are ready to buy fertilizers is unlikely to work.

iii. Blended fertilizers have not been successful in India. Their high cost is a big reason for their low popularity and minuscule market share. Bulk blending, though less precise, may be more cost effective. However, the government does not permit bulk blending because it may lead to a proliferation of adulterated poor-quality products by less credible firms.

iv. Dr. Amit Rastogi from Coromandel highlighted the importance of user-focused product development. Indian farmers are price sensitive, risk averse and do not prefer inputs that require multiple applications. Rising labor costs and labor availability are acutely felt problems by farmers across India. New products, therefore, should aim to reduce labor costs of application and at the same time, protect against risks.

v. The Fertilizer Control Order should be replaced by an act like the Seeds Act or Insecticides Act. The FCO restricts itself only to supply management of fertilizers in the country and involves a long process for product approvals. The FCO is under the Essential Commodities Act that manages the supply and demand of scarce commodities. But fertilizer supply in India is not scarce currently and removal of FCO

from the ECA will enable more flexibility in product testing, approvals and other regulatory requirements, including price setting.



The World Bank report on Enabling the Business of Agriculture 2017 compared 62 countries on various parameters to understand how laws and regulations affect private sector development for agribusiness. The report found that of the 62 countries studied, it takes the longest time (804 days) to register a new fertilizer product in India .



Innovations in scientific methods of soil health assessment and targeting

To promote balanced nutrition, certain states are resorting to 100% subsidies on micronutrients. While leveraging subsidies to promote balanced nutrient application may be an appropriate strategy in the short-term, the long-term impacts are still not clear. At the same time, targeting product distribution based on the Soil Health Card scheme may not be appropriate. Product targeting is valuable in regions where there is a need for certain nutrients as determined by existing soil properties. The current methods of soil sampling and analysis are time and labor intensive. The current approach of soil testing and the infrastructure available to conduct soil testing are not sufficient to cater to the requirement of millions of smallholder farmers in India. CSISA's research shows that wet tests are slow and cumbersome, and test-based fertilizer use recommendations have little impact on farmers' fertilizer use. Modern scientific methods can provide such information in a rapid manner. Using advanced instruments and analysis techniques such as spectroscopy and remote sensing, it is now possible to generate digital maps that contain information on soil properties. The second session aimed to integrate these innovations in policy and the following key recommendations from the same:

- i. Nutrient management in rainfed systems is more crucial than other agro-ecologies and should be a priority. Customized blends of fertilizers can provide the nutrient requirements of different agro-ecologies. Dr. Kamal Kumar Singh of Adventz pointed towards the need for predictive soil maps that rely on precise data. Cluster-wise maps of similar geographies can be created and used to target product development and extension activities across the country.
- ii. A simpler process of registration of new products will ease the production of custom blends. Some leading private sector companies have invested in the development of niche products. However, the production process is investment-intensive and hence customized products are more expensive. Heavily subsidized fertilizers have crowded out the market for such products. High costs of manufacturing Zincated Urea and Zincated DAP have also affected their markets, since the current levels of subsidy on these products are small and not sufficient to cover their costs. Therefore, products which are approved under FCO also have not seen their fair share of the market.
- iii. The bulk blending of fertilizers should also be allowed to ensure economies of scale. Research institutions can support this process by generating landscape level soil data using legacy data.

Innovative methods of extension

The Soil Health Card Scheme aims to reach all 140 million farmers in the country with soil health reports and crop-specific fertilizer recommendations. At the time of publication, the government has carried out wet-tests of more than 47 million soil samples and distributed 176 million Soil Health Cards to farmers across India under the scheme. However, the rich data collected from millions of soil tests remains underutilized and there is scant evidence on the impact of the scheme. The third session of the dialogue presented evidence from the ground on the working of the SHC scheme, farmers' response to the scientific information provided to them, and experiment results on different ways to make the scheme more successful.

- i. Most farmers do not understand the soil test results and fertilizer use recommendations presented in the Soil Health Cards given to them. A study by IFPRI in Bihar and Odisha shows that small changes in the design of the SHC and the way information is presented in it — bigger fonts, use of colors, pictures, symbols, and local units, putting the most important information first, etc.— can make it easier for farmers to better understand the Soil Health Card. An independent study by IDinsight also emphasized the need for similar changes in the design of the SHC.
- ii. An experiment by Precision Agriculture for Development (PAD) in Gujarat shows that giving SHC to farmers, and then following up with cell phone-based extension to explain the information and answer any questions farmers may have, can lead to a significant increase in farmers' adoption of the recommended fertilizer dosage at only a small additional cost.

The Cereal Systems Initiative for South Asia (CSISA) is a regional initiative to sustainably increase the productivity of cereal-based cropping systems, thus improving food security and farmers' livelihoods in Bangladesh, India and Nepal. CSISA works with public and private partners to support the widespread adoption of resource-conserving and climate-resilient farming technologies and practices. The initiative is led by the International Maize and Wheat Improvement Center (CIMMYT), implemented jointly with the International Food Policy Research Institute (IFPRI) and the International Rice Research Institute (IRRI), and is funded by USAID and the Bill & Melinda Gates Foundation.

www.csisa.org
