

# Direct Benefit Transfer in Fertilizer:

Fourth round of concurrent  
evaluation—A nationally  
representative study





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## Abbreviations

ATM	Automated Teller Machine
BVFCL	Brahmaputra Valley Fertilizer Corporation Limited
DBT	Direct Benefit Transfer
DBT-F	Direct Benefit Transfer in Fertilizer
DCT	Direct Cash Transfer
DoF	Department of Fertilizers
DD	Demand draft
DILRMP	Digital India Land Record Modernization Program
EPIC	Electoral Photo Identity Card
FCO	Fertilizer Control Order
FMS	Fertilizer Management System
GRM	Grievance Resolution Mechanism
HIMFED	Himachal Pradesh State Co-operative Marketing and Consumers Federation Limited
INR	Indian Rupee
ID	Identity
IFFCO	Indian Farmers Fertilizer Cooperative
IT	Information Technology
KCC	Kisan Credit Card
Kg	Kilogram
LFS	Lead Fertilizer Supplier
LPG	Liquefied Petroleum Gas
MCO	Movement Control Order
MDR	Merchant Discount Rate
mFMS	Mobile Fertilizer Management System
MoS	Measure of Size
MRP	Maximum Retail Price
MSC	MicroSave Consulting
NCU	Neem -coated urea
NITI Aayog	National Institute for Transforming India Aayog
PoS Device	Point of Sale device (It is an electronic device used to process sale transaction)
PPS	Probability proportional to the size
SECC	Socio-Economic and Caste Census
SHC	Soil Health Card
SIM	Subscriber Identity Module
TAT	Turnaround-time
USD	United States Dollar

# 1. Executive summary



India is the world's second-largest consumer of fertilizer.<sup>1</sup> The farming sector and farmers comprise the majority of India's workforce. To support them, the Government of India provides a fertilizer subsidy, the budget for which is approximately USD 10.71 billion (INR 750 billion) for 2019-20.<sup>2</sup> The government's role in shaping the fertilizer landscape goes back to 1957 when it introduced the Fertilizer Control Order (FCO) to regulate the sale, price, and quality of fertilizers followed by the Movement Control Order (MCO) in 1973 to regulate the distribution of fertilizer.<sup>3</sup> The government did not provide subsidies to farmers to purchase fertilizer until 1977. After 1977, the Government of India introduced a range of fertilizer subsidies to ensure price stability and efficient distribution to farmers.

Over the years, fertilizer distribution became prone to "leakages." The Economic Survey of 2015-16 estimated that 65% of the fertilizer produced does not reach the intended beneficiaries—small and marginal farmers.<sup>4</sup> Initiatives, including technological interventions through the Fertilizer Management System (FMS) in 2007 and neem coating of urea in 2008 have resulted in increased transparency in the fertilizer distribution system. Yet they have not managed to curb the leakage.<sup>5</sup>

In the Union Budget 2016-17, the Government of India proposed to bring fertilizer subsidy under the Direct Benefit

Transfer (DBT) system. DBT in Fertilizer (DBT-F) is a modified subsidy payment system under which the government remits a subsidy amount to fertilizer companies after fertilizer retailers have sold fertilizer to farmers through successful *Aadhaar*-based authentication.<sup>6</sup> Unlike the previous system where subsidy was paid after production and dispatch of fertilizer, farmers under the DBT-F system may purchase any quantity of subsidized fertilizer regardless of the land size they possess or cultivate.

In 2016, the government announced pilots for DBT-F in 16 districts across India before the pan India roll-out.<sup>7</sup>

<sup>1</sup> [India's Position in World Agriculture, Agriculture Research Data Book 2018, Indian Agricultural Statistics Research Institute](#)

<sup>2</sup> 1 USD = 70 INR (As on 22nd April, 2019)

<sup>3</sup> <https://cfqcti.dacnet.nic.in/dutenf.html> and <http://fert.nic.in/page/work-allocation-0>

<sup>4</sup> <https://www.indiabudget.gov.in/budget2016-2017/es2015-16/echapvol1-09.pdf>

<sup>5</sup> <http://mfms.nic.in/> and <http://pib.nic.in/newsite/PrintRelease.aspx?relid=159903>

<sup>6</sup> *Aadhaar* is India's national identity number, which uses citizens' biometrics (<https://uidai.gov.in/>). When a farmer authenticates using *Aadhaar*, this means the retailer asks the farmer for their *Aadhaar* number, which the retailer enters into the PoS device in the farmer's presence. The retailer then asks the farmer to apply their fingerprint to the PoS device for biometric authentication.

<sup>7</sup> The 16 districts were Una (Himachal Pradesh), Kishanganj (Bihar), Hoshangabad (Madhya Pradesh), Karnal and Kurukshetra (Haryana), Kannur (Kerala), Nasik and Raigarh Maharashtra, Tumkur (Karnataka), Rangareddy (Telangana), Krishna and West Godavari (Andhra Pradesh, Maldah and South 24 Parganas (West Bengal), Narmada (Gujarat), and Pali (Rajasthan).

The government then launched the pilots in 14 districts out of the proposed 16.<sup>8</sup> Before the official pilot phase, the government launched a pre-pilot in Krishna and West Godavari districts of Andhra Pradesh in September, 2016 to test the concept. Later, the pilot was scaled to an additional 12 districts between January and March 2017.

Acting on the request of the National Institute for Transforming India (NITI) Aayog and Department of Fertilizers (DoF), MicroSave Consulting (MSC) conducted four rounds of evaluation.<sup>9</sup> The first three rounds of the evaluation consisted of the pilot districts, while the fourth round included the pan-India rollout, as well as a “booster survey” of the 14 pilot districts studied in Round III.

For the nationally representative study, MSC conducted quantitative research with 1,182 retailers and 11,281 farmers (please see Annex I for the detailed methodology). We conducted qualitative in-depth interviews with 74

retailers and 140 farmers. Furthermore, to gain a holistic view, we also conducted intensive qualitative interviews with other stakeholders including district government officials (District Agriculture Officers and Block Agriculture Officers), fertilizer company representatives (Lead Fertilizer Suppliers (LFS) and others), and state coordinators and district consultants.

This report provides detailed findings from the evaluation conducted in Round IV for fertilizer retailers and farmers on training and awareness, transaction status and experience, compliance with processes, grievance resolution mechanisms (GRM), and farmer feedback on DBT-F and the cashless payment system. This report provides recommendations to aid policy-level decision making and improve operations on the ground. It also highlights findings from the booster survey, which includes the 14 pilot districts compared to the previous rounds of evaluation.

## 1.1. Key findings

- 01 Incidences of manual sales without *Aadhaar* and adjusted transactions were at 13.0%.<sup>10</sup> The retailers adjusted transactions when a farmer’s *Aadhaar* was not available at the time of fertilizer purchase or in cases when the *Aadhaar* authentication failed.<sup>11</sup> We also observed that retailers did not ask farmers to provide their *Aadhaar* number to purchase fertilizer and simply sold the fertilizer to manually adjusting the transactions later.
- 02 Among *Aadhaar*-authenticated transactions, 86.6% were successful on the first attempt. Overall, successful *Aadhaar* authentication in three attempts was at 98.0%.<sup>12</sup>
- 03 The average transaction time through PoS device was three to four minutes.<sup>13</sup>
- 04 Among farmers, 94.0% received transaction proof. Of them, 83.6% received printed receipts, 10.1% received handwritten receipts, and the remaining 6.3% received both printed and handwritten receipts.
- 05 During the peak agriculture season, 60.0% of retailers faced issues in managing sales effectively. These
- 06 retailers sold the fertilizer manually and adjusted the transactions immediately after the sale, or later.
- 06 Among the retailers, 39.5% received physical stock of the fertilizer before receiving the stock acknowledgment ID.<sup>14</sup> Ideally, retailers should not sell fertilizer without updating their stock in PoS devices. However, pressure from farmers and fear of losing business compelled retailers to sell stock without updating the acknowledgment ID in the PoS devices and without authenticating the farmers’ *Aadhaar*. Following the sale, the retailers updated the stock in the POS devices and adjusted the transactions manually.
- 07 Training and awareness efforts for retailers were laudable. Of the total retailers surveyed, 90.0% received at least two training sessions. Of these retailers, 83.1% stated that the training was sufficient to understand the features and operations of the PoS device.<sup>15</sup>
- 08 Among the farmers, 92.0% were aware of the *Aadhaar* requirement to buy fertilizer. However, 75.0% of the farmers realized *Aadhaar* was required only after they arrived at the retailer-outlet. They claimed

<sup>8</sup> The 14 districts were Una (Himachal Pradesh), Kishanganj (Bihar), Hoshangabad (Madhya Pradesh), Karnal and Kurukshetra (Haryana), Thrissur (Kerala), Nasik and Raigarh (Maharashtra), Tumkur (Karnataka), Rangareddy (Telangana), Krishna and West Godavari (Andhra Pradesh, Narmada (Gujarat), and Pali (Rajasthan).

<sup>9</sup> <http://niti.gov.in/> and <http://fert.nic.in/>

<sup>10</sup> “Adjusted transaction” means that retailers use their own or someone else’s *Aadhaar* number instead of the farmers to authenticate and register sales, either during the sale or later. Such “adjusted transactions” may also take the form of the retailer registering all sales for the day using a few *Aadhaar* numbers.

<sup>11</sup> That is, respondents did not bring their *Aadhaar* when they purchased fertilizer.

<sup>12</sup> Data is provided for the farmers whose *Aadhaar* authentication was successful and did not include data from farmers who bought fertilizer manually.

<sup>13</sup> Transaction time measure the duration once the retailer begins to input the farmer’s *Aadhaar* number into the PoS device through printing of the PoS receipt.

<sup>14</sup> Retailers require a “stock acknowledgement ID” to update the physical stock in the PoS application (mFMS application). After updating the physical stock in the PoS application, retailers can sell fertilizer to buyers who authenticate using *Aadhaar*. This enables online tracking of fertilizer sales and stock in real time.

<sup>15</sup> A point-of-sale (PoS) device is a hardware system that processes payments at retail locations through debit or credit cards or through biometric authentication. For details see: [http://mfms.nic.in/dbt/dbt\\_epos\\_user\\_manual.pdf](http://mfms.nic.in/dbt/dbt_epos_user_manual.pdf)



that they did not receive information regarding the *Aadhaar* requirement from any credible source, such as government or *panchayat* or village officials.

09 Retailers faced issues, such as those related to the server (75.0%), authentication problems (46.0%), connectivity challenges (37.0%), and shortened battery life of PoS devices (31.0%). Only 38.0% of the retailers were aware of the toll-free number to register and resolve complaints, of which 43.0% used it. 69.0% of the users were satisfied with the support they received through the toll-free number.

10 Farmers did not favor direct cash transfers (DCT) in fertilizer even if the government paid the subsidy in advance.<sup>16</sup> Farmers felt that the system of cash transfer would increase their financial burden in the form of their input cost. Furthermore, despite a 99.0% bank account penetration at the household level, farmers believed that the system would not work because of their experience with payment issues related to the Liquefied Petroleum Gas (LPG) subsidy.<sup>17</sup>

11 Awareness of Soil Health Card (SHC) among farmers remained poor at only 25.2% of the total farmers surveyed.<sup>18</sup> An alarmingly low number of farmers had an SHC. However, the usage among the small proportion of farmers who had SHC was high.

12 Of the farmers, 93.0% used cash to purchase fertilizer. However, 42.0% were willing to pay using a cashless mode, such as debit or credit card and wallets in the future—if sufficient payment infrastructure was ensured. Similarly, despite 72.0% of retailers

having sold fertilizer for cash, 65.0% would prefer to conduct sales using a cashless mode because they considered it convenient and time-saving.

13 The majority of farmers (75.0%) and retailers (59.0%) preferred the DBT-F system to the previous annual system of fertilizer distribution.

14 DBT-F and other initiatives by the government had the following impact:

- Among the farmers, 76.5% were aware that the urea was coated with extract of neem (*Azadirachta indica*). Of them, 94.9% perceived that neem-coated urea (NCU) was beneficial for agricultural crops.
- Based on MSC's recommendation, the government doubled the retailer or cooperative commission on urea, which resulted in higher margins.<sup>19</sup> However, the extent of margin passed on to retailers varies depending on market dynamics and wholesalers involved.
- Anecdotal evidence suggests that reducing the weight of a urea bag by 5 kg resulted in optimum use of urea, particularly for small and marginal farmers.

15 While 87.0% of farmers used pesticides on their crops, 65.0% acknowledged health-related concerns. Farmers commonly experienced respiratory, ocular, and epidermal ailments after or while applying pesticides.



<sup>16</sup> Under DCT, farmers will pay the non-subsidized market price to buy fertilizer and then receive cash in their bank accounts in lieu of the subsidy.

<sup>17</sup> <https://www.microsave.net/2018/10/31/fuel-subsidy-reform-experiences-from-india-and-learnings-for-other-countries/>

<sup>18</sup> The purpose of the SHC is to identify macro- and micro-nutrients needed by the soil and translate such nutrients into specific, measured quantities of fertilizer – <http://www.soilhealth.dac.gov.in/>.

<sup>19</sup> <http://pib.nic.in/newsite/PrintRelease.aspx?relid=178203>

## 1.2. Key recommendations

Technological recommendations		
Issues	Recommendations	Outcome
 <ul style="list-style-type: none"> <li>Fertilizer retailers faced PoS-related issues, such as short battery life, small size of the PoS device screen, lack of available maintenance services, and ink fading on transaction receipts.</li> </ul>	 <ul style="list-style-type: none"> <li>Develop a device-agnostic application to sell fertilizer and allow retailers to use a device of their choice, such as laptops, desktops, tablets, and smartphones to run the sales application.</li> </ul>	 <ul style="list-style-type: none"> <li>Based on this recommendation, the government developed a desktop and an Android application.</li> </ul>
<ul style="list-style-type: none"> <li>Farmers could not read the content on the transaction receipt because they were either illiterate or could not read the receipt, which was in English.</li> </ul>	<ul style="list-style-type: none"> <li>Alter the POS application so that transaction receipt is generated in local languages.</li> </ul>	<ul style="list-style-type: none"> <li>Based on the recommendation, the government initiated changes to the POS application to generate transaction receipts in local languages.</li> </ul>
<ul style="list-style-type: none"> <li>Once an administrator was designated in the PoS device, changes could not be made. As a result, cooperatives faced problems if the secretary, who was often designated as the administrator for the PoS application, was either transferred or if they retired.</li> </ul>	<ul style="list-style-type: none"> <li>Registration of a new administrator should be enabled on PoS devices when required.</li> </ul>	<ul style="list-style-type: none"> <li>Based on this recommendation, the government enabled multiple administrator registrations at cooperatives and society retail points.</li> </ul>
<ul style="list-style-type: none"> <li>State coordinators and fertilizer retailers did not receive a notice before an update for the PoS application which was through the use of patch files shared via USB drives. This resulted in retailers being unable to conduct transactions through PoS devices.</li> </ul>	<ul style="list-style-type: none"> <li>Implement an automatic software update within PoS devices to eliminate the use of patch files shared via USB drives.</li> </ul>	<ul style="list-style-type: none"> <li>Recognizing the inconvenience, the government modified the software so that POS devices were updated automatically.</li> </ul>
<ul style="list-style-type: none"> <li>Wholesalers often sent stock to unintended retailers by mistake. Moreover, the retailers also often received damaged stock.</li> </ul>	<ul style="list-style-type: none"> <li>Develop an option in the PoS application to reverse such stock.</li> </ul>	<ul style="list-style-type: none"> <li>The government installed an option in the system that can be used to return stock.</li> </ul>
<ul style="list-style-type: none"> <li>Wholesalers could not enter three decimal points on the PoS device as it allowed a maximum input of up to two decimal points. This presented a problem when wholesalers converted tons into kilograms, which is the metric used when forwarding to retailers (each bag weighed 45kg).</li> </ul>	<ul style="list-style-type: none"> <li>The government should update the PoS application to allow retailers to input fertilizer sales up to three decimal points.</li> </ul>	<ul style="list-style-type: none"> <li>The government changed the PoS application to allow the input of fertilizer sales up to three decimal points.</li> </ul>

## Operational recommendations

Issues	Recommendations	Outcome
<ul style="list-style-type: none"> <li>• Due to a lack of Information Technology (IT) infrastructure at the railway rake points, fertilizer companies did not update the stock in the PoS application.<sup>20</sup> This delayed the real-time stock update and compelled retailers to sell fertilizer manually without <i>Aadhaar</i> authentication.</li> </ul>	<ul style="list-style-type: none"> <li>• The department should develop a device-agnostic application. Fertilizer companies should be able to use devices they select at railway rake points to update stock in a timely manner.</li> </ul>	<ul style="list-style-type: none"> <li>• Based on this recommendation, the government developed a desktop and an Android application.</li> </ul>
<ul style="list-style-type: none"> <li>• PoS devices distributed by the company Analogics had issues, such as short battery life and sudden shutdowns, and could only accommodate a 2G SIM card.</li> </ul>	<ul style="list-style-type: none"> <li>• The government should initiate arrangements with Analogics to repair faulty devices or replace them.</li> </ul>	<ul style="list-style-type: none"> <li>• The government addressed such issues by either replacing them with Visiontek devices or by repairing existing devices.</li> </ul>
<ul style="list-style-type: none"> <li>• In Dibrugarh, Assam, only 63 of the 156 retailers had POS devices. The LFS, Brahmaputra Valley Fertilizer Corporation Limited (BVFCL) was financially weak and could not afford additional PoS devices.</li> </ul>	<ul style="list-style-type: none"> <li>• The government should ask fertilizer companies with market share in the various districts to purchase and distribute POS devices to rectify the shortfall.</li> </ul>	<ul style="list-style-type: none"> <li>• The fertilizer companies purchased and provided PoS to retailers.</li> </ul>
<ul style="list-style-type: none"> <li>• Most retailer complaints made through the grievance resolution mechanism (GRM) were routed through the toll-free number to the state coordinator. A single person was ill-equipped to handle the complaints of an entire state.</li> </ul>	<ul style="list-style-type: none"> <li>• The government should deploy a call center with employees capable of understanding local languages. Only complex issues should be addressed to the state coordinators.</li> </ul>	<ul style="list-style-type: none"> <li>• The government created a 14-member call center with language capabilities in English, Hindi, Malayalam, Bengali, Kannada, and Tamil.</li> </ul>

<sup>20</sup> Fertilizer companies dispatch fertilizer through the railway; fertilizer is accumulated at railway rake points before being dispatched to retailers.

