

## Challenges in implementing India's Aadhaar-enabled fertilizer management system

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### Background

Fertilizer subsidies in India currently account for the second-largest government transfer, with estimated outlays of over 700 billion rupees (USD 10 billion) projected for the 2018-19 fiscal year. Because of the vast size of fertilizer subsidies and the subsequent market distortions they introduce, India's fertilizer subsidies have been the subject of much scrutiny for some time. Among other effects, these subsidies introduce arbitrage opportunities whereby subsidized fertilizer supplies from India can be smuggled across porous borders into Nepal and Bangladesh and sold in so-called 'grey markets.' Several reforms have been introduced in recent years in an attempt to improve the distribution of fertilizers across the country, including the introduction of the mobile fertilizer management system (mFMS), which electronically tracks fertilizer supplies down the supply chain from manufacturer to input dealer. More recently, the Government of India has introduced what is commonly referred to – albeit incorrectly – as a Direct Benefit Transfer (DBT) scheme for fertilizers. The government has previously introduced DBT programs for liquefied petroleum gas cylinders for domestic use, and several state governments have recently introduced DBT schemes for seeds. One of the primary motivations behind DBT for fertilizers is that it would enable better monitoring of transactions of heavily subsidized fertilizer across the country. Digitizing purchases would also allow inventories to be managed better and the system's demand-prediction ability to be improved, given that most of the annual demand is concentrated into 3–4 months. A longer-term goal is to integrate land records and fertilizer recommendations through their Aadhaar (unique identification) numbers so that, at the time of purchase, farmers would only be allowed to purchase subsidized fertilizer according to the recommendations on their soil health cards.

### Status of the fertilizer "DBT"

In February 2011, a taskforce headed by Nandan Nilekani (former chairman of the Unique Identification Authority of India, the organization behind India's Aadhaar system) recommended a phased approach for implementing a DBT for fertilizer subsidies in India. Phase I involved producing comprehensive digital maps of the retail fertilizer supply chain, with the subsidy still being provided to the fertilizer manufacturer based on receipt at the retail level (i.e., independent of sales). This phase has been operational since 2011. The policy is presently in Phase II, where the aim is to disburse subsidies to the fertilizer manufacturer based on sales made at the retail level (electronically recorded on point-of-sale, or PoS, devices), rather than merely on receipts at the district level.