Other recommendations		
Issues	Recommendations	Outcome
<ul style="list-style-type: none"> <li>State marketing federations, for instance, as in Himachal Pradesh, did not pass sufficient margins on fertilizer sales and the benefit of secondary freight (subsidy support provided by the government) to the retailers or member societies.<sup>21</sup></li> </ul>	<ul style="list-style-type: none"> <li>The government should revisit this issue to ensure margins are allocated fairly.</li> </ul>	<ul style="list-style-type: none"> <li>The government is yet to take any action on this.</li> </ul>
<ul style="list-style-type: none"> <li>To transfer the subsidy to the fertilizer companies after the sale, the state government required them to possess a physical certificate namely 'B1 certificate' that confirmed the number of sales.</li> </ul>	<ul style="list-style-type: none"> <li>The existing real-time fertilizer monitoring system (mFMS) monitors sale quantity. Accordingly, the government should review the requirement of the fertilizer companies to possess a B1 certificate as it can be incorporated as a digital solution in the PoS application.</li> </ul>	<ul style="list-style-type: none"> <li>The government is yet to take any action on this.</li> </ul>
<ul style="list-style-type: none"> <li>Farmers used their bare hands to apply fertilizer to their fields, which affected their skin adversely and resulted in poor quality fingerprint impressions.</li> </ul>	<ul style="list-style-type: none"> <li>The government should advise fertilizer companies to provide biodegradable gloves when fertilizer is purchased.</li> </ul>	<ul style="list-style-type: none"> <li>The government is yet to take any action on this.</li> </ul>

DBT-F is one of the most successful direct benefit programs implemented in the country. The Government of India has reported savings of INR 100 billion (USD 1.54 billion) from various fertilizer-related initiatives, including DBT-F and NCU.<sup>22</sup> Despite the overwhelming financial savings from DBT-F implementation, the subsidy is still not targeted and delivered exclusively to poorer farmers. The difficulty in targeting beneficiaries is due to the absence of a reliable database of beneficiaries and the challenges of defining the amount or the quantity of fertilizer to which each beneficiary is entitled. Currently, as long as Aadhaar authentication occurs, fertilizer purchases are not restricted by quantity or beneficiary, that is, anyone can buy any quantity of fertilizer.

The Government of India has plans to implement cash transfers in fertilizer. Such cash transfers are likely to face obstacles due to the challenges that have prevented accurate subsidy targeting. However, the government can address these issues by creating a beneficiary database by utilizing the PM-KISAN database, Digital India Land Record Modernization Program (DILRMP), or other databases of farmers that been created over time, such as *Pradhan Mantri Fasal Bima Yojana* database.<sup>23</sup> This can help to define the entitlement so that the annual requirement of fertilizer for small and medium farmers is ensured.<sup>24</sup>

<sup>21</sup> State marketing federations are the apex societies for agricultural marketing and processing cooperatives in the state, for instance, HIMFED in Himachal Pradesh (<http://www.himfed.com/>) and <http://fert.nic.in/page/fertilizer-policy>.

<sup>22</sup> <https://dbtbharat.gov.in/page/frontcontentview?id=ODM=>

<sup>23</sup> <http://www.pmkisan.gov.in/>

<sup>24</sup> <http://dilrmp.nic.in/>



### 1.3. Where do we go from here?

The Indian government began the fertilizer subsidy to provide low-cost input to farmers to boost productivity. It helped improve the productivity of the Indian farm sector. Over time, however, fertilizer subsidy has increased to about USD 11 billion annually and has caused problems, such as worsening of soil quality due to overuse of nitrogenous fertilizer.

To solve the triple problems of pricing of fertilizer, agriculture extension, and behavioral barriers, the government would need a multipronged and coherent strategy. The fertilizer market is distorted, and farmers have a clear incentive to use subsidized fertilizer. There is a need to allow market pricing, that is, decontrolling or creating a proxy to market pricing of all types of fertilizer so that farmers can choose the right fertilizer, crop, and other inputs based on overall economics.

However, farmers will need the right information at the right time to make such decisions. So, a technology-enabled system is needed to help and guide farmers. Such a system would use soil health data, weather data, and market data, among others, coupled with traditional and new extension channels, such as extension workers, agriculture entrepreneurs, fertilizer retailers, and mobile apps, among others. Adoption of such massive change is not going to be easy and will need a focused approach to identify and remove behavioral barriers to adoption. Hence, a focused approach to build trust and nudge farmers to adopt will also be needed. Pilots, as was done with DBT in fertilizer, will be needed to decide the right model and associated policy and operational modalities to move forward.








## 2. Project background



In the Union Budget 2016–17, the Indian government proposed to bring the fertilizer subsidy under the DBT program. Under DBT, the government releases subsidies on various grades of fertilizer to fertilizer manufacturers based on actual sales made by retailers to the beneficiaries through PoS devices. Retailers authorize the sales through successful *Aadhaar*-based authentication of the farmers on PoS devices. Retailers can also use a beneficiary's

*Aadhaar* enrolment ID along with *Kisan Credit Card* (KCC) or Electoral Photo ID Card (EPIC) to authorize the sale if a farmer has not yet received *Aadhaar* number after enrolling for it. The government has provided this facility primarily for states and union territories with low *Aadhaar* penetration, such as Assam, Meghalaya, Nagaland, Jammu and Kashmir, Arunachal Pradesh, Mizoram, and Manipur.<sup>25</sup>

The government launched the DBT-F program with the following objectives:

-  To build an efficient and replicable fertilizer subsidy distribution model;
-  To study fertilizer consumption at the farmer-level and encourage optimum usage of fertilizer via SHC recommendation;
-  To identify the actual beneficiaries of fertilizer subsidies;
-  To digitalize the sale of fertilizer through POS;
-  To track and mitigate the overuse of fertilizer based on sales data;

<sup>25</sup> <https://uidai.gov.in/images/state-wise-aadhaar-saturation.pdf>



To rationalize the subsidy payments to the manufacturers and thereby reduce the fertilizer subsidy burden on the Government of India; and



To understand land-holding details, cropping, and cultivation patterns to plan estimates of fertilizer demand better.

The government announced pilots for DBT-F in 16 districts across India before the pan-India rollout but actually launched the pilots only in 14 districts. The government launched the pilot in two phases, and a pan-India rollout occurred by April 2018.

### 1. Pre-pilot phase

The pre-pilot phase in DBT for fertilizer distribution took place in Krishna and West Godavari districts of Andhra Pradesh on September, 2016.

### 2. Pilot phase

In the pilot phase, the government expanded DBT-F to 12 more districts between January and March 2017.

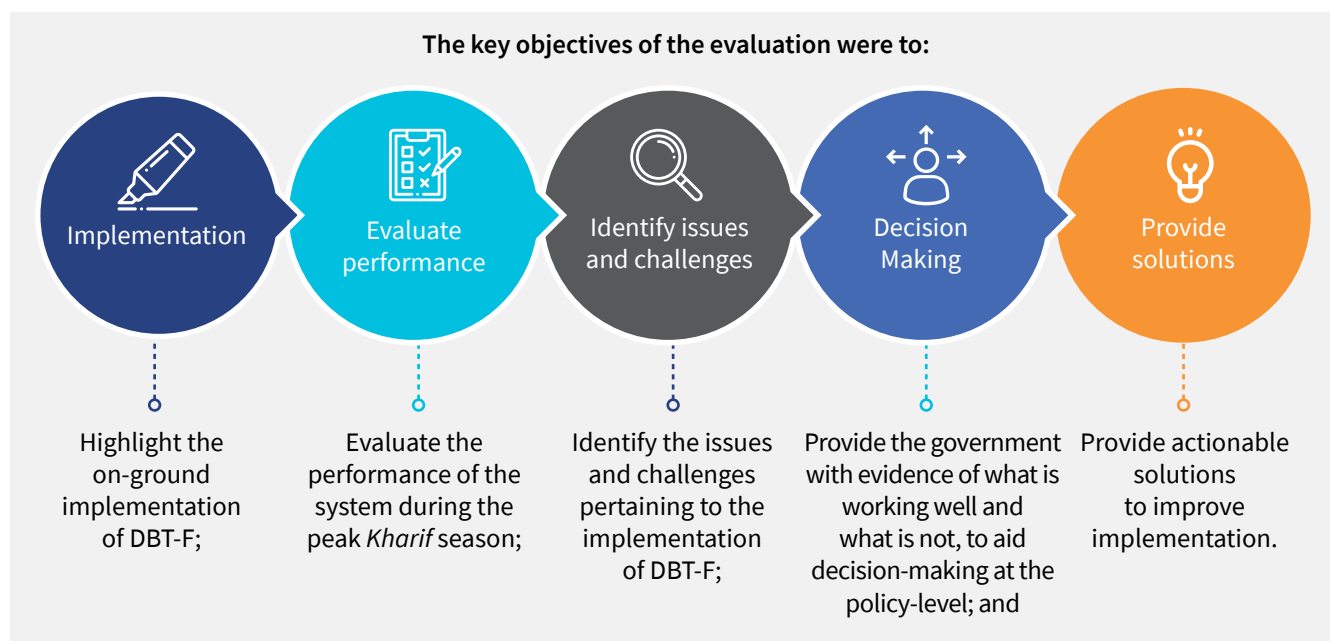
At the request of NITI Aayog and Department of Fertilizers (DoF), MicroSave Consulting (MSC) conducted three rounds of evaluations in the pre-pilot and pilot districts and a nationally representative study in the fourth round.

Evaluation	Study duration	Number of districts assessed (live districts <sup>26</sup> )	Farmer sample	Retailer sample
Round I	September 2016	Two, that is, Krishna and West Godavari (Andhra Pradesh)	650	36
Round II	January 2017	Six, including the two districts from Round I, that is, Una (Himachal Pradesh), Hoshangabad (Madhya Pradesh), Rangareddy (Telangana), Krishna and West Godavari (Andhra Pradesh), and Pali (Rajasthan).	1,734	200
Round III	July –September 2017	Fourteen, including the six districts from Round II, that is, Una (Himachal Pradesh), Kishanganj (Bihar), Hoshangabad (Madhya Pradesh), Karnal and Kurukshetra (Haryana), Thrissur (Kerala), Nasik and Raigarh (Maharashtra), Tumkur (Karnataka), Rangareddy (Telangana), Krishna and West Godavari (Andhra Pradesh), Narmada (Gujarat), and Pali (Rajasthan)	5,659	427

<sup>26</sup> Live districts are those districts where the government pays subsidies to the fertilizer manufacturers on the actual sales realized through PoS devices.

Round IV	July – September 2018	<ol style="list-style-type: none"> <li>1. Nationally representative study in 54 districts from 18 states<sup>27</sup></li> <li>2. 14 pilot districts studied in Round III (booster survey)</li> </ol>	<ol style="list-style-type: none"> <li>1. 11,281 (national study)</li> <li>2. 5,349 (pilot districts)</li> </ol>	<ol style="list-style-type: none"> <li>1. 1,182 (national study)</li> <li>2. 416 (pilot districts)</li> </ol>
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Note: The findings across three rounds are not comparable, strictly speaking. Readers should be aware of this while reviewing the conclusions or comparisons in this report. The inter-round comparisons made are indicative.



## 2.1. Round I evaluation

In the pre-pilot phase of DBT-F in Krishna and West Godavari districts, the government-integrated farmers’ land records, SHC information, and the *Aadhaar* database. The government used the integrated database to identify and distribute fertilizer to farmers using *Aadhaar*-based biometric authentication using a PoS device. The PoS device, provided to the fertilizer retailers, fetched land record details and corresponding SHC information using the farmers’ *Aadhaar* numbers.

Although the recommended fertilizer quantity based on SHC information and landholding was displayed on the PoS device after successful authentication, farmers were free to buy whatever quantity of fertilizer they desired. Additionally, the government designed the pre-pilot phase on a “no denial policy”, whereby retailers were not permitted to deny the sale of fertilizer to farmers if they failed to produce their *Aadhaar* number or if they failed to authenticate.

MSC’s evaluation of the pre-pilot phase identified a number of challenges. These included issues like inadequate training of field functionaries, length of transaction time,

delayed deployment of PoS devices, technology and connectivity issues that led to *Aadhaar* authentication failure, and challenges surrounding database integration (*Aadhaar*, land records, and SHC). MSC recommended the following measures:

- 01 Delink the SHC and land record data to save on transaction time and decrease authentication failure;
- 02 Use the *Aadhaar* database exclusively for authentication in the initial phase;
- 03 Integrate exception management practices in the system;
- 04 Increase the retailer margin to support business viability and improve participation;
- 05 Carry out a communication campaign to increase farmers’ awareness so that they bring their *Aadhaar* numbers when buying fertilizer

In the pilot phase, the government incorporated MSC’s

<sup>27</sup> States covered in the survey included Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Tamil Nadu, Andhra Pradesh, Telangana, Chhattisgarh, Jharkhand, West Bengal, Tripura, Manipur, Assam, and Bihar.



policy and operational-level recommendations. One significant modification in the DBT-F pilot phase in the 14 districts was delinking the SHC and land record databases from the *Aadhaar* database. This was done for two reasons. First, the integration of the three databases increased transaction time substantially from approximately one minute under the manual transaction process to 10 minutes. Second, at the time of writing, in December

2016, SHC and land records were not seeded with *Aadhaar* numbers across India.

Hence, it was not possible to roll out this model across India. In the subsequent pilot phase in the 14 districts, the government used the *Aadhaar* database exclusively to authenticate for fertilizer purchase transactions.

## 2.2. Round II evaluation <sup>28</sup>

MSC evaluated the six pilot districts that were live in January, 2017. The key findings from the evaluation were:

- 01 On the supply side, the groundwork to implement DBT-F across six districts was commendable. Almost all retailers (97.0%) received training and operational support. The process of grievance resolution—through informal methods, such as WhatsApp groups—was quick and responsive. However, the national rollout of DBT-F would require a robust, formal GRM to track and analyze operational and technical issues.
- 02 On the demand-side, awareness of farmers on the new fertilizer distribution system, process, and requirements was low. 88.0% of farmers were unaware of the requirement to produce their *Aadhaar* number at the retailer-outlet to buy fertilizer.
- 03 Approximately 10.0% of the total transactions were adjusted, which means someone other than the farmer making the purchase performed the *Aadhaar* authentication either during the sale or later for reconciliation purposes.
- 04 The average transaction time improved significantly from 10.5 minutes to five minutes in the initial pre-pilot phase due to the databases being delinked and increased server capacity.
- 05 Fertilizer retailers worried that transactions authenticated through PoS devices may not be feasible during upcoming peak *Kharif* season due to transaction duration.

### MSC recommended the following measures:

01	02	03
An “early check out” system, where farmers could pre-authenticate at designated points a few days before buying fertilizer to manage sales during the peak agriculture season;	A centralized GRM to allow tracking and analysis of issues and a structured approach to resolve the issues;	A strong focus on communication strategies in local languages to increase awareness among the beneficiaries.

## 2.3. Round III evaluation <sup>29</sup>

MSC conducted an evaluation of 14 live districts between July and September 2017. The major findings from the evaluation were:

- 01 Instances of adjusted transactions increased to 21.0% as compared to 10.0% observed in Round II.<sup>30</sup> Fertilizer retailers adjusted transactions because *Aadhaar* numbers were not available at the time of fertilizer purchase, as well as due to failures in *Aadhaar* authentication.<sup>31</sup> Additionally, retailers often did not ask farmers for their *Aadhaar* numbers and sold to them manually, after which they adjusted the transactions.
- 02 The transaction experience improved for farmers; successful *Aadhaar* authentication on the first attempt increased to 62.0% as compared to

<sup>28</sup> [http://fert.nic.in/sites/default/files/Final%20Report\\_Assessment\\_of\\_AeFDS\\_Aadhaar\\_enabled\\_Fertilizer\\_Distribution\\_System\\_Pilot.pdf](http://fert.nic.in/sites/default/files/Final%20Report_Assessment_of_AeFDS_Aadhaar_enabled_Fertilizer_Distribution_System_Pilot.pdf)

<sup>29</sup> [https://www.microsave.net/wp-content/uploads/2018/11/Assessment\\_of\\_Direct\\_Benefit\\_Transfer\\_in\\_Fertiliser.pdf](https://www.microsave.net/wp-content/uploads/2018/11/Assessment_of_Direct_Benefit_Transfer_in_Fertiliser.pdf)

<sup>30</sup> The datasets are not statistically comparable over the three rounds. However, we have compared the datasets to provide a trend over the Rounds II and III.

<sup>31</sup> Farmers generally do not carry their *Aadhaar* card when they visit retailers to buy fertilizer.

35.0% in Round II.<sup>32</sup> Overall, successful *Aadhaar* authentication in three attempts increased to 97.0% as compared to 93.0% and 41.0% in Rounds II and I, respectively.

**03** Training and awareness efforts for retailers were laudable. Of the total retailers surveyed, 93.0% (396) received training. Out of these retailers, 90.0% (356) found the training useful as it helped them understand the functionalities and features of the PoS devices. However, only 23.0% (98) of retailers referred to the online training material, including videos and MS PowerPoint presentations

available on the mFMS website. The remaining retailers either did not use the online material or did not know that it was available.

**04** The average transaction time through PoS was five minutes. The duration did not change from the Round II evaluation.

**05** As compared to Round II, the informal GRM, such as using a WhatsApp group or email, lost its relevance in Round III. Satisfaction levels with the existing informal GRM decreased from 91.0% in Round II to 79.0% in Round III.

#### MSC recommended the following measures:

**01**

Increase retailer commission to stem retailer attrition due to unattractive fertilizer sale commissions and additional operational hassles post-DBT. Based on the recommendation, the government doubled the commission on the sale of urea, which constitutes a significant portion of retailers' annual sales;<sup>33</sup>

**02**

An efficient GRM that allows conversations in regional languages and generates complaint IDs, tracks the status of grievance resolutions using the complaint ID, prescribes a defined turnaround time (TAT) for grievance resolution, and acknowledges resolution of complaints;

**03**

A device-agnostic PoS application that allows retailers to use laptops, desktops, tablets, or smartphones to run the mFMS application.

## 2.4. Round IV evaluation

MSC conducted a nationally representative survey of the pan-India DBT-F program between July and September, 2018. MSC also evaluated the 14 pilot districts studied in Round III (that is, the booster survey). We conducted the booster survey to compare among the pilot districts over time. This report on the Round IV evaluation

provides details of the on-the-ground realities of DBT-F implementation and makes actionable recommendations to improve the DBT-F system further. This report also presents findings from the booster survey highlighted at the end of each section or subsection. Annex I presents a detailed methodology for Round IV evaluation.

<sup>32</sup> Data is provided for farmers whose *Aadhaar* authentication was successful and did not include data from farmers whose *Aadhaar* authentication failed or for those who bought fertilizer manually.

<sup>33</sup> <http://www.pib.nic.in/Pressreleaseshare.aspx?PRID=1559144>

### 3. Transaction status and experience



Adjusted transactions are high because of a number of issues. These include the unavailability of *Aadhaar* number with the farmer at the time of fertilizer purchase, *Aadhaar* authentication failure, reluctance of retailers on asking for farmers' *Aadhaar*, and transactions conducted deliberately by retailers without *Aadhaar* authentication. However, the success rate of authentication is very high for farmers who purchase fertilizer through the *Aadhaar* authentication route. The success rate has improved over time because of several reasons, such as increase in server capacity, training of retailer to use the system effectively, and changes in PoS software and hardware, among others.

#### 3.1. Incidences of “adjusted transactions” were high at 13.0%

**01** The proportion of manual sales without *Aadhaar*, including adjusted transactions, was at 13.0%.<sup>1</sup> The retailers adjusted transactions either because the *Aadhaar* authentication process failed or because the farmers did not bring their *Aadhaar* number while buying fertilizer. We also observed that retailers did not ask farmers to provide their *Aadhaar* number to purchase fertilizer and simply sold the fertilizer by adjusting the transactions manually later (see figure 1). The primary reason to do this was to minimize transaction time during peak sales periods. Another reason was that a few retailers either did not receive or failed to update the stock acknowledgment ID in the PoS. Hence, the stock position in PoS was either lesser or zero despite retailers having physical stock—which forced retailers to sell fertilizer manually.

**02** Of the total farmers surveyed, 80.3% (9,057) used *Aadhaar* to initiate the fertilizer purchase at the retail outlet. Out of the 9,057 farmers, *Aadhaar*

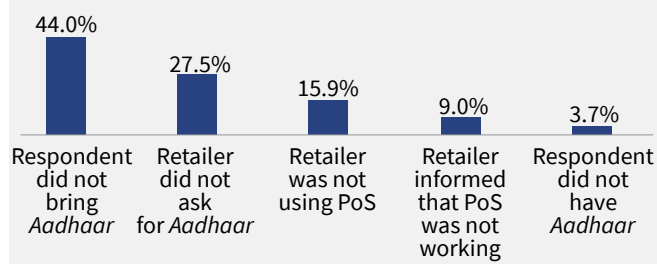
authentication was successful in 9,002 cases (79.8% of the total farmers) and failed in 55 cases (0.5% of total farmers). Of the 55 authentication failures, 45 (0.4%) received fertilizer manually. Retailers denied fertilizer to the remaining 10 farmers (0.1% of the total farmers). See figure 2 for details.

**03** According to the farmers, retailers conducted manual transactions because of five main reasons (See figure 1 for details):

- Farmers did not bring their *Aadhaar* card (44.0%);
- The retailer did not ask for their *Aadhaar* number (27.5%);
- The retailer did not use a PoS device to conduct sale transactions (15.9%);
- The retailer informed the farmers that the PoS device was not working (9.0%); or
- The farmers did not have an *Aadhaar* number at the time of purchasing fertilizer (3.7%).

<sup>1</sup> “Adjusted transaction” means that retailers used their own or someone else’s *Aadhaar* number to authenticate and register sales, either during the time of the sale or after. Such “adjusted transactions” may also imply situations where a retailer registers all sales for the day using only a few *Aadhaar* numbers.

**Figure 1: Reasons for manual and adjusted transactions**

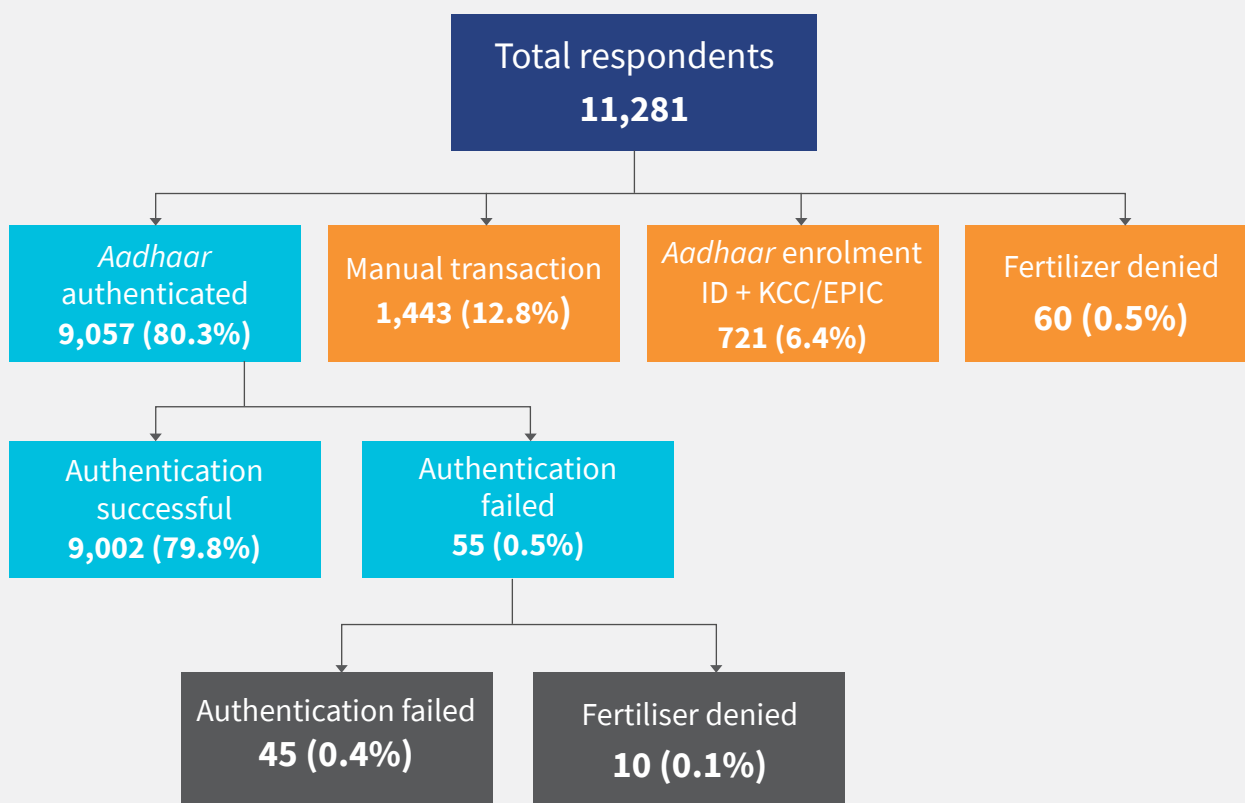


**04** Due to the low penetration of *Aadhaar* in Assam, retailers used *Aadhaar* Enrolment ID + KCC/EPIC to sell fertilizer. Of the 633 farmers interviewed

in Assam, 89.0% bought fertilizer using their *Aadhaar* Enrolment ID + KCC/EPIC.<sup>2</sup>

**05** Manipur reported the highest percentage of adjusted transactions among all the states surveyed. 56.0% of farmers in the state bought fertilizer without *Aadhaar* authentication. The percentage of adjusted transactions was high due to connectivity issues and unavailability of PoS devices with 86.0% of retailers in the state reported connectivity as a major issue. Moreover, the LFS company in the state, BVFCL was financially weak and could not afford to provide sufficient POS devices to the retailers.

**Figure 2: Transaction Status**



**Transaction status in the pilot districts (booster survey)**

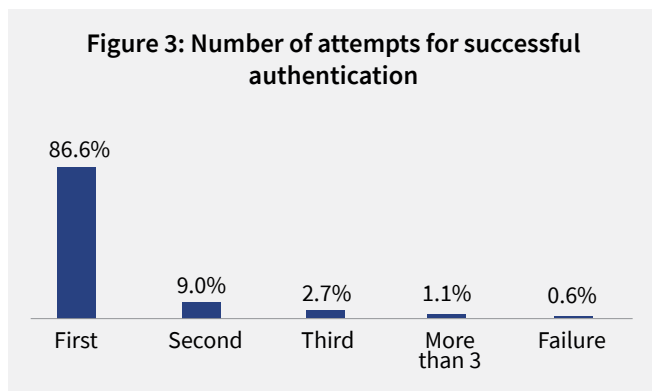
- Instances of manual sale without *Aadhaar* number and adjusted transactions in the 14 pilot districts reduced from 21.0% in Round III to 6.0% in Round IV.
- In the 14 pilot districts, *Aadhaar*-initiated transactions increased from 81.0% in Round III to 94.0% in Round IV.

<sup>2</sup> *Aadhaar* saturation in Assam is at 16%; refer to: [https://uidai.gov.in/aadhaar\\_dashboard/india.php](https://uidai.gov.in/aadhaar_dashboard/india.php)



### 3.2. Transaction experience of farmers

**01** 86.6% of *Aadhaar* authentication for farmers succeeded at the first attempt (see figure 3).



**05** Assam was an outlier, as the average transaction time was 7 to 8 minutes. Only 0.3% of the total transactions in the state were completed through *Aadhaar* authentication due to low *Aadhaar* penetration. The majority (89.0%) of transactions were conducted using *Aadhaar* Enrolment ID + KCC/EPIC, for which the average transaction time was 5 minutes.

**06** Of the farmers who purchased fertilizer, 94.0% received transaction receipts. Among those who received transaction receipts, 98.5% were charged the same amount as depicted on the transaction receipt. 1.3% were charged more than the amount on the transaction receipt, whereas 0.2% were charged less.

**02** Overall, 98.3% of *Aadhaar* authentications were successful within the first three attempts.

**07** Of the farmers who received transaction receipts, 83.6% received printed receipts generated through PoS devices, 10.1% received handwritten receipts, and 6.3% received both printed and handwritten receipts.

**03** The average transaction time was 3-4 minutes.

**04** Of the total farmers, 51.0% completed the sale transaction in less than 3 minutes. 33.0% completed the transaction within 3-5 minutes, and only 16.0% of the farmers completed the sale transaction in more than 5 minutes (see figure 4). The transactions took more than 5 minutes mainly due to *Aadhaar* authentication failure (78.0%) and network connectivity issues (65.0%).

**08** Farmers instinctively used their right-hand thumb on the first attempt to authenticate *Aadhaar* (68.1%), followed by left thumb (14.5%), right index finger (9.2%), right middle finger (3.8%), and left index finger (1.5%). See figure 5 for details.

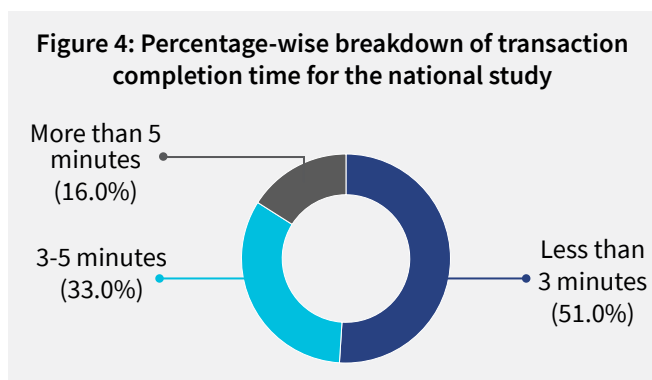
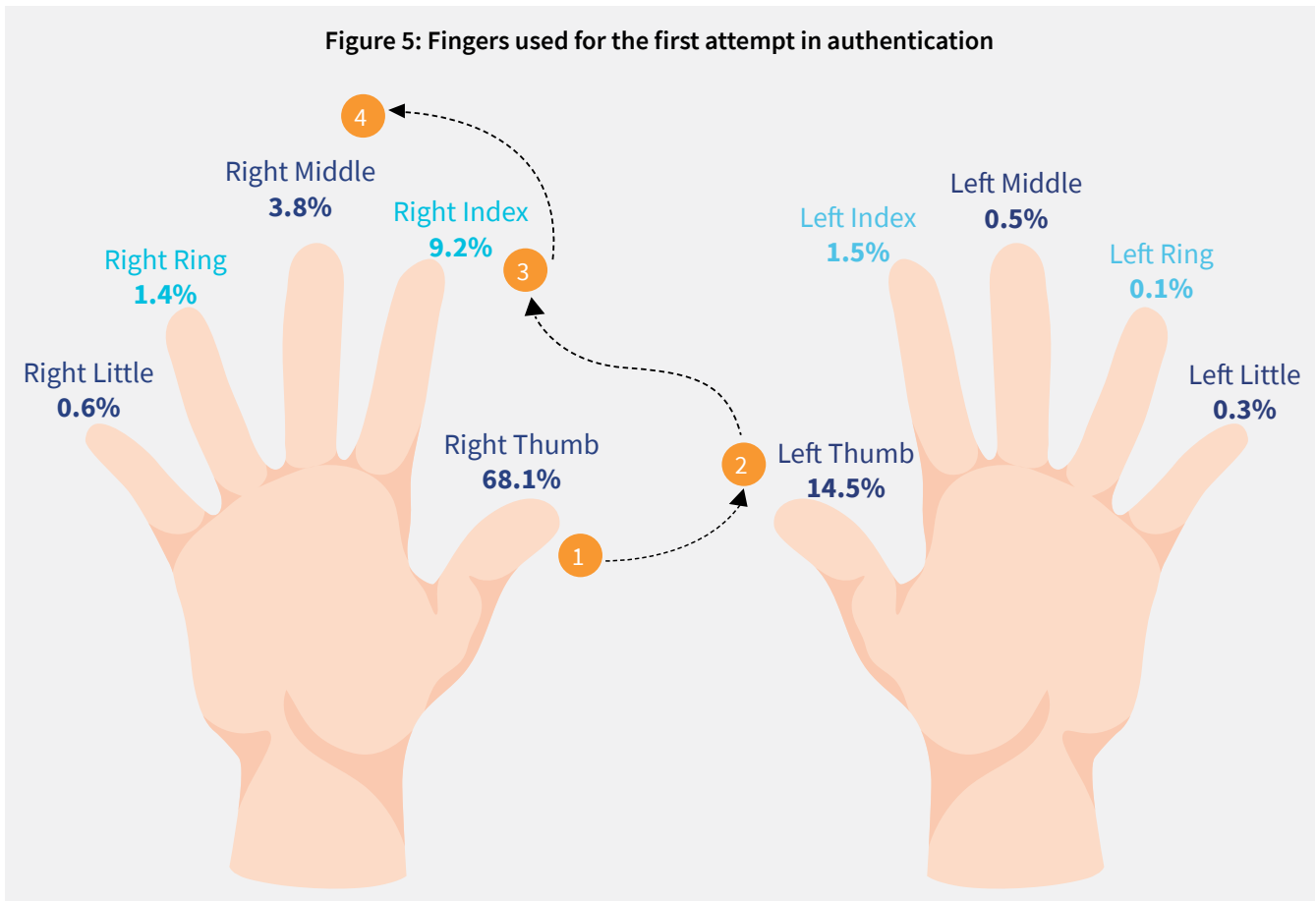


Figure 5: Fingers used for the first attempt in authentication



**Transaction experience for farmers improved in the pilot districts (booster survey)**

- Successful *Aadhaar* authentication in the first attempt increased from 35.0% in Round II and 62.0% in Round III to 89.0% in Round IV.
- Successful *Aadhaar* authentication during the first three attempts increased from 41.0% in Round I, 93.0% in Round II, and 97.0% in Round III, to 99.0% in Round IV (see figure 6).
- The average transaction time improved from 9 to 10 minutes in Round I, 5 to 6 minutes in Round II, and 4 to 5 minutes in Round III, to 3 to 4 minutes in Round IV (see figure 7). To improve the transaction time, the government increased server capacity by deploying new servers.
- As compared to 85% of farmers in Round III, 92% received transaction proof in Round IV.

Figure 6: Rate of success in authentication during the first three attempts

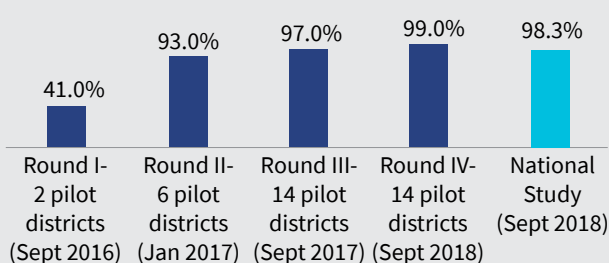
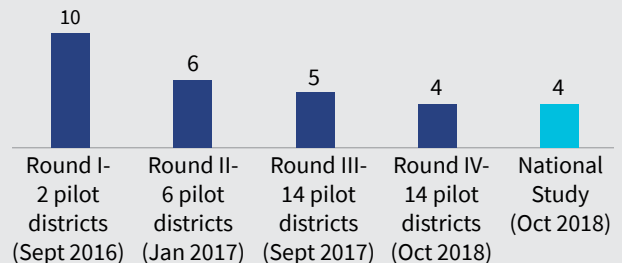


Figure 7: Average transaction time (minutes)

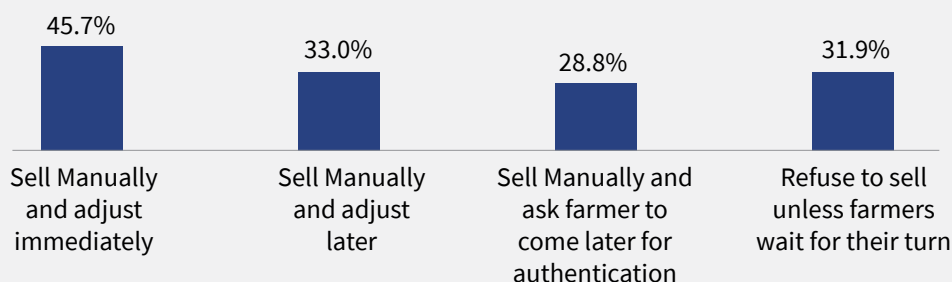


### 3.3. Retailers managed sales in the peak season by adjusting transactions

01 Among the retailers surveyed, 60.0% complained of difficulty in serving customers during the peak season, as an average of 45 customers were present at the retail outlet at any given time on a single day. However, these retailers managed sales by selling manually and adjusting later (33.0%), by adjusting multiple transactions under one transaction at the time of sale (45.7%), by selling manually and asking farmers to authenticate later (28.8%), or by refusing to sell unless the farmers waited in the queue for their turn (31.9%).<sup>3</sup> See figure 8 for details. Hence, the majority of retailers who faced difficulties managing sales during peak agriculture season resorted to adjusting transactions.

02 On average, retailers used only one PoS device at each outlet. They did not wish to use more than one PoS device to manage sales during peak season, as this would require additional resources and increase their costs.

Figure 8: Ways to manage sales during the peak season



### 3.4. Experience of retailers around transactions

01 According to the retailers, *Aadhaar* authentication failed due to fingerprint mismatch (78.2%), connectivity issues (64.6%), server-related issues (54.7%), technical errors (18.9%), or invalid or missing biometric details (14.5%).<sup>4</sup> See figure 9.

02 68.0% of the retailers surveyed believed that the network strength of the PoS ranged between good and very good, that is, they rarely faced connectivity issues. The remaining 32.0% faced connectivity issues either intermittently or regularly, which affected the PoS transactions adversely (see figure 10).

Figure 9: Reasons for authentication failure

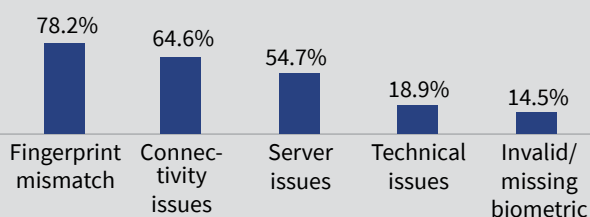
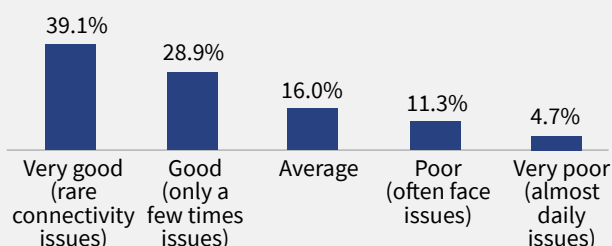


Figure 10: Retailers' perception of network strength



<sup>3</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.

<sup>4</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.



## 4. The majority of farmers and retailers preferred DBT-F

Both farmers and retailers preferred DBT-F because it brought transparency to the fertilizer distribution system and ensured fertilizer supply.

**01** 75.5% of the farmers preferred DBT-F to the earlier system of manual fertilizer distribution while 18.7% preferred the manual system. Only 4.8% of the farmers were indifferent.