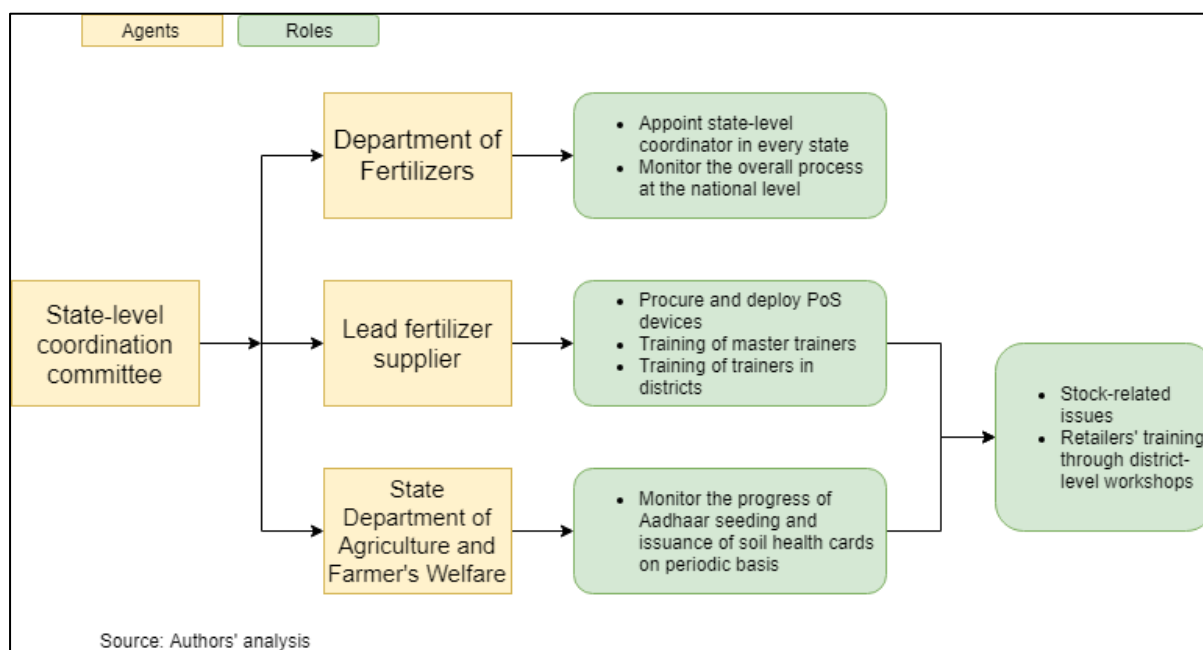


*The Cereal Systems Initiative for South Asia (CSISA) is a regional initiative to sustainably increase the productivity of cereal-based cropping systems, thus improving food security and farmers' livelihoods in Bangladesh, India and Nepal. CSISA works with public and private partners to support the widespread 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 the US Agency for International Development (USAID) and the Bill & Melinda Gates Foundation.*

While this program is informally designated a 'DBT', it does not follow the traditional form of a DBT. Rather than transferring the subsidy benefits directly to identified beneficiaries, subsidy payments continue to be made to fertilizer manufacturers. Consequently, the prices that end users face are not reflective of world market conditions, but rather remain based upon the nutrient content of the fertilizers and the vintage of the manufacturing facility.

A pilot of this program was implemented across 17 districts during Rabi (dry season) 2016–17. An integrated fertilizer management system (IFMS) was also launched, with support from the Indian National Informatics Centre (NIC), to record and monitor all transactions from the importing or manufacturing stage to final retail purchases at the farmer level. While the pilot districts were still learning from implementation and identifying key bottlenecks and gaps, the central government issued orders for a nationwide rollout, with intended effect from June 1, 2017. Preparations for this widescale rollout at the state level included the establishment of state-level committees for the management and implementation of the program and the appointment of a central government-recruited state-coordinator to work closely with the State Department of Agriculture (Figure 1). The lead fertilizer company in each state was also directed to procure PoS devices such that all retailers had them before the policy was officially in effect. At the time of this writing the program has yet to be fully implemented across all the states in the country, following several adjustments to the official implementation date. The program is now being implemented in a state-wise, phased manner through Kharif (monsoon season) 2018.

**Figure 1 Pan-India Direct Benefit Transfer system**



Note: PoS = point-of-sale.

## Preliminary Implementation Process Assessment

Since April 2017, IFPRI has been engaged in focused and fruitful discussions with various stakeholders at the Centre and at state level to better understand the challenges and opportunities in the implementation of this policy. These stakeholders include the Joint Secretary and NIC officials in the

Department of Fertilizers within the Ministry of Chemicals and Fertilizers; the Joint Directors (Inputs) and the state-coordinators in the states of Bihar, Odisha, and Uttar Pradesh; staff and researchers from the consulting firm MicroSave; and senior officials of the Fertilizer Association of India (FAI).

There is a clear indication that full binding implementation of the DBT will be delayed further.<sup>1</sup> The primary reason cited for this delay has been the unavailability of PoS machines across the country. Only three manufacturers have been notified to supply PoS machines for more than 500,000 retailers.<sup>2</sup> In the three states of our focus (Bihar, Odisha, and Uttar Pradesh) alone, PoS machines had to be supplied to more than 100,000 registered retailers. By May 2017, shortly before the initial June 1 implementation date, fewer than 10 percent of retailers in these states had access to the PoS machines. In the course of the next 10 months, only about 40 percent of retailers in the country have received the PoS machines.<sup>3</sup>

The introduction of a Goods and Services Tax (GST) in India has also been cited as reason for delays in procurement of the devices. Introduced at midnight on June 30, 2017, the GST required the providers of all goods and services in the country to pre-register with a unique GST number. The uncertainties of pre- and post-tax costs (and their implications) led to several manufacturers slowing down their production, trying to exhaust existing inventory and not producing anything new until the actual impact of GST had become clear (BusinessLine 2017).