**02** 59.0% of the retailers preferred the DBT-F to the previous manual system of fertilizer distribution while

32.3% of the retailers preferred the manual system. Only 8.7% of the retailers were indifferent.

**03** The farmers and the retailers preferred the DBT-F system over the manual system for a number of reasons, as illustrated in figure 11.

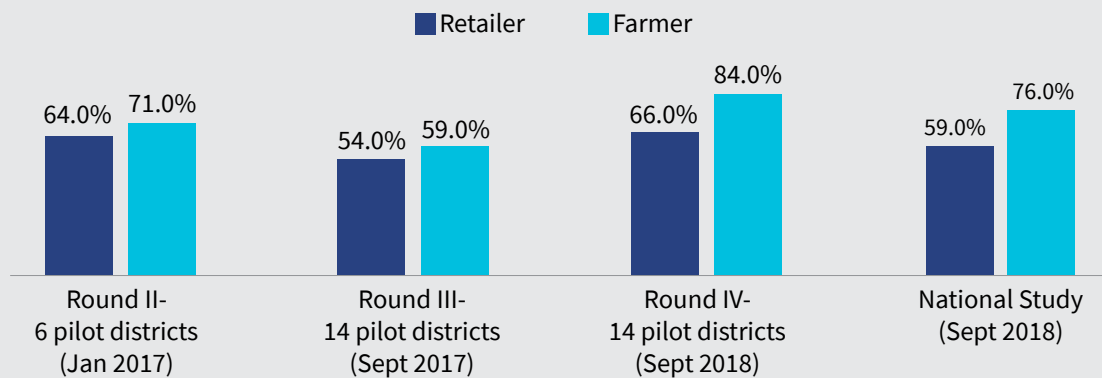
Figure 11: Reasons for preference for DBT-F

	Reasons for preference for DBT-F	Reasons for preference for manual system
<b>Farmer</b>	<ul style="list-style-type: none"> <li>Tracked the actual buyer (72.0%)</li> <li>Reduced black marketing and diversion (72.0%)</li> <li>Reduced overcharging by retailers (35.0%)</li> <li>Induced awareness about quantity and price of fertilizer (20.0%)</li> </ul>	<ul style="list-style-type: none"> <li>Issues related to fingerprint mismatch (65.0%)</li> <li>Longer transaction time (46.0%)</li> <li>Longer waiting time (46.0%)</li> <li>Connectivity or server issues (38.0%)</li> <li>Did not like to carry <i>Aadhaar</i> all the time (32.0%)</li> <li>Did not want to share <i>Aadhaar</i> (8.0%)</li> </ul>
<b>Retailer</b>	<ul style="list-style-type: none"> <li>Improved real-time recordkeeping (78.0%)</li> <li>Identified customers properly (67.0%)</li> <li>Reduced diversion and black marketing (67.0%)</li> <li>Eased paperwork and record keeping (42.0%)</li> <li>Ensured supply of urea or fertilizer (21.0%)</li> </ul>	<ul style="list-style-type: none"> <li>Higher transaction time (83.0%)</li> <li>Connectivity issues (65.0%)</li> <li><i>Aadhaar</i> requirement for fertilizer (62.0%)</li> <li>Authentication issues (62.0%)</li> <li>Difficulty in managing high customer footfall during the peak season (46.0%)</li> <li>Farmers did not prefer sharing <i>Aadhaar</i> (31.0%)</li> </ul>



**Preference for DBT-F in pilot districts (booster survey)**

The majority of farmers and retailers preferred DBT-F in the past three rounds, that is, Round II, Round III, and Round IV as opposed to the manual system (see figure 12).

**Figure 12: Preference for DBT-F system among retailers and farmers**

## 5. Compliance



Retailer-adjusted transactions arise either from delays in the receipt of “stock acknowledgment IDs” by retailers or delay in updating these in the PoS device despite receiving it. The LFS company managers are unable to generate the “stock acknowledgment ID” at the railway rake points while dispatching physical stock of fertilizer to retailers because of a lack of IT infrastructure. Moreover, the delay in updating the PoS software, which had to be done manually through a USB drive, prevented retailers from updating the stock acknowledgement ID. This hampered the daily operations of retailers, as they were not able to operate their PoS devices without the latest version.

### 5.1. Delay in receipt and updating of “stock acknowledgment ID” compelled retailers to adjust transactions

#### What is the stock acknowledgment ID or dispatch ID?

Retailers require the stock acknowledgment ID to update the physical stock in the PoS application (mFMS application). After updating the physical stock in the PoS application, retailers can sell fertilizer to those buyers who authenticate using their *Aadhaar* numbers. This enables online tracking of fertilizer sales and stock in real-time.<sup>5</sup>

The LFS company manager generates the stock acknowledgment ID at the railway rake point, or the wholesaler generates the stock acknowledgment ID at their wholesale point. They generate the stock acknowledgment ID in the PoS application against the quantity of physical stock dispatched to the retailers. The retailers receive the stock acknowledgment ID through SMS on their mobile phones and as a *challan* (invoice) along with the physical stock. The retailers are expected to update the physical stock in the PoS application before selling fertilizer through *Aadhaar* authentication.

Delays in acknowledgment ID receipts and subsequent PoS updates were due to the following reasons:

- 01 39.5% of the retailers received the physical stock of fertilizer before they received the stock acknowledgment ID. This delay was due to the lack of IT infrastructure at the railway rake points. The LFS company managers dispatched the physical stock to retailers without updating the stock in the PoS application to generate the acknowledgment ID. They updated the stock when they returned to the office, which often resulted in delays in receipt of the stock acknowledgment ID by the retailers.

Of these retailers, 83.0% received the stock acknowledgment ID after a day or more of receiving the physical stock. In such cases, retailers should not sell the fertilizer. However, pressure from the farmers and fear of losing business compelled

<sup>5</sup> For details, please refer to page number 32 from the following link:-

[https://www.microsave.net/wp-content/uploads/2018/11/Assessment\\_of\\_Direct\\_Benefit\\_Transfer\\_in\\_Fertiliser.pdf](https://www.microsave.net/wp-content/uploads/2018/11/Assessment_of_Direct_Benefit_Transfer_in_Fertiliser.pdf)

retailers to sell the fertilizer stock manually. Among such retailers, 41.0% who received the stock acknowledgment ID after a day or more of receiving the physical stock sold fertilizer manually. Later, they adjusted these transactions once the physical stock was updated in the PoS application.

02 The remaining 60.5% of the retailers received the stock acknowledgment ID either before the physical stock or concurrent with the physical stock. However, 31.5% of these retailers took more than one day to update the stock in the PoS application. These retailers also sold fertilizer manually and later adjusted the transactions.

## 5.2. Other compliance-related observations

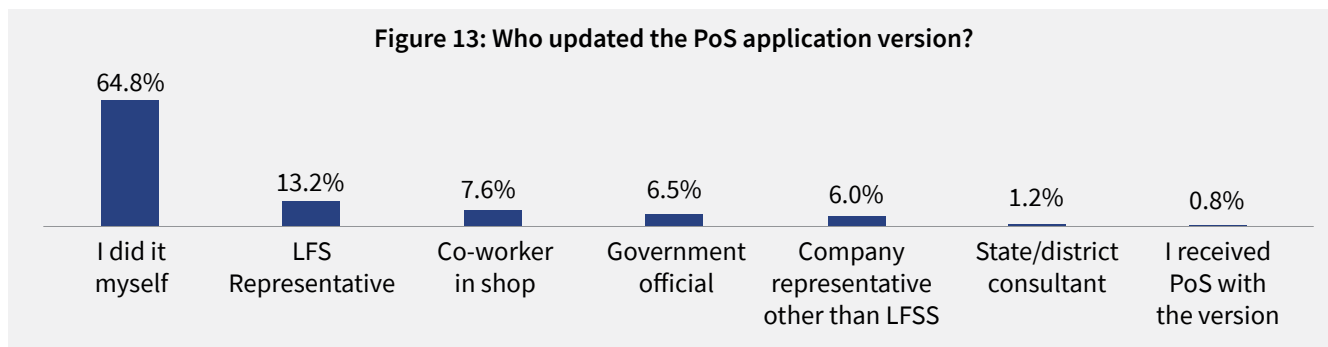
01 Of the retailers, 92.9% stated that the initial stock was updated correctly in the POS devices on the “go live” date, whereas 7.1% of the retailers faced discrepancies.<sup>6</sup>

02 Of the retailers surveyed, 80.2% updated their PoS with the latest version of mFMS, while 10.3% were not aware if their PoS devices reflected the latest version. Only 9.5% of retailers had not updated their PoS devices to the latest version.

03 Of the retailers who updated their PoS devices,

64.8% either did it themselves or took help from LFS company representatives (13.2%), co-workers in the shop (7.6%), government officials (6.5%), or fertilizer company representatives other than the LFS (6.0%) (See figure 13). The majority of retailers reported that PoS application updates did not occur frequently. Moreover, the government did not provide advance information about the dates when the application would be updated. This hampered the daily operations of retailers as they were unable to operate their PoS devices without the latest version.

Figure 13: Who updated the PoS application version?



<sup>6</sup> “Go live” date is the date the government began DBT in fertilizer.



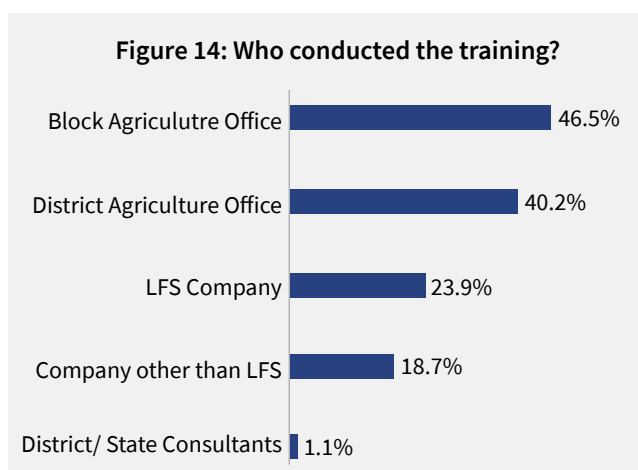
## 6. Training and awareness



Retailers understand the functionalities of PoS devices and can conduct transactions efficiently. A range of stakeholders, such as state or district government officials and fertilizer companies have conducted multiple training sessions, created an enabling environment for “learning while doing”, and communicated the objectives of DBT-F clearly. Moreover, retailers who referred to the online training material and those provided by the government found it to be useful. However, low awareness among farmers about the mandatory *Aadhaar* requirement led to sales without their *Aadhaar* authentication.

### 6.1. Retailer training and awareness efforts were laudable

- 01 Retailer training and awareness efforts that the government undertook were laudable. These efforts helped retailers understand the functionalities of PoS devices and conduct transactions efficiently. Moreover, the government ensured refresher training for retailers. Of the total retailers surveyed, 90.3% underwent training and attended at least two sessions on average.
- 02 Of the total retailers surveyed, 83.1% stated that the training was sufficient to understand the functionalities and operations of the PoS device.
- 03 The government conducted training through Block Agriculture Officers, District Agriculture Officers, LFS company representatives, other fertilizer company representatives, and district or state coordinators (See figure 14).<sup>7</sup>
- 04 Only 32.0% of the retailers were aware of online training material, such as videos and MS PowerPoint



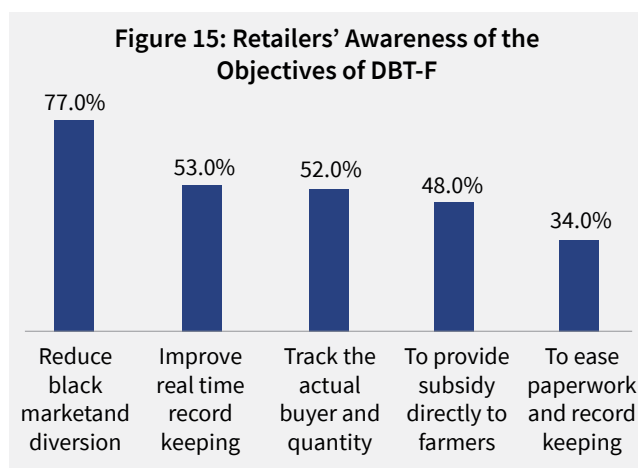
presentations on the mFMS website. Of these retailers, 71.0% referred to the online training material, while 89.0% of the retailers who referred to the online training material stated that it was useful.

<sup>7</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.

**05** Only 34.0% of the retailers surveyed received training material from the government and 67.0% of these retailers referred to the training material at least once to understand the functionalities of the PoS. 91.0% of the retailers who referred to the training material said that it was useful.

**06** Retailers were aware that DBT-Objectives included reducing the diversion of subsidized urea (77.0%), improving real-time record-keeping (53.0%), tracking the buyer and quantity purchased (52.0%), providing a subsidy directly to farmers (48.0%), and reducing paperwork and bookkeeping (34.0%). However, some retailers also believed that eventually, the government would transfer

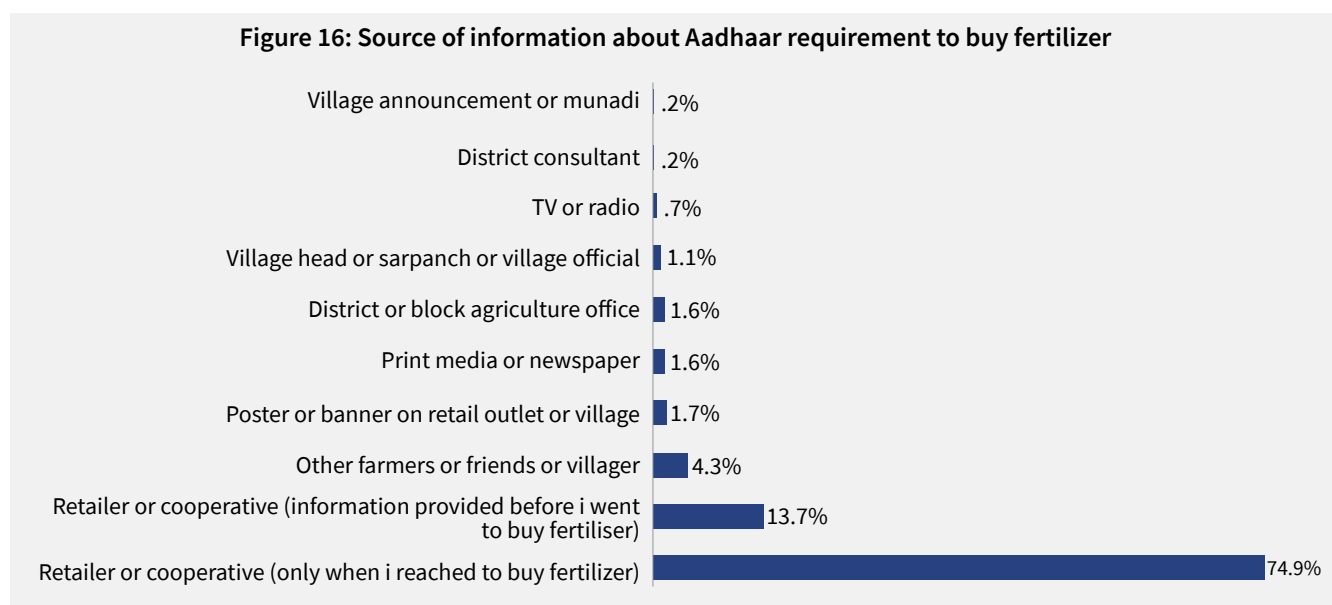
cash subsidies directly to the farmers’ accounts (see figure 15).<sup>8</sup>



## 6.2. Communication efforts to create awareness among farmers needed improvement

**01** Of the total farmers surveyed, 92.0% reported that they knew that “Aadhaar was mandatory to buy fertilizer.” However, 75.0% of the farmers received this information only after they arrived at the fertilizer retail outlet (see figure 16).

**02** Of the total farmers surveyed, 37.0% were aware that the government provided subsidized urea bags. Of the remaining, 32.0% perceived that the government did not provide subsidized urea and 31.0% did not know.



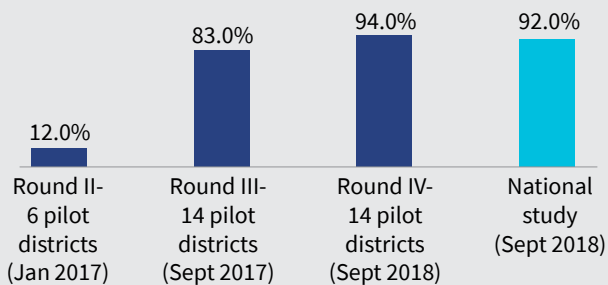
<sup>8</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.



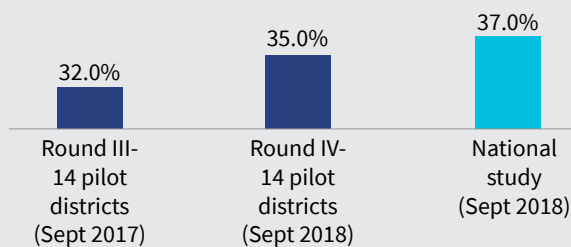
### Awareness among farmers in pilot districts (booster survey)

- Awareness of the need for *Aadhaar* to purchase fertilizer increased in the pilot districts from 12.0% in Round II and 83.0% in Round III to 94.0% in Round IV (see figure 17).
- Awareness that the government provides subsidized urea in the market increased slightly from 32.0% in Round III to 35.0% in Round IV (see figure 18).

**Figure 17: Awareness of the need for *Aadhaar* to buy fertilizer**



**Figure 18: Awareness of the urea subsidy**





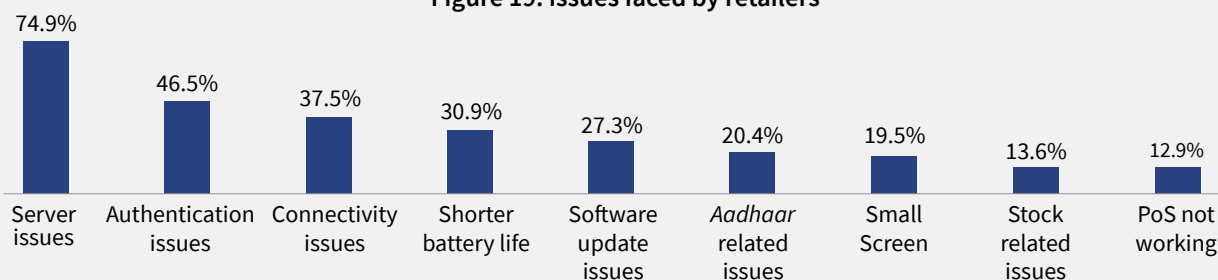
## 7. Grievance resolution mechanism (GRM)

Retailers preferred to contact the Block or District Agriculture Officers and fertilizer company representatives rather than to use toll-free number to resolve grievances. Moreover, a majority of retailers were unaware of the toll-free number. A higher rate of grievance resolution through methods other than the toll-free number also meant that retailers continue to use these methods.

**01** Retailers faced a myriad of issues (see figure 19). These included issues related to the server (74.9%), authentication (46.5%), connectivity or network (37.5%), short battery life (30.9%), and problems with PoS application updates (27.3%).<sup>9</sup> To resolve these issues, retailers used varying GRMs including the toll-free number as well as reliance on Block or District Agriculture Officers and fertilizer company representatives, among others. Retailers preferred to contact the latter rather than use the toll-free number.

**02** Of the total retailers surveyed, 38.3% were aware of the toll-free or helpline number for grievance resolution. Only 43.0% of these retailers registered their grievances through the toll-free number.

Figure 19: Issues faced by retailers



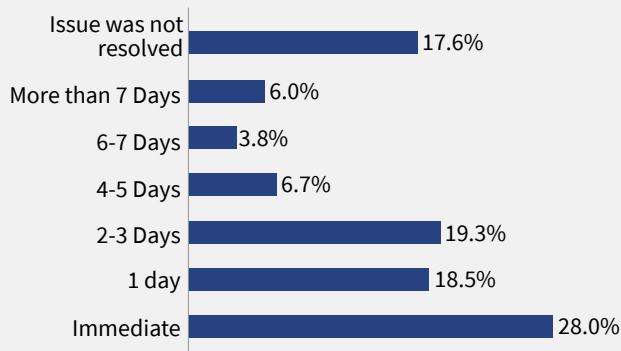
<sup>9</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.

**02** Of the total retailers surveyed, 38.3% were aware of the toll-free or helpline number for grievance resolution. Only 43.0% of these retailers registered their grievances through the toll-free number.

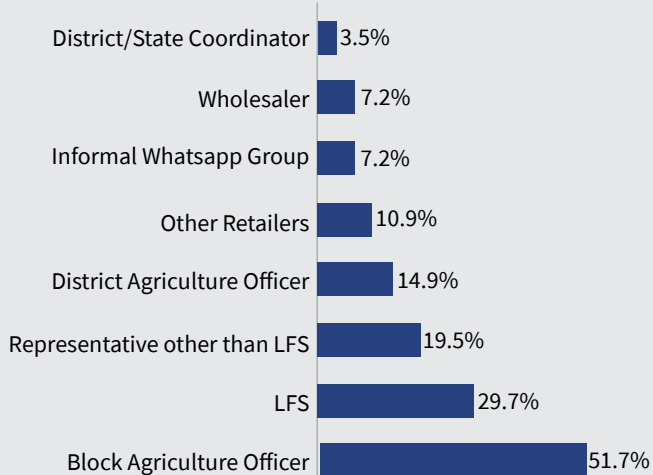
**03** Of those retailers who registered their grievances, 69.0% were satisfied with the support provided, as approximately 66% of these grievances were resolved within three days (see figure 20).

**04** Retailers preferred contacting their Block or District Agriculture Officer or fertilizer company representative, among others, to resolve grievances (see figure 21).<sup>10</sup> Of the total retailers surveyed, 93.0% contacted one of these people at least once to register their grievances. 79.0% of these retailers were satisfied with the support provided as 86.0% of the grievances were resolved within three days (see figure 22).

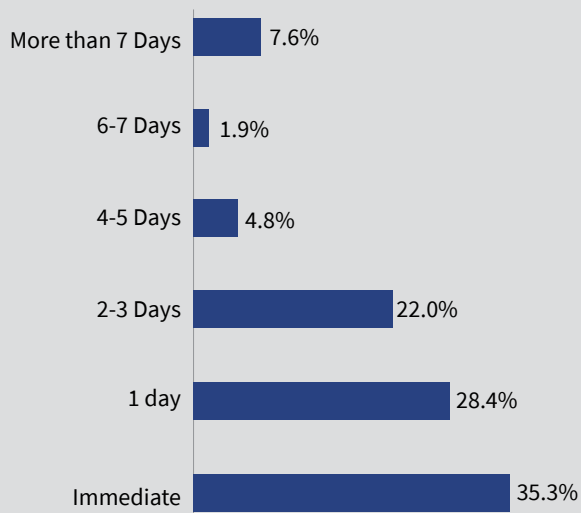
**Figure 20: Turn-around time for grievance resolution through the toll-free number**



**Figure 21: Methods of GRM (other than toll-free number)**



**Figure 22: Turn-around time for grievance resolution through other methods**



<sup>10</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.



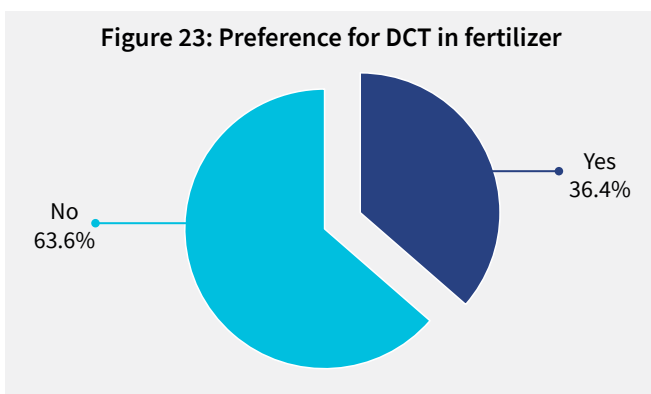


## 8. Farmers did not prefer Direct Cash Transfer (DCT) for fertilizer

Farmers did not prefer DCT in fertilizer. They are concerned about the increased financial burden and issues in cash transfers that they faced in other cash transfers programs. The government should look into these aspects before implementing DCT in fertilizer.

Although 95.5% of the farmers surveyed had individual bank accounts, only 36.4% of the farmers said that, if given a choice, they would prefer DCT in fertilizer subsidy. This means that they would pay the market price (decontrolled market) to buy fertilizer and then receive cash in their bank accounts instead of the subsidy. The remaining 63.6% of farmers said that they would not prefer DCT in fertilizer subsidy and would like to buy fertilizer at a subsidized price. This preference from the farmers can be attributed to the factors given below:

Figure 23: Preference for DCT in fertilizer



- 01 Farmers believed that their financial burden would increase if they had to buy fertilizer at the market

price, as they would be forced to borrow additional money to compensate for the perceived increase in the price of the fertilizer. For example, a farmer bought an average of 25 bags annually. Currently, in a controlled environment, at INR 266 (USD 3.83) per bag of urea, the farmer requires INR 6,650 (USD 95). However, in a decontrolled environment, assuming the price of per bag of urea at INR 1,100 (USD 15.71), the farmer would need INR 27,500 (USD 392.86). It would result in an additional up-front financial burden of INR 20,850 (USD 297.86)<sup>11</sup>.

- 02 In addition, under DCT, farmers noted that they would pay more interest on the increased amount borrowed. The interest burden would be more difficult for farmers who borrow from informal financial sources at higher interest rates.
- 03 Farmers recalled facing issues when they received the Liquefied Petroleum Gas (LPG) subsidy into their bank accounts<sup>12</sup>. Farmers either did not receive their subsidy or the subsidy was delayed. Due to this experience, farmers believed that they would face similar issues in DCT in fertilizer.

<sup>11</sup> <https://www.indiabudget.gov.in/budget2016-2017/es2015-16/echapvol1-09.pdf>

<sup>12</sup> <https://www.microsave.net/2018/10/31/fuel-subsidy-reform-experiences-from-india-and-learnings-for-other-countries/>

## 9. Soil Health Card (SHC) status



Awareness and availability of SHC has been low among farmers. However, usage among the small proportion of farmers who had SHC was high but they were primarily using it to avail subsidized inputs linked to the SHC. Farmers were not aware of the purpose of SHC, hence they were averse to risk affecting their productivity by applying fertilizer according to the SHC rather than as per their own experience. This indicates that farmers would start following SHC recommendations if they are informed about the objectives of the SHC initiative and are involved in the SHC generation process.

The government launched the SHC program in February, 2015.<sup>1</sup> The program works to improve the soil quality of farmlands by helping farmers understand the importance of optimum use of fertilizer. Under the program, farmers' soil is tested for 12 key elements, based on which a static soil quality report is generated and given to the farmers. The government expects farmers to use fertilizer based on the SHC. Hence, SHC is seen as a behavioral lever for optimum use of fertilizer.

In November 2016, we conducted a behavioral study in Krishna district of Andhra Pradesh to understand the barriers and triggers to the use of SHC and identify the most effective communication channel to engage farmers.<sup>2,3</sup> Furthermore, MSC has assessed the awareness, availability, and usage of SHC with every round of evaluation. The section below highlights the basic information on the use of SHC by farmers at the national level:

**01** Awareness of SHC among farmers remained poor. An alarmingly low number of farmers either had an SHC or followed the recommendations provided on the SHC.

**02** Only 25.2% of the farmers surveyed were aware of SHC. The remaining 74.8% of the farmers were unaware of it. The majority of farmers stated that the government did not provide information about the SHC program, the soil sample collection process, the timeline for soil sample collection, or the SHC distribution.

**03** Of all the farmers surveyed, only 7.4% had received the SHC.

**04** Only 6.7% of the farmers surveyed said that the SHC provided recommendations on the crops they cultivated.

**05** Only 6.1% of farmers followed the SHC recommendations. This was primarily because of a lack of awareness regarding the purpose of the SHC. However, 82% of farmers who received SHC followed the recommendations.

<sup>1</sup> <https://soilhealth.dac.gov.in/>

<sup>2</sup> [https://www.microsave.net/wp-content/uploads/2018/10/IFN\\_140\\_Is\\_Soil\\_Health\\_Card\\_the\\_Magic\\_Pill\\_for\\_Agricultural\\_Woes.pdf](https://www.microsave.net/wp-content/uploads/2018/10/IFN_140_Is_Soil_Health_Card_the_Magic_Pill_for_Agricultural_Woes.pdf)

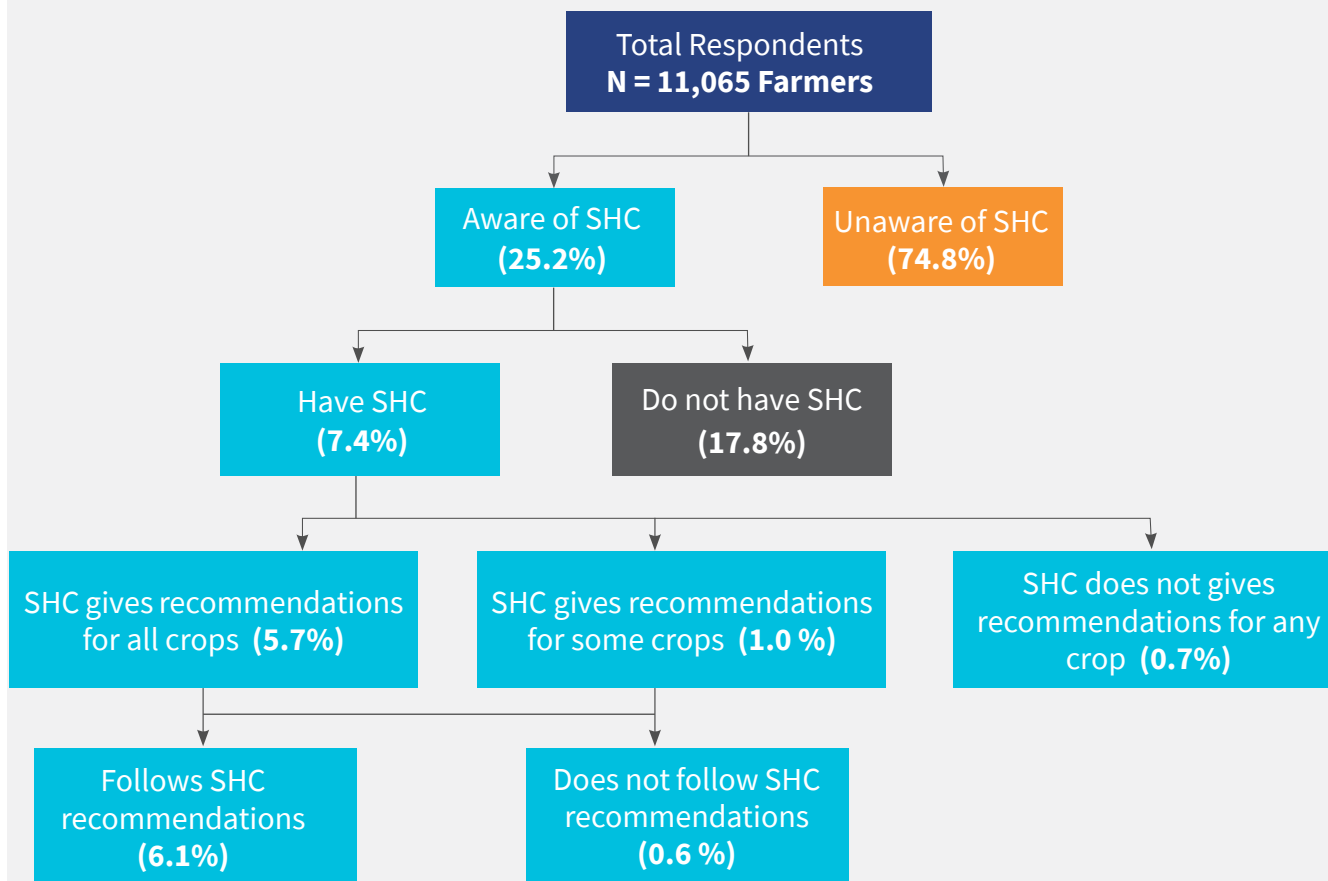
<sup>3</sup> <https://www.microsave.net/signature-projects/shc-communication-for-farmers/>



06 A few farmers (0.6%) who did not follow the recommendations on the SHC stated that they did

not want to risk their farm crop productivity, as they believed strongly in their own experience with applying fertilizer over the years.

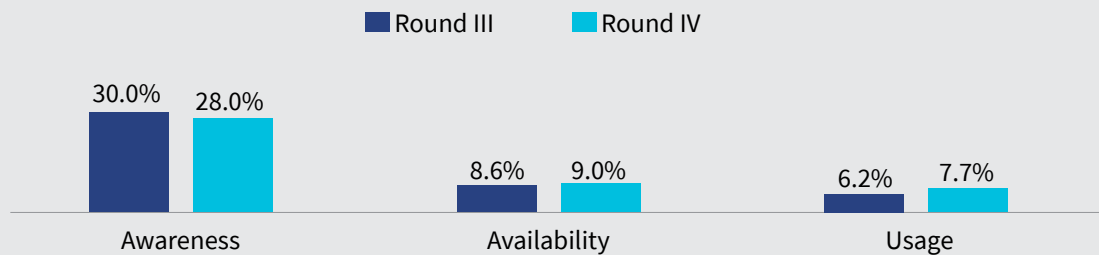
Figure 24: Status of Soil Health Card



**Status of SHC in pilot districts (booster survey)**

- Awareness of SHC in the pilot districts decreased from 30.0% in Round III to 28.0% in Round IV.
- However, the availability of SHC among farmers increased from 8.6% in Round III slightly to 9.0% in Round IV, while usage increased from 6.2% in Round III to 7.7% in Round IV (see figure 25).

Figure 25: Awareness, availability, and usage of SHC in pilot districts





## 10. Mixed response from retailers and farmers on cashless payment

The majority of fertilizer sales and purchases were conducted in cash. If given a choice, retailers would prefer to accept payment through cashless instruments to reduce cost and risk of handling cash, for easier record keeping, and for convenient money management. Yet farmers preferred cash to purchase fertilizer, mainly due to the ease of using cash. The government should focus on a “pull” strategy to enable cashless payment by providing an enabling payment infrastructure.

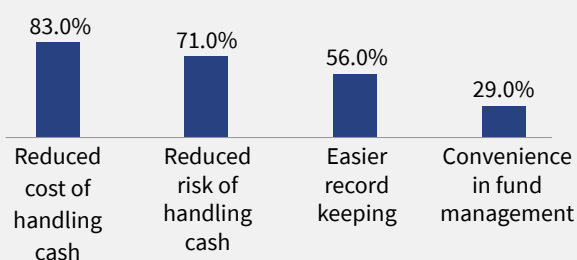
### 10.1. Two-thirds of the retailers preferred cashless sales

**01** Of the retailers, 72.0% conducted sales in cash. However, 65.4% of the retailers surveyed preferred payment through cashless instruments, such as ATM or debit cards, credit cards, mobile wallets, among others. These retailers cited benefits of cashless transactions, which include reduced cost of handling cash (83.0%), reduced risk of handling cash (71.0%), easier record-keeping (56.0%), and the convenience of managing the money (29.0%). See figure 26 for details.<sup>4</sup>

**02** Retailers who were inclined to cashless transactions preferred to accept payments through ATM or debit cards (86.0%), mobile wallet (36.0%), bank check (29.0%), e-KCC or credit card (24.0%), and NEFT or RTGS (21.0%).<sup>5</sup>

**03** Of the retailers surveyed, 34.6% would prefer cash payments for fertilizer sales. These retailers cited the convenience of using cash (77.0%), farmers’ inability

**Figure 26: Reasons for preference for cashless sales**



to pay in the cashless mode (37.0%), connectivity issues (36.0%), lack of enabling infrastructure at the outlets (35.0%), and merchant discount rate (MDR) charges (27.0%) as the major obstacles for cashless payments.<sup>6</sup>

<sup>4</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.

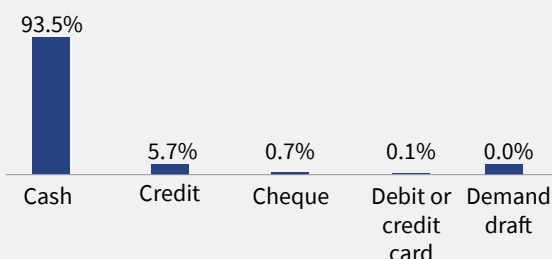
<sup>5</sup> The Kisan Credit Card (KCC) program provides credit to farmers at a discounted interest rate for their farming requirements (both short term and long term). <https://www.rbi.org.in/CommonPerson/upload/english/notification/pdfs/04mckcc03072017.pdf>

<sup>6</sup> The merchant discount rate (MDR) is the rate charged to a merchant for payment processing services on debit and credit card transactions. The merchant must set up this service and agree to the rate prior to accepting debit and credit cards as payment.

## 10.2. The majority of farmers preferred using cash buy fertilizer

**01** Of the farmers who bought fertilizer, 93.5% paid in cash for their most recent transaction (see figure 27).

**Figure 27: Current modes of payment to purchase fertilizer**



**02** However, 42.3% of the farmers surveyed said that in the future, they would prefer to buy fertilizer using a cashless mode. These farmers stated that they would prefer ATM or debit card (85.0%), e-KCC or credit card (22.0%), mobile wallet (17.0%), and bank check (16.0%) as their cashless payment instruments.

**03** Of the farmers, 57.7% said that they would not prefer a cashless mode to buy fertilizer, citing the perceived ease of using cash (80.0%) as a primary reason. Other reasons cited for the low preference for cashless modes were availability and lack of accessibility of enabling infrastructure, such as ATMs and smartphones, among others.

### Improved acceptance of cashless mode for fertilizer sale and purchase (booster survey)

- In the pilot districts, the preference of retailers to sell fertilizer using cashless modes increased from 49.0% in Round III to 65.9% in Round IV.
- The preference of farmers to buy fertilizer through cashless mode also increased from 32.0% in Round III to 44.0% in Round IV.