Many farmer protests also took place in India in 2017, primarily because:

- Surplus production of pulses that led to a steep decline in market prices;
- Droughts in states such as Maharashtra forced farmers to seek loans; and
- The failure of state governments to fulfill their promises of loan waivers to farmers contributed to a string of farmer protests, the most recent being in Rajasthan.<sup>4</sup>

These protests could also be attributed to the delay in implementation of the scheme, since farmer dissatisfaction with transaction delays may promote another round of protests (Biswas 2017; Firstpost 2017).

While the program was initially designed by the central government, the actual implementation was undertaken by state governments. State departments of agriculture were directed to undertake a specific set of activities in anticipation of the implementation date. These preliminaries included training district-level nodal officers and master trainers on the use of PoS machines and data management, in close coordination with the state coordinator. Like other schemes, even the implementation of this scheme was marred by state-specific factors. Uttar Pradesh and Bihar, for example, were better prepared for the policy rollout than Odisha, as they had been able to complete the majority of trainings in time for the planned nationwide rollout, and a greater percentage of retailers in those states were reported to have received the PoS devices. At least part of this advantage can be attributed to prior experience with the overall operational guidelines of the program

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<sup>1</sup> Binding here implies that no retail sales will be made offline (without the use of PoS machines) and without identification of the consumers through their Aadhaar card numbers

<sup>2</sup> Department of Fertilizers FMS database

<sup>3</sup> Department of Fertilizers FMS database

<sup>4</sup> <http://indianexpress.com/article/india/rajasthan-farmers-protest-third-round-of-talks-with-government-on-thursday-4842471/>

(particularly the training requirements of the retailers), since one district in both Uttar Pradesh and Bihar was included in the initial pilot. Towards the end of May 2017, and in line with the intended implementation date, Uttar Pradesh had completed the training of all retailers statewide, despite having not received its full allotment of PoS devices. Bihar, on the other hand, had completed only around 30 percent of trainings while waiting for the remaining PoS devices to arrive. The coordinators for both states had initiated planning meetings with district collectors to conduct weekly progress reviews, and were receiving almost daily reports on the placement of PoS device orders, as well as on their dispatch and receipt. They were also working closely with the lead fertilizer supplier in their respective states to ensure that all infrastructure and trainings were in place before the intended implementation date. Uttar Pradesh revoked an earlier ban on fertilizer retail licenses within 10 kilometers of the border with Nepal—which had been in place to reduce cross-border smuggling of fertilizers—arguing that the new system would reduce the inconvenience and high travel costs for residents of border areas. Since all transactions could be tracked through the IFMS, pilferage would be less of a concern. Finally, the governments of both Uttar Pradesh and Bihar had facilitated close coordination and convergence between various departments such as telecommunications and information technology, which was almost certainly necessary for the successful implementation of this scheme.

There were noticeable delays in the procurement of the PoS devices in Odisha, and training had not been undertaken as it was intended that devices should reach every retailer before it was initiated.

### Learning from the Rabi 2016/2017 Pilot

The pilot phase of this DBT was rolled out in Rabi 2016/17. Rabi typically witnesses relatively less fertilizer demand, and this period of low demand saw some successes in the system. For example, retailers charged printed maximum retail prices (MRPs) for fertilizer as compared with the higher prices they would have charged earlier, and there were no delays in fertilizer availability (although this was attributed to the mFMS). Anecdotal evidence suggests that before the introduction of PoS, retailers could make sales without printing sales receipts, and sell fertilizer in loose quantities (smaller than the standard 50-kilogram bags of urea). In that way, they might mark up prices above the MRP. Farmers told us of several instances of dealers exercising monopoly power, citing supply shortages, and marking up prices.