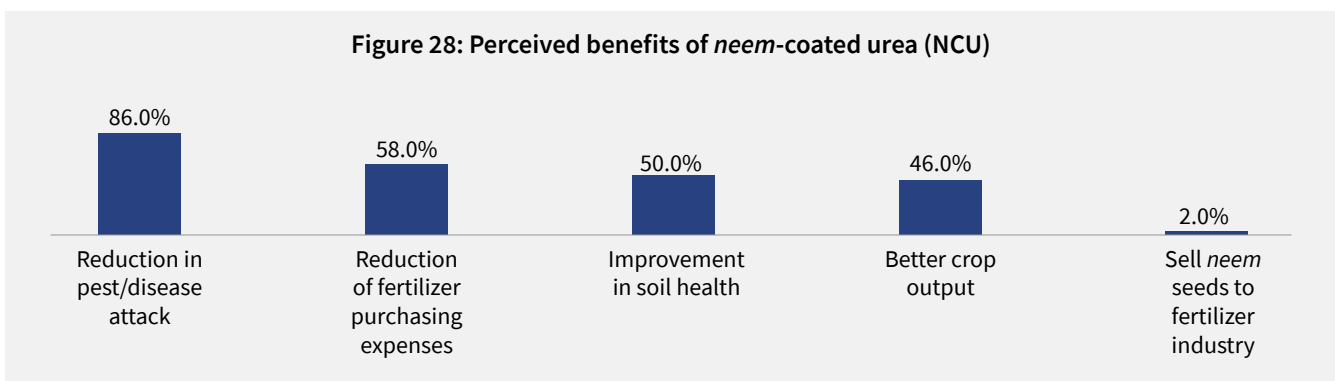
# 11. Impact of DBT and other initiatives

Initiatives such as *neem*-coated urea (NCU), increasing retailer commission on urea, and reducing the weight of a urea bag by 5kg had a positive impact on the fertilizer distribution system and fertilizer usage.

## 11.1. Farmers perceived NCU as beneficial for agriculture<sup>7</sup>

01 Of the farmers, 76.5% were aware that urea available in the market was coated with extract of neem (*Azadirachta indica*). Of these farmers, 94.9% perceived that *neem*-coated urea (NCU) was

beneficial for agricultural crops to reduce pest attacks and lower the cost of fertilizer, improve soil health, better crop output, and additional income from the sale of *neem* seeds to the fertilizer industry (see figure 28).<sup>8</sup>



<sup>7</sup> Urea is coated with the extract of neem (*Azadirachta indica*) seeds. *Neem*-coated urea minimizes loss due to leaching and prevents its misuse for industrial purposes as it slows the release of urea when applied. Urea finds use in a myriad of industries, as an ingredient in the chemical, medical and explosives industries, automobile systems, laboratories, as flavor enhancing additives in cigarettes, among others.

<sup>8</sup> Respondents were able to provide more than one answer to the survey questions. Hence, the sum of the percentages may exceed 100.



## 11.2. Retailers received a higher margin per bag of urea

Based on MSC's recommendation to increase the retailer commission following the Round III evaluation, the government doubled the retailer/cooperative commission from INR 9 (USD 0.13)/INR 10 (USD 0.14) per 50 kg urea to INR 20 (USD 0.28) per 50 kg urea for both private retailers and cooperatives. This move resulted in higher sales margins. However, the extent varied from one retailer to another depending on the market dynamics and wholesalers. For example:

01 In Himachal Pradesh, Indian Farmers Fertilizer Cooperative (IFFCO) passed a margin up to

INR 16 (USD 0.23) per urea bag to the cooperatives, whereas the Himachal Pradesh State Cooperative Marketing and Consumers Federation Limited (HIM-FED) passed INR 6 (USD 0.08) to INR 8 (USD 0.11) per urea bag.

02 Private wholesalers passed on a margin of INR 6 (USD 0.08) to INR 10 (USD 0.14) to retailers depending on the availability of wholesalers in a particular market, the demand and supply of fertilizer, and the relationship between the wholesaler and retailer.

## 11.3. Anecdotal evidence suggested that reducing the weight of a urea bag by 5kg resulted in optimizing the use of urea

The government reduced the weight of one bag of urea from 50 kg to 45 kg. The objective was to push farmers to use less urea in proportion to other nutrient fertilizers, such as Phosphorous (P) and Potassium (K). The assumption was that the farmers buy fertilizer based on the number of bags and not by weight. Hence, we expected that farmers would use less urea if they bought the same number of bags after the change was implemented. The following section outlines our findings from the qualitative assessment:

01 Most small and marginal farmers required a smaller number of fertilizer bags, for instance, less than 10 bags. Reducing the weight of the bag resulted in optimizing the use of urea. For example, if a farmer

previously purchased four bags of urea, they would have applied 200 kg of urea. However, in the new scenario, the farmer applied only 180 kg of urea.

02 Medium and large farmers required more fertilizer bags (for example more than 10 bags). These farmers buy urea by weight in kg rather than by the number of bags. Accordingly, these farmers bought additional bags to compensate for the reduction in urea per bag. For example, a farmer who would buy 10 bags of urea bought an additional bag under the new scenario to compensate for the reduction in the amount (50 kg in this case).

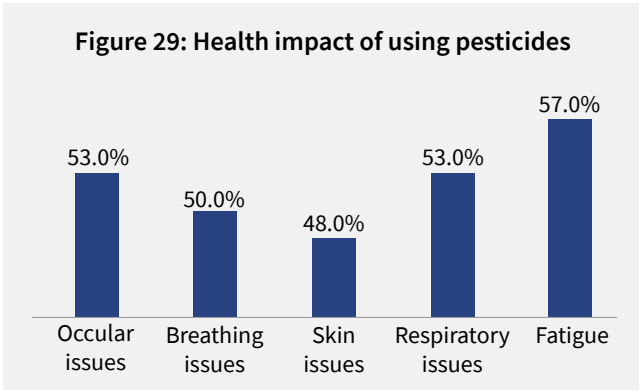


## 12. Impact of pesticide use on the health of farmers



Farmers were aware of the ill effects of pesticide use. They reported experiencing a variety of symptoms during or immediately after applying pesticide on the fields. However, they continued using pesticide as it is essential for crop protection. Better awareness creation about the ill effects of the use of pesticide and better knowledge of protective gear and its use while applying fertilizer should reduce the ill effects.

- 01 The use of pesticide was prevalent even though farmers were aware of its ill effects. Most of the farmers (87.0%) used pesticide to protect their crops while 65.0% of the farmers were aware that the use of pesticide affected their health adversely.
- 02 On average, an agricultural household incurred approximately INR 7,872 (USD 114.4) annually on pesticides.
- 03 Farmers who engaged in pesticide application experienced a variety of symptoms during or immediately after use. These symptoms included shortness of breath, pain, and irritation of the eyes and skin, ailments such as redness and rashes, coughing and sneezing, and fatigue (see figure 29)<sup>9</sup>.
- 04 Despite the high use of pesticides and awareness of its effects among farmers, only 62.0% of them used protective gear, including gloves, and masks or eyeglasses, or both, while applying the pesticide. Most farmers did not use a mask, but rather a cloth to cover their face.
- 05 The average annual household expenditure on health services was INR 20,788. While the majority of farmers could not point to a specific ailment related directly to the use of pesticides, a few did consider the use of pesticides as a major health concern.
- 06 The percentage of farmers who use pesticides in Assam (70.0%), Himachal Pradesh (53.0%), and Manipur (61.0%) were lower than the national average of 87.0%. This could be attributed to the prevalence of organic farming practices in the states.



<sup>9</sup> <https://www.ncbi.nlm.nih.gov/pubmed/16967829> and <http://el.doccentre.info/eldoc1/d70e/080101zzz1B.pdf>



## 13. Recommendations

### 13.1. Technological recommendations



Develop a device agnostic application to sell fertilizer

Retailers faced a variety of PoS-related issues, such as short battery life, small screen size, lack of maintenance services, and fading of ink on transaction receipts that the PoS devices generate. Moreover, PoS-related maintenance issues were likely to increase as the PoS devices age. Retailers were also concerned about the cost of replacing the PoS device.

To overcome these challenges, MSC recommended that the government develop a device-agnostic mFMS application. This application should be both mobile and web-based. It would allow retailers to use various devices at the front-end including laptops, desktops, or tablets or smartphones, or both. Many retailers and wholesalers, who used laptops and desktops to maintain the fertilizer manufacturer's Enterprise Resource Planning (ERP) requirements could also use the laptops and desktops for fertilizer sales.

Based on this recommendation, the government developed a PC and an Android application and tested it before rolling it out to retailers. Retailers could choose to run the application on a PoS device, PC, or Android phone to sell fertilizer.



Enable transaction receipts in regional languages

Farmers were unable to read the contents of the transaction receipts because either they were illiterate or the receipt was in English. MSC recommended that the government facilitate the generation of transaction receipts in regional languages so that the literate farmers could understand. Based on the recommendation, the government initiated changes to the POS application to generate transaction receipts in local languages.



**Facilitate the registration of new “admin” at cooperative or society retail points**

The current system did not allow a change in administrator more than once in the POS device. This posed a problem for the cooperatives in the event the secretary, who acted as the administrator, retired or was transferred. Based on this recommendation, the government enabled multiple administrator registrations at cooperatives and society retail points.



**Enable automatic software updates in PoS devices**

The state coordinators and retailers did not receive advance notice of imminent software updates. Commonly, such updates were implemented through patch files on USB drives. Recognizing the inconvenience that such need-based updates imposed on retailers, the government modified the software so that POS devices were automatically updated. In the latest software update, the department updated 175,000 devices automatically.



**Allow the option of stock reversal in case of damaged stock or incorrect recipient, or both**

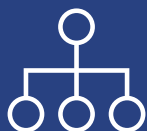
While transferring stock to retailers, wholesalers selected only the name of the retailer. The module did not allow wholesalers to select or check the retailer ID. In cases where more than one retailer with the same name existed, some wholesalers erroneously selected and dispatched fertilizer to another retailer. Further, retailers received damaged stock on occasion. To address these issues, MSC recommended that the government add a stock reversal option in the PoS. Subsequently, the government installed an option in the system that can be used to return stock due to damaged stock or incorrect recipient.



**Allow weight input in PoS up to three decimal points**

Wholesalers would enter their receipt of fertilizer stock in metric tons in the PoS application while they forwarded stock to retailers in kilograms. The PoS application could only accommodate up to two decimal points in metric tons. Due to the new 45 kg retail unit, the conversion into tons is more accurate up to the third decimal point. Therefore, MSC recommended that the government make changes to the PoS application to allow the input of fertilizer sales up to three decimal points. Subsequently, the government implemented MSC's recommendation.

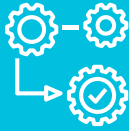
## 13.2. Operational recommendations



**Restructure the PoS application to address issues around stock update at railway rake points**

Due to a lack of IT infrastructure, such as desktops and laptops at the railway rake points, fertilizer companies did not update the stock in the PoS at the rake points. This delayed real-time stock updates and compelled retailers to sell fertilizer manually. MSC recommended that the department develops a device-agnostic PoS application so that fertilizer companies could use a device of their choice at railway rake points.

Based on our recommendation, the department developed a device-agnostic application. At the time of writing, fertilizer companies were able to use a device of their choice at railway rake points to update the PoS application in a timely manner.



#### Facilitate the replacement or repair of faulty POS devices

The devices from Analogics were of poor quality. Some issues associated with these devices included short battery life, sudden shutdowns, and their inability to accommodate SIMs beyond 2G technology. Retailers in many states, such as Haryana, Uttar Pradesh, Karnataka, and Maharashtra reported facing issues with Analogics devices. MSC recommended that the government to take steps to either replace these devices or provide sufficient service support.

In Uttar Pradesh and West Bengal, the government ordered nearly 1,000 new devices to replace faulty ones. In other instances, the government either repaired existing devices or replaced them with Visiontek devices.



#### Increase the availability of PoS devices in Assam

In Dibrugarh, Assam, only 63 of the 156 retailers had a POS device. BVFCL, the LFS Company in the state, was financially unstable and could not afford additional POS devices. As a result, the government broke up the district into market share held by each fertilizer company and requested the representative fertilizer companies to purchase POS devices. Currently, the number of POS devices in the state has doubled from 569 to 1,200.



#### Develop a robust GRM

Despite having a toll-free number, most of the complaint resolution calls from retailers were forwarded to state coordinators. One state coordinator was not able to handle the complaints of an entire state. A single person handling a large volume of queries and complaints crippled the efficiency of both the GRM system and other aspects of the state coordinator's work. MSC recommended the government to develop a one-stop solution where retailers' complaints are resolved and only newer or complex complaints are escalated to state coordinators.

Acknowledging the need for a more efficient GRM, the government:

1. Created a 14-member call center at the central level; the members are able to answer queries in six languages, namely, English, Hindi, Malayalam, Bengali, Kannada, and Tamil; and
2. Established a POS vendor support system with toll-free numbers.

### 13.3. Other recommendations



#### Regulate commission sharing between market federations and retailers or societies

State market federations did not pass on sufficient margins to the retailers or societies, for instance, in Himachal Pradesh. Furthermore, the federations did not pass the benefit of secondary freight subsidy to the retailers or societies. To resolve this issue, MSC recommended that the government should advise state market federations to provide retailers with sufficient margins and secondary freight.





Review the need for a “quantity of sales” (B1) certificate

The government required a certificate from state governments to confirm the quantity of sale, known as the B1 certificate. Based on this, the Government of India provided a subsidy to the fertilizer manufacturers in the form of reimbursement. However, after DBT-F was implemented, the mFMS application was capable of tracking sales of each retailer with a POS device. Therefore, MSC recommended that the government should review the B1 certificate requirement used to confirm the number of sales by the state.



Promote the use of gloves to protect fingerprint impressions

The farmers would apply fertilizer using their bare hands. Direct contact with chemicals damaged their skin, and especially affected their fingerprints. In addition to health concerns, farmers with damaged fingerprint impressions found it challenging to authenticate biometrically when purchasing fertilizer. MSC recommended that the government advise fertilizer companies to provide biodegradable gloves with fertilizer bags to promote safety while applying fertilizer.





## 14. Launch of Phase-II of DBT-F by DoF



Initiatives, such as DBT-F, mFMS, and NCU have brought transparency to the fertilizer system. Furthermore, the government launched phase-II of DBT-F in July 2019<sup>10</sup>

in a bid to facilitate real-time monitoring of availability and sale of fertilizer and improve the transaction experience. Phase II of DBT-F has the following features:



### 01. DBT dashboard

The dashboard provides reports regarding fertilizer stock position at ports, fertilizer manufacturing plants, warehouses, wholesalers, and retailers.<sup>11</sup> It also provides the requirement and availability of fertilizer at the level of the state, district, wholesaler, and retailer. The Government of India, state governments, and district administrations can monitor the top-20 buyers that purchase the largest quantity of fertilizer in a district, frequent buyers who purchase multiple times, and retailers who do not sell fertilizer.

### 02. PoS software 3.0

The multi-lingual facility would provide an option of virtual *Aadhaar* ID for registration. It would also have a provision for area-specific and crop-specific recommendations based on SHC data. Furthermore, it would capture details of the sale to farmers, mixture manufacturers, and planters' associations separately.<sup>12</sup>

### 03. Desktop PoS Version

The government developed a multilingual desktop version of the PoS software to address the various challenges faced in PoS devices. This was an alternative to PoS devices. Retailers with laptops and desktop PCs can use the PoS software through a high-speed broadband service for fertilizer sales.

<sup>10</sup> <http://pib.nic.in/PressReleaselframePage.aspx?PRID=1578063>

<sup>11</sup> <http://www.urvarak.nic.in>

<sup>12</sup> "Mixture of Fertilizers" means a mixture of fertilizers made by physically mixing two or more fertilizers, with or without inert material in physical or granular form and includes mixtures of NPK Fertilizers, a mixture of micronutrient fertilizers and a mixtures of NPK with micronutrient fertilizers;

## 15. Conclusion

DBT-F is one of the most successfully implemented direct benefit programs in the country. The Government of India launched the program with a pre-pilot in two districts and did not rush to implement the program at the national level. The objective in the pre-pilot phase was to test the idea and apply the lessons to improve the larger implementation. Based on the lessons from the pre-pilot, the government scaled the program to six districts and then to 14 districts in total.

Only after the successful implementation of the program in the 14 pilot districts and positive feedback from stakeholders, as reflected in MSC's evaluations, did the Government of India launch the program at the national level. Furthermore, the launch at the national level was done in a "phase-wise manner" over seven months.

The Government of India has implemented the program successfully as a result of several initiatives, which include the training of more than 220,000 fertilizer retailers, appointment of district and state coordinators to monitor the implementation, and technology enhancements to improve *Aadhaar* authentication and transaction times.

In terms of areas of improvement, the government could have provided a more robust GRM and communicated to the farmers better about the program.

The Government of India has reported a savings of INR 100 billion (USD 1.54 billion) due to implementation of various fertilizer-related initiatives, including DBT-F, mFMS, and NCU. Despite the overwhelming financial savings from DBT-F implementation, this subsidy has yet to be disbursed in a targeted manner. Currently, as long as *Aadhaar* authentication occurs, the quantity or the nature of beneficiaries does not restrict fertilizer purchases. The difficulty in targeting beneficiaries is due to the absence of a reliable database of beneficiaries and challenges associated with defining the entitlement amount for each beneficiary.

Although the Government of India has plans to implement cash transfers in fertilizer, it is likely to face obstacles due to the aforementioned challenges that have prevented accurate subsidy targeting. In addition, MSC believes that implementing DCT in fertilizer will be difficult for the following reasons:<sup>13</sup>



Financial burden

01

Farmers will face an additional financial burden if they have to pay for fertilizer upfront; the MRP of subsidized urea is INR 266 (USD 3.83), whereas non-subsidized urea costs approximately INR 1,100 (USD 15.71) per bag.

<sup>13</sup> For details, please refer to: [http://www.microsave.net/wp-content/uploads/2018/10/IFN\\_147\\_Barriers\\_to\\_Direct\\_Benefit\\_Transfers\\_for\\_Fertiliser\\_subsidy-1.pdf](http://www.microsave.net/wp-content/uploads/2018/10/IFN_147_Barriers_to_Direct_Benefit_Transfers_for_Fertiliser_subsidy-1.pdf)



Fertilizer purchases

02

Fertilizer purchases are time-sensitive. Farmers buy fertilizer only after the seasonal rains arrive. The farmers, therefore, would need to receive the subsidy in advance of the seasonal rains. However, existing cash transfer programs, such as those for LPG do not guarantee subsidy delivery on a fixed date.



Different amount

03

There are 72 different types of fertilizers, each subsidized at a different amount. In the absence of a fixed entitlement, managing the sales of all fertilizers uniformly on a single platform under DCT will be a complex proposition.

### The government can initiate DCT by adopting the following initiatives:<sup>14</sup>

- 01 Create a beneficiary database by leveraging the Digital India Land Records Modernization Programme (DILRMP), which is a first step toward creating a beneficiary database of landowners. The DILRMP aims to develop a modern, comprehensive, and transparent land records management system, which would provide a conclusive title guarantee to landowners. This database can be used to identify, enroll, and target farmers with land titles. However, the database does not have details of tenant farmers. The Government of India and various state governments can take a cue from the Government of Andhra Pradesh's *Mee Bhoomi* program.<sup>15</sup> This program works to digitize land records, seed *Aadhaar* with land records, and identify tenant farmers as beneficiaries.
- 02 Define the entitlement to ensure the annual requirement of fertilizer for small and medium farmers.
- 03 Make a one-time cash advance payment to all beneficiaries. With this one-time advance payment, farmers would not face the additional financial burden of paying market rates to buy fertilizer, which at the time of writing was around three times the current subsidized rate. Furthermore, to ensure that the farmers spend the subsidy to buy fertilizers, the government can create a sub-account that only allows it to be spent on fertilizer at agricultural retail outlets.
- 04 Develop a sophisticated rule engine to carry out the complex calculation of subsidies on the back-end for transfer ahead of the next cycle. The existing mFMS could be used to develop this platform.

Although the above recommendations will assist the Government of India in its DCT rollout, it will be necessary to design and pilot-test the program before a wider roll-out at the national level.

<sup>14</sup> for details, please refer to: [http://www.microsave.net/wp-content/uploads/2018/10/IFN\\_148\\_Enablers\\_for\\_Direct\\_Benefit\\_Transfers\\_of\\_Fertiliser\\_subsidy-1.pdf](http://www.microsave.net/wp-content/uploads/2018/10/IFN_148_Enablers_for_Direct_Benefit_Transfers_of_Fertiliser_subsidy-1.pdf)

<sup>15</sup> <https://meebhoomi.ap.gov.in/Home.aspx>



# Annex I: Methodology

## 1.1. Nationally representative survey

MSC adopted a mixed-methods study design comprised of quantitative and qualitative components. The qualitative component involved in-depth interviews with 140 farmers and 74 retailers. In addition, we conducted in-depth interviews with district government officials including District Agriculture Officers, Block Agriculture Officers, fertilizer company representatives, and State Coordinators responsible for the implementation of DBT-F at the state and district-levels.

We designed the quantitative research exercise to provide nationally representative estimates of the implementation status and surveyed 11,281 farmers and 1,182 fertilizer retailers.

### Research design

The quantitative component adopted a cross-sectional

design with a multi-stage stratified sampling approach. For the retailer survey, the target population included all retailers engaged by fertilizer companies to sell fertilizer to farmers or buyers through PoS devices via *Aadhaar* authentication. We compiled the sample retailers from the list available on the mFMS website.

For the farmer survey, the target population included all farmers who bought subsidized fertilizer from the above-mentioned fertilizer retailers through PoS devices via *Aadhaar* authentication.

### Farmer and retailer sampling

To finalize the quantitative sample of farmers and retailers we conducted the following:

**Stage  
1**

We divided the target population into six strata based on the Socio-Economic and Caste Census (SECC) of India. The SECC divides India into seven zones namely North, South, East, West, Central, Northeast, and Union Territories (UT). We excluded the UTs as obtaining a sufficient number of farmers in the UTs was anticipated to be difficult. Hence, we conducted the study in six zones. We selected three states from each zone using simple random sampling resulting in 18 states for the study.

**Stage  
2**

We selected three districts from each of the 18 states using simple random sampling, resulting in 54 districts. Based on the number of cumulative transactions, we divided each district into four sub-strata:

<ol style="list-style-type: none"> <li><b>1. Large retailers:</b> More than 100 transactions</li> <li><b>2. Medium retailers:</b> 51 to 100 transactions</li> </ol>	<ol style="list-style-type: none"> <li><b>3. Small retailers:</b> 21 to 50 transactions</li> <li><b>4. Micro retailers:</b> up to 20 transactions</li> </ol>
---	--



**Stage 3**

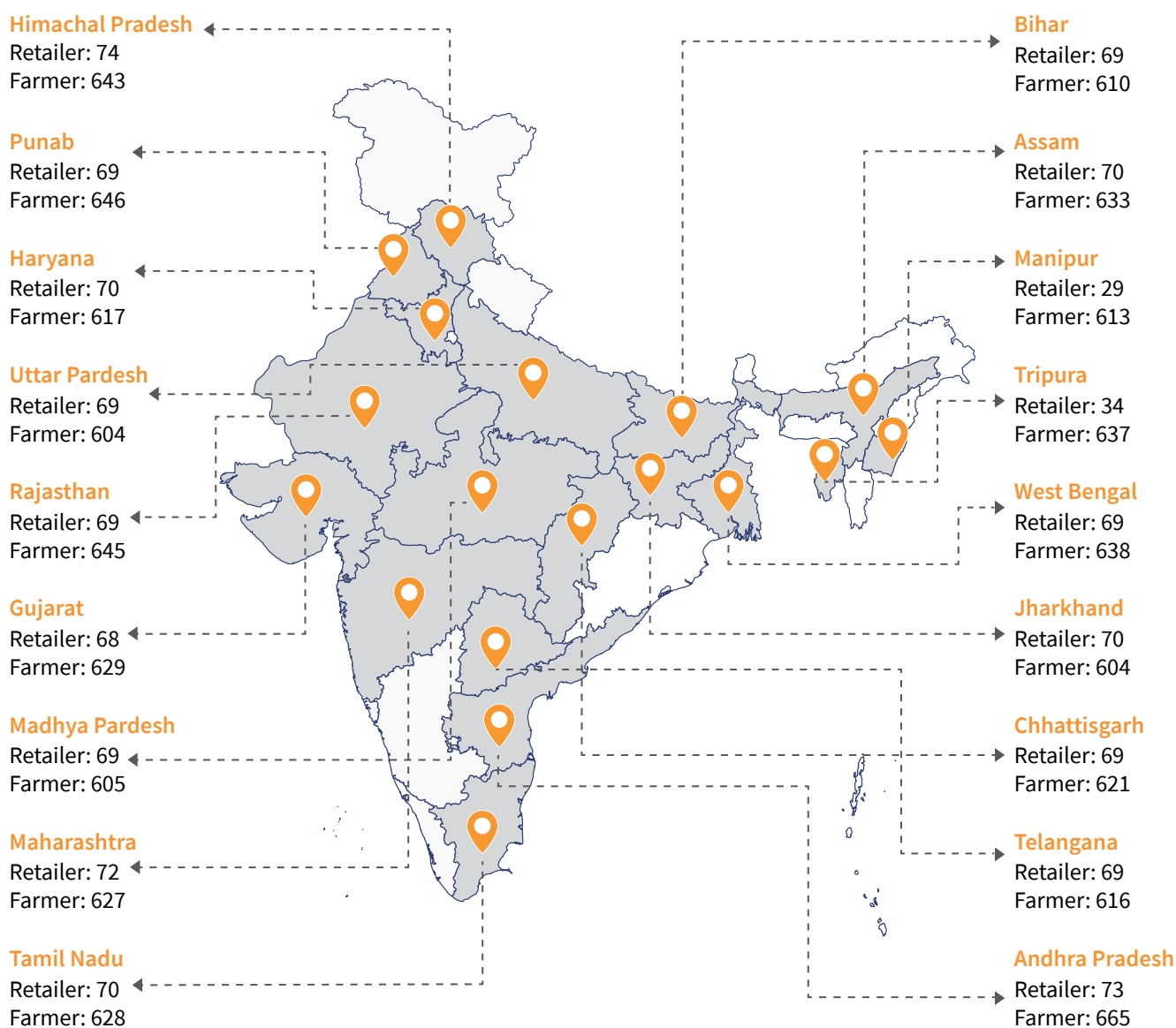
In each of the 54 sampled districts, from each sub-stratum of retailers (large, medium, small, and micro), we selected a predetermined number of retailers using Probability Proportional to Size (PPS) sampling because the number of farmers or buyers per retailer varies widely. Hence, retailers with a larger farmer or buyer footfall had a higher probability of selection under each sub-stratum. We used the number of cumulative transactions as a Measure of Size (MoS).

**Stage 3**

Based on the median “number of transactions” in each of the four sub-strata, we selected the number of farmers per retailer using systematic sampling with a sampling interval of two.

Map not to scale

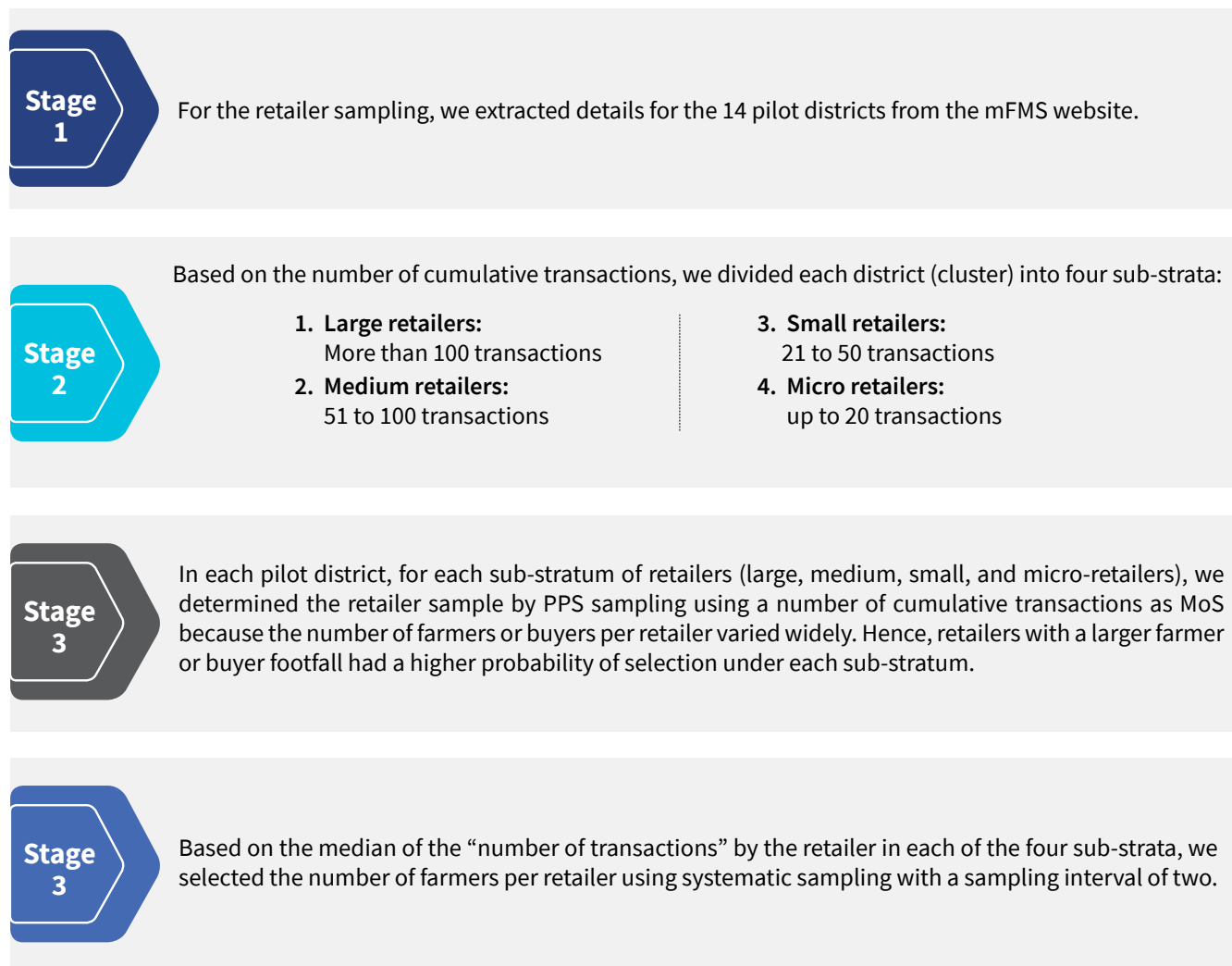
**Figure 30: Quantitative sample of farmers and retailers (national study)**



## 1.2. Booster survey (14 pilot districts)

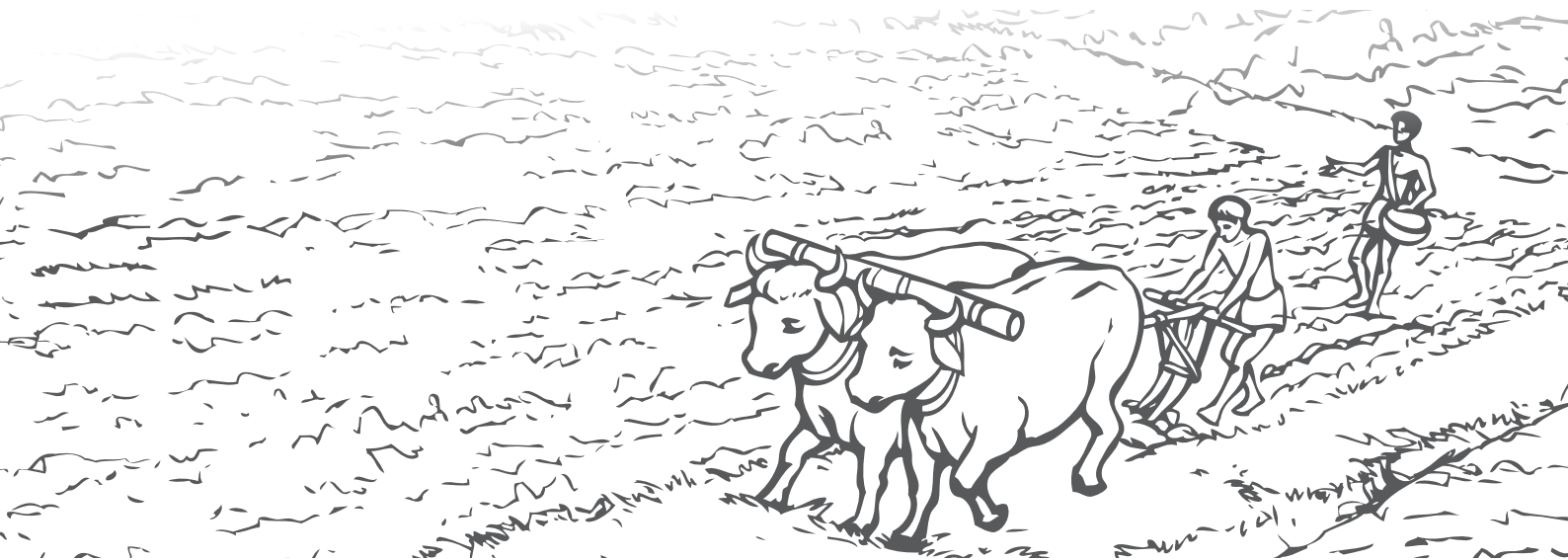
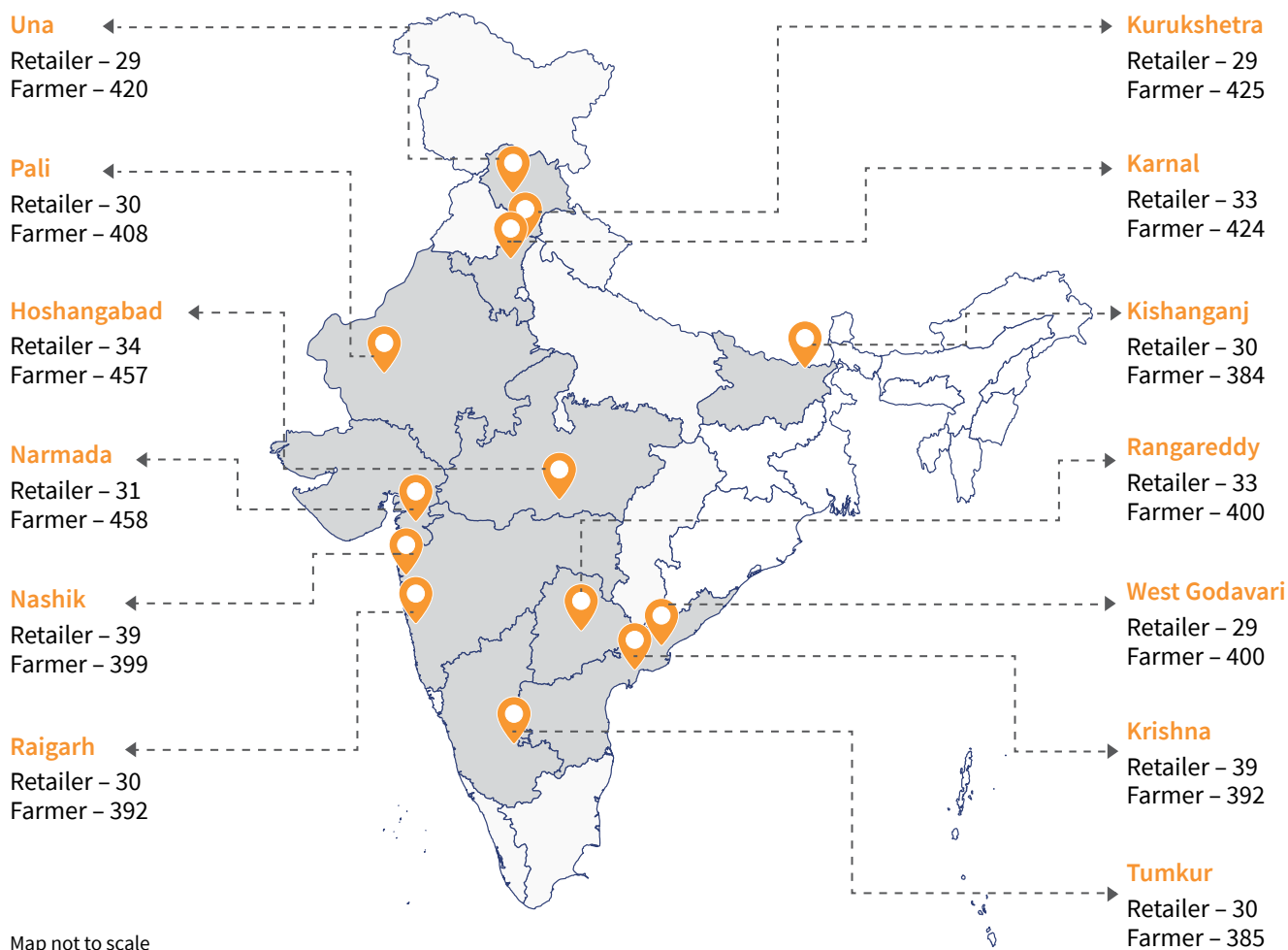
In 2017, MSC had conducted the third round (Round III) of evaluation to assess the implementation status of DBT-F in 14 pilot districts.<sup>1</sup> MSC also conducted a booster survey in Round IV to understand the progress of DBT-F

implementation over time in the 14 pilot districts and to gauge the sustainability of the process. The survey covered 416 retailers and 5,349 farmers. The sampling strategy adopted to select retailers and farmers was as follows:



<sup>1</sup> In the round IV evaluation, we did not cover Kerala due to severe floods in the state.