Farmer identifying himself through the Point-of-Sale machine. Credit: Vartika Singh, 2018

Giri et al. (2017) also identified several implementation bottlenecks. Identification and verification emerged as important challenges, largely due to difficulties of biometric authentication because many farmers still do not have Aadhar cards. Furthermore, the transaction time needed under the proposed system was considerably higher than before, with retailers recording farmers' demographic details like landholding and tenancy status, as well as transactional details such as the name of both the company and the specific plant where the fertilizer was manufactured. The pre-pilot transaction time was as high as 10.5 minutes per transaction, and although the time required had gone down to 5 minutes per transaction by the end of the pilot, it is still doubtful that retailers could manage these sorts of transactional burdens during peak periods

when they typically expect to service approximately 300–400 farmers per day. Giri et al. (2017) found that retailers were undertaking workarounds when the intended procedure was not feasible or when transaction costs were simply too high. When they were faced with heavy volumes, or when transactions failed because of network or connectivity issues, retailers would make the sales, manually record notes on the transactions in their ledgers, and ask the farmers to return later in the day for biometric authentication. When farmers lacked verifiable identification (e.g., if they did not have Aadhaar cards or if the biometric verification failed), retailers would ask for the Aadhaar card number of the farmers' relatives or acquaintances in order to complete the transaction, adding the number of bags to the purchase history of the next person in line. While these anecdotes were not perhaps ubiquitous experiences, the evidence that retailers failed to follow the operational guidelines to the letter and reverted to workarounds is relatively widespread, and was likely one of the underlying factors for the subsequent delays in the nationwide implementation date. Furthermore, the traditional credit-based nature of these transactions between retailer and farmer also prompted retailers to make the sales without immediately recording them. This had two important implications. First, if this were to take place as part of the official nationwide rollout of DBT, fertilizer manufacturers would fail to receive subsidies for these transactions, since subsidy payments are supposed to be based solely on the recorded transactions. Second, since district nodal authorities rely on these transaction records to make predictions about fertilizer demand and supply, missing transactions could potentially lead to an underestimation of district-level fertilizer demand or an overestimation of district-level fertilizer supply, which could inhibit timely fertilizer stock updates and lead to shortages.

## Industry Perspective

We also interacted with senior officials from the Fertilizer Association of India (FAI), the country's leading industry group. Overall, there was a positive outlook toward this "forward-looking" policy and they were hopeful that—barring a few initial, inevitable glitches—there would be large successes conditional on appropriate implementation. From the industry's perspective, the greatest opportunities entailed a more timely disbursement of subsidy payments. Subsidy backlogs remain a major constraint in the day-to-day operations of these manufacturers, resulting in considerable reductions in working capital and hindering their ability to invest. These backlogs have increased from 31 percent at the end of financial year (FY) 2014-15 to 59 percent at the end of FY 2016-17 and were expected to remain high through the end of FY 2017-18. In monetary terms, there has been yearly carryforward of subsidy payments on the order of INR 300–400 billion (USD 4.6 billion to 6 billion) for the past 3–4 years (Chander 2016). It is unclear whether or to what extent the introduction of this program will reduce these carryforwards, especially since the process of obtaining subsidy reimbursements has been made even more cumbersome for the fertilizer manufacturers. The initial process of obtaining subsidy was based on the confirmation of receipt of fertilizer at the railheads or district headquarters. The manufacturer would then be paid 90 percent of the subsidy upon confirmation by the respective district authorities. Under the new program, input dealers submit sale receipts to the district authorities for fertilizer manufacturers to receive subsidies. Dealers' concerns around the revised import rates of inputs due to the introduction of GST and marginal changes in the prices of outputs have been further exacerbated by the revised process of obtaining subsidies.

Retailers have also been burdened with multiple responsibilities in the course of a transaction, including providing advisory services to farmers based on soil health analyses seeded in the Aadhaar database; entering farmers' details at the time of purchase; and updating stock information. They also have to print and save sales receipts and submit them to the industry representatives. These tasks are burdensome for retailers who are already operating on very thin margins. Retailers' commissions have not been revised for more than 10 years, and there is a strong belief that these additional burdens will further disincentivize them from adhering to the program's operational guidelines. Giri et al. (2017) noted other challenges at the retail level, with retailers complaining about increased internet and telephone expenses for operating the PoS machines; their inability to view or manually input data into the PoS devices because of the small screens; and having to make more than one attempt to record transactions, which is both frustrating and time-consuming. On this latter point, more than 50 percent of retailers reported attempting multiple transactions due to either network or transaction failures in the middle of a transaction. The PoS machines supplied during the pilot did not support offline data entry, and retailers had to make multiple attempts in the absence of effective network connectivity.

## Looking Ahead

There is considerable hope within policy circles that these reforms will improve transaction monitoring, and reduce leakages to non-agricultural uses or across borders, speed up the distribution of subsidy payments to fertilizer manufacturers, and eventually improve the application rates for chemical fertilizers. There is, however, tacit acknowledgement of the barriers and a pent-up demand for evidence that sheds light on these gaps and allows planners to further strengthen and support both the industry and farmers. Some other areas may need to be improved before a complete rollout is implemented:

1. Efforts to strengthen formal channels for distributing fertilizers will typically require a credible enforcement regime with a manageable system for monitoring potentially fraudulent transactions, and a well-defined system of penalties to levy on those found guilty of violating regulations. At present, the task of monitoring transactions falls to district collectors who, along with myriad other responsibilities, are also responsible for monitoring retail-level transactions within their districts. Even if this was their only responsibility, it would be a daunting task because of the sheer size of the fertilizer industry. Even the smallest district has between 300 and 500 retailers, and monitoring all their records on a regular basis would be incredibly time-consuming and virtually impossible during peak retail periods. The policy also stops short of prescribing recommended actions to be taken in the case of fraudulent transactions or excess purchases. While it is unclear how frequent such transactions would occur once this program were rolled out on a nationwide basis, Giri et al. (2017) found that approximately 10 percent of transactions had been adjusted, implying that the transaction details recorded were not reflective of the actual transaction. In times of peak demand or when there is poor network connectivity, one could imagine that the frequency of these adjustments could be considerably higher.
2. Giri et al. (2017) also observed that there have been delays in updating mFMS to reflect fertilizer deliveries at the retailer level. As a result, mFMS information did not accurately reflect retailers' fertilizer stocks. These stock records serve as the figure of record for salable inventories. On some occasions, even if a retailer had taken physical possession of fertilizer stocks, their sale would not be possible if the stocks had not been updated on the system by officers at the district level, or if there had been lags in data synchronization due to poor

network connectivity. Giri et al. (2017) noted that 58 percent of retailers reported a delay of more than 1 day in updating the mFMS database. In such a situation, rather than refusing the transaction, retailers would typically sell the fertilizer manually and record the transaction later.

3. Relying on input dealers to also advise farmers on recommended fertilizer quantities may have little credibility. While input dealers are typically a primary source of information about new technologies and practices, there is evidently some distrust towards them when they stand to make a profit from farmers' purchases. Authors' interactions with farmers in Bihar and Odisha revealed that input dealers were perceived as less trustworthy sources of information on fertilizer recommendations. The common perception among farmers was that input dealers would only recommend fertilizers that earned them higher commission. This is relevant, considering planned integration between the Department of Fertilizers, the national Soil Health Card scheme, and the Department of Land Resources within the Ministry of Rural Development to link all data of every individual through their unique identification number.

At present, the policy is being rolled out in phases across different states, with varying degrees of cooperation and resistance. This evaluation of the implementation processes across the states of Bihar, Odisha, and Uttar Pradesh provide an opportunity to make significant recommendations and feedback to policy makers and implementers at the state and central level to influence and enhance its chances for success.

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