Figure 31: Quantitative sample of farmers and retailers (booster survey—14 pilot districts)



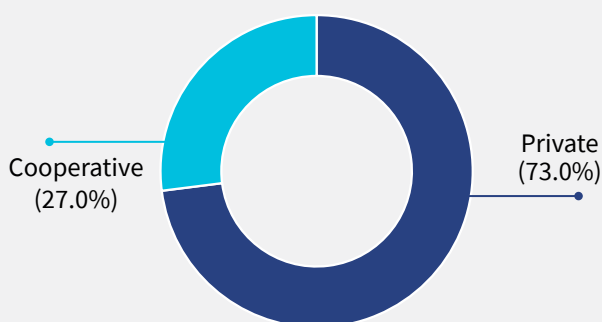


## Annex II: Respondent profile

### 2.1. Retailer profile

- Of the 1,182 retailers surveyed across the 54 districts, 73.0% were private retailers and the remaining 27.0% were cooperatives. These cooperatives were involved in additional activities, such as farm produce sales, agriculture input procurement, agriculture credit, and other banking services.
- On average, retailers sold fertilizer worth INR 5.9 million (USD 0.08 million) during the last year. Cooperatives sold fertilizer worth INR 8.2 million (USD 0.11 million) and private retailers sold fertilizer worth INR 5.1 million (USD 0.07 million).
- Average turnover of retailers including other agricultural commodities was INR 10.9 million (USD 0.16 million) during the year prior to data collection. The turnover of cooperatives was INR 17.1 million (USD 0.24 million), while private retailers clocked a turnover of INR 9.4 million (USD 0.13 million).
- On average, fertilizer outlets remained open for nine and a half hours per day.

**Figure 32: Ownership type of fertilizer retailers**



### 2.2. Farmer profile

- Of the 11,281 respondents surveyed, 98.4% were farmers. The remaining 1.6% constituted non-farmers who purchased fertilizer on behalf of other farmers, relatives, or friends.
- Of the total respondents, 97.7% bought fertilizer for self-consumption, 1.7% bought for others, and 0.6% bought for both self and others. Respondents who bought fertilizer for others included auto or buggy drivers, or individuals who sell loose fertilizer in villages.
- Of the total farmers, 84.6% were landowners and 6.0% were tenants. The remaining 9.4% of the farmers were both tenants and landowners.
- The average landholding of all the farmers surveyed was 7.5 acres (3.0 hectares).
- The farmers bought an average of 25 urea bags during the year prior to data collection.



## Annex III: State profiles



### 1. Andhra Pradesh

Respondent profile	
Districts covered	Anantapur, Krishna, and Vizianagaram
Farmer profile	1. Landowner: 91.5% 2. Sharecropper or tenant farmer: 3.8% 3. Both (own land and lease land): 4.7%
Retailer profile	1. Private: 87.7% 2. Cooperative: 12.3%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 57.5% 2. Old manual system: 34.2% 3. Indifferent (do not see much difference between the two): 8.3%
Training and awareness	
Training received	1. Yes: 91.8% 2. No: 8.2%
Training sufficiency	1. Yes: 88.1% 2. No: 11.9%

Compliance	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 82.0% 2. No: 16.0% 3. Not Sure: 2.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 49.0% 2. Receives dispatch ID first: 18.0% 3. Receives physical stock first: 33.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 50.7% 2. Two: 31.5% 3. Three: 15.1% 4. Four or more: 2.7%
Problem faced in managing transactions during the peak season	1. Yes: 75.3% 2. No: 24.7%
GRM	
Awareness of official toll-free number	1. Yes: 57.5% 2. No: 42.5%
Retailer satisfaction with the GRM	1. Yes: 68.4% 2. No: 31.6%
Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 54.8% 2. No: 45.2%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 95.6% 2. No: 4.4%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 81.4% 2. The old system through <i>Aadhaar</i> and PoS: 17.0% 3. Indifferent or not sure: 1.6%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 97.0% (a.) Authentication successful: 99.8% (b.) Authentication failed: 0.2% (i.) Manual transaction: 0.0% (ii.) Fertilizer denied: 0.2% 2. Manual Transaction (latest transaction): 2.5% 3. Enrolment ID + EPIC/KCC: 0.0% 4. Fertilizer Denied: 0.5%

The average number of attempts for <i>Aadhaar</i> authentication	1. One: 88.0% 2. Two: 9.0% 3. Three: 2.5% 4. Four or more: 0.5%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 53.7% 2. No: 46.3%
Preference for Direct Cash Transfers (DCT)	1. Yes: 58.0% 2. No: 42.0%

## 2. Assam

Respondent profile	
Districts covered	Dibrugarh, Lakhimpur, and Nagaon
Farmer profile	1. Landowner: 82.9% 2. Sharecropper or tenant farmer: 7.7% 3. Both (own land and lease land): 9.4%
Retailer profile	1. Private: 91.4% 2. Cooperative: 8.6%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 51.4% 2. Old manual system: 30.0% 3. Indifferent (do not see much difference between the two): 18.6%
Training and awareness	
Training received	1. Yes: 97.1% 2. No: 2.9%
Training sufficiency	1. Yes: 77.9% 2. No: 22.1%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 96.0% 2. No: 1.0% 3. Not sure: 3.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 53.0% 2. Receives dispatch ID first: 17.0% 3. Receives physical stock first: 30.0%

Transaction experience	
The average number of attempts to log in to PoS device	1. One: 22.9% 2. Two: 48.6% 3. Three: 17.1% 4. Four or more: 11.4%
Problem faced in managing transactions during the peak season	1. Yes: 71.4% 2. No: 28.6%
GRM	
Awareness of official toll-free number	1. Yes: 50.0% 2. No: 50.0%
Retailer satisfaction with the GRM	1. Yes: 81.5% 2. No: 18.5%
Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 75.7% 2. No: 24.3%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 74.1% 2. No: 25.9%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 70.9% 2. The old system through <i>Aadhaar</i> and PoS: 11.8% 3. Indifferent or not sure: 17.2%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 0.3% (a.) Authentication successful: 0.3% (b.) Authentication failed: 0.0% (i.) Manual transaction: 0.0% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 10.6% 3. Enrolment ID + EPIC/KCC: 89.1% 4. Fertilizer Denied: 0.0%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 50.0% 2. Two: 50.0% 3. Three: 0.0% 4. Four or more: 0.0%
Average transaction time using PoS	7 to 8 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 67.0% 2. No: 33.0%
Preference for DCT	1. Yes: 75.8% 2. No: 24.2%



### 3. Bihar

Respondent profile	
Districts covered	Kaimur (Bhabua), Katihar, and Khagaria
Farmer profile	1. Landowner: 71.8% 2. Sharecropper or tenant farmer: 14.2% 3. Both (own land and lease land): 14%
Retailer profile	1. Private: 85.5% 2. Cooperative: 14.5%
Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 68.1% 2. Old manual system: 23.2% 3. Indifferent (do not see much difference between the two): 8.7%
Training and awareness	
Training received	1. Yes: 97.1% 2. No: 2.9%
Training sufficiency	1. Yes: 83.6% 2. No: 16.4%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 67.0% 2. No: 12.0% 3. Not sure: 21.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 72.0% 2. Receives dispatch ID first: 16.0% 3. Receives physical stock first: 12.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 46.4% 2. Two: 33.3% 3. Three: 13.1% 4. Four or more: 7.2%
Problem faced in managing transactions during the peak season	1. Yes: 52.2% 2. No: 47.8%
GRM	
Awareness of official toll-free number	1. Yes: 45.8% 2. No: 54.2%
Retailer satisfaction with the GRM	1. Yes: 72.7% 2. No: 23.3%

Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 73.9% 2. No: 26.1%
Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 91.5% 2. No: 8.5%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 82.0% 2. The old system through <i>Aadhaar</i> and PoS: 15.5% 3. Indifferent or not sure: 2.5%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 88.0% (a.) Authentication successful: 99.0% (b.) Authentication failed: 1.0% (i.) Manual transaction: 1.0% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 12.0% 3. Enrolment ID + EPIC/KCC: 0.0% 4. Fertilizer Denied: 0.0%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 95.4% 2. Two: 1.8% 3. Three: 2.8% 4. Four or more: 0.0%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 58.2% 2. No: 41.8%
Preference for DCT	1. Yes: 43.3% 2. No: 56.7%

## 4. Chhattisgarh

Respondent profile	
Districts covered	Bemetara, Bilaspur, and Uttar Bastar Kanker
Farmer profile	1. Landowner: 94.2% 2. Sharecropper or tenant farmer: 1.6% 3. Both (own land and lease land): 4.2%
Retailer profile	1. Private: 53.6% 2. Cooperative: 46.4%

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	1. PoS-based system: 87.0% 2. Old manual system: 8.7% 3. Indifferent (do not see much difference between the two): 4.3%
<b>Training and awareness</b>	
Training received	1. Yes: 97.1% 2. No: 2.9%
Training sufficiency	1. Yes: 83.6% 2. No: 16.4%
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 74.0% 2. No: 13.0% 3. Not Sure: 13.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 36.0% 2. Receives dispatch ID first: 7.0% 3. Receives physical stock first: 57.0%
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	1. One: 34.8% 2. Two: 43.5% 3. Three: 14.5% 4. Four or more: 7.2%
Problem faced in managing transactions during the peak season	1. Yes: 36.2% 2. No: 63.8%
<b>GRM</b>	
Awareness of official toll-free number	1. Yes: 49.3% 2. No: 50.7%
Retailer satisfaction with the GRM	1. Yes: 100.0% 2. No: 0.0%
<b>Cashless sale</b>	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 73.9% 2. No: 26.1%
<b>Farmer-level findings</b>	
<b>Awareness and perception</b>	
Awareness of Aadhaar being mandatory for fertilizer purchase	1. Yes: 95.5% 2. No: 4.5%

Preference of system for buying fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i>-based system through PoS: 86.0%</li> <li>2. The old system through <i>Aadhaar</i> and PoS: 9.3%</li> <li>3. Indifferent or not sure: 4.7%</li> </ol>
<b>Transaction status and experience</b>	
Mode of purchasing fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i> authenticated: 99.0% <ol style="list-style-type: none"> <li>(a.) Authentication successful: 98.6%</li> <li>(b.) Authentication failed: 0.4% <ol style="list-style-type: none"> <li>(i.) Manual transaction: 0.4%</li> <li>(ii.) Fertilizer denied: 0.0%</li> </ol> </li> </ol> </li> <li>2. Manual Transaction (latest transaction): 1.0%</li> <li>3. Enrolment ID + EPIC/KCC: 0.0%</li> <li>4. Fertilizer Denied: 0.0%</li> </ol>
Average number of attempts for <i>Aadhaar</i> authentication	<ol style="list-style-type: none"> <li>1. One: 92.0%</li> <li>2. Two: 8.0%</li> <li>3. Three: 0.0%</li> <li>4. Four or more: 0.0%</li> </ol>
Average transaction time using PoS	3 to 4 minutes
Preference to buy fertilizer using cashless mode in the future	<ol style="list-style-type: none"> <li>1. Yes: 62.2%</li> <li>2. No: 37.8%</li> </ol>
Preference for DCT	<ol style="list-style-type: none"> <li>1. Yes: 63.1%</li> <li>2. No: 36.9%</li> </ol>

## 5. Gujarat

<b>Respondent profile</b>	
Districts covered	Banaskantha, Dahod, and Rajkot
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 94.6%</li> <li>2. Sharecropper or tenant farmer: 1.6%</li> <li>3. Both (own land and lease land): 3.8%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 26.5%</li> <li>2. Cooperative: 73.5%</li> </ol>

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 58.8%</li> <li>2. Old manual system: 32.4%</li> <li>3. Indifferent (do not see much difference between the two): 8.8%</li> </ol>
<b>Training and awareness</b>	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 95.6%</li> <li>2. No: 4.4%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 61.5%</li> <li>2. No: 38.5%</li> </ol>



Compliance	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 76.0% 2. No: 16.0% 3. Not Sure: 8.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 62.0% 2. Receives dispatch ID first: 19.0% 3. Receives physical stock first: 19.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 70.6% 2. Two: 8.8% 3. Three: 13.2% 4. Four or more: 7.4%
Problem faced in managing transactions during the peak season	1. Yes: 48.5% 2. No: 51.5%
GRM	
Awareness of official toll-free number	1. Yes: 32.4% 2. No: 67.6%
Retailer satisfaction with the GRM	1. Yes: 91.7% 2. No: 8.3%
Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 41.2% 2. No: 58.8%

Farmer-level findings	
<b>Awareness and perception</b>	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 90.6% 2. No: 9.4%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 64.5% 2. Old system: 18.3% 3. Indifferent or not sure: 17.2%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 92.5% (a.) Authentication successful: 99.5% (b.) Authentication failed: 0.5% (i.) Manual transaction: 0.0% (ii.) Fertilizer denied: 0.5% 2. Manual Transaction (latest transaction): 7.2% 3. Enrolment ID + EPIC/KCC: 0.3% 4. Fertilizer Denied: 0.0%

Average number of attempts for <i>Aadhaar</i> authentication	1. One: 92.1% 2. Two: 6.9% 3. Three: 1.0% 4. Four or more: 0.0%
Average transaction time using PoS	3 to 4 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 9.2% 2. No: 90.8%
Preference for DCT	1. Yes: 18.1% 2. No: 81.9%

## 6. Haryana

Respondent profile	
Districts covered	Fatehabad, Panchkula, and Rewari
Farmer profile	1. Landowner: 82.3% 2. Sharecropper or tenant farmer: 4.2% 3. Both (own land and lease land): 13.5%
Retailer profile	1. Private: 80.0% 2. Cooperative: 20.0%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 42.9% 2. Old manual system: 40.0% 3. Indifferent (do not see much difference between the two): 17.1%
Training and awareness	
Training received	1. Yes: 92.9% 2. No: 7.1%
Training sufficiency	1. Yes: 87.7% 2. No: 12.3%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 77.0% 2. No: 10.0% 3. Not Sure: 13.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 50.0% 2. Receives dispatch ID first: 14.0% 3. Receives physical stock first: 36.0%

Transaction experience	
The average number of attempts to log in to PoS device	1. One: 40.0% 2. Two: 28.6% 3. Three: 11.4% 4. Four or more: 20.0%
Problem faced in managing transactions during the peak season	1. Yes: 68.6% 2. No: 31.4%
GRM	
Awareness of official toll-free number	1. Yes: 40.6% 2. No: 59.4%
Retailer satisfaction with the GRM	1. Yes: 50.0% 2. No: 50.0%
Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 65.7% 2. No: 34.3%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 83.5% 2. No: 16.5%
Preference of system for using fertilizer	1. <i>Aadhaar</i> -based system through PoS: 46.5% 2. Old system: 34.8% 3. Indifferent or not sure: 18.7%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 71.1% (a.) Authentication successful: 99.3% (b.) Authentication failed: 0.7% (i.) Manual transaction: 0.7% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 26.4% 3. Enrolment ID + EPIC/KCC: 0.4% 4. Fertilizer Denied: 2.1%
average number of attempts for <i>Aadhaar</i> authentication	1. One: 89.0% 2. Two: 8.0% 3. Three: 2.0% 4. Four or more: 1.0%
Average transaction time using PoS	2 to 3 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 48.3% 2. No: 51.7%
Preference for DCT	1. Yes: 19.9% 2. No: 80.1%

## 7. Himachal Pradesh

Respondent profile	
Districts covered	Chamba, Mandi, and Shimla
Farmer profile	1. Landowner: 97.2% 2. Sharecropper or tenant farmer: 1.7% 3. Both (own land and lease land): 1.1%
Retailer profile	1. Private: 37.8% 2. Cooperative: 62.2%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 78.4% 2. Old manual system: 16.2% 3. Indifferent (do not see much difference between the two): 5.4%
Training and awareness	
Training received	1. Yes: 89.2% 2. No: 10.8%
Training sufficiency	1. Yes: 86.4% 2. No: 13.6%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 68.0% 2. No: 7.0% 3. Not sure: 25.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 70.0% 2. Receives dispatch ID first: 9.0% 3. Receives physical stock first: 21.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 24.3% 2. Two: 39.2% 3. Three: 24.3% 4. Four or more: 12.2%
Problem faced in managing transactions during the peak season	1. Yes: 52.7% 2. No: 47.3%
GRM	
Awareness of official toll-free number	1. Yes: 45.9% 2. No: 54.1%
Retailer satisfaction with the GRM	1. Yes: 55.6% 2. No: 44.4%



Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 59.5% 2. No: 40.5%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 81.3% 2. No: 18.7%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 88.8% 2. The old system through <i>Aadhaar</i> and PoS: 8.6% 3. Indifferent or not sure: 2.6%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 93.0% (a.) Authentication successful: 92.8% (b.) Authentication failed: 0.2% (i.) Manual transaction: 0.2% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 6.1% 3. Enrolment ID + EPIC/KCC: 0.5% 4. Fertilizer Denied: 0.4%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 69.0% 2. Two: 25.0% 3. Three: 5.0% 4. Four or more: 1.0%
Average transaction time using PoS	2 to 3 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 47.1% 2. No: 52.9%
Preference for DCT	1. Yes: 44.3% 2. No: 55.7%

## 8. Jharkhand

Respondent profile	
Districts covered	Deoghar, Hazaribagh, and Khunti
Farmer profile	1. Landowner: 93.9% 2. Sharecropper or tenant farmer: 2.5% 3. Both (own land and lease land): 3.6%
Retailer profile	1. Private: 88.6% 2. Cooperative: 11.4%

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	1. PoS-based system: 71.4% 2. Old manual system: 21.4% 3. Indifferent (do not see much difference between the two): 7.2%
<b>Training and awareness</b>	
Training received	1. Yes: 90.0% 2. No: 10.0% 3. Not Sure: 0.0%
Training sufficiency	1. Yes: 82.5% 2. No: 17.5%
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 69.0% 2. No: 7.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 49.0% 2. Receives dispatch ID first: 7.0% 3. Receives physical stock first: 44.0%
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	1. One: 34.3% 2. Two: 41.4% 3. Three: 14.3 % 4. Four or more: 10.0%
Problem faced in managing transactions during the peak season	1. Yes: 52.9% 2. No: 47.1%
<b>GRM</b>	
Awareness of official toll-free number	1. Yes: 32.9% 2. No: 67.1%
Retailer satisfaction with the GRM	1. Yes: 80.0% 2. No: 20.0%
<b>Cashless sale</b>	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 68.6% 2. No: 31.4%
<b>Farmer-level findings</b>	
<b>Awareness and perception</b>	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 81.1% 2. No: 18.9%

Preference of system for buying fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i>-based system through PoS: 81.5%</li> <li>2. The old system through <i>Aadhaar</i> and PoS: 13.1%</li> <li>3. Indifferent or not sure: 5.5%</li> </ol>
<b>Transaction status and experience</b>	
Mode of purchasing fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i> authenticated: 82% <ol style="list-style-type: none"> <li>(a.) Authentication successful: 81.6%</li> <li>(b.) Authentication failed: 0.4% <ol style="list-style-type: none"> <li>(i.) Manual transaction: 0.4%</li> <li>(ii.) Fertilizer denied: 0.0%</li> </ol> </li> </ol> </li> <li>2. Manual Transaction (latest transaction): 14.7%</li> <li>3. Enrolment ID + EPIC/KCC: 2.8%</li> <li>4. Fertilizer Denied: 0.5%</li> </ol>
Average number of attempts for <i>Aadhaar</i> authentication	<ol style="list-style-type: none"> <li>1. One: 88.0%</li> <li>2. Two: 6.0%</li> <li>3. Three: 5.0%</li> <li>4. Four or more: 1.0%</li> </ol>
Average transaction time using PoS	3 to 4 minutes
Preference to buy fertilizer using cashless mode in the future	<ol style="list-style-type: none"> <li>1. Yes: 49.0%</li> <li>2. No: 51.0%</li> </ol>
Preference for DCT	<ol style="list-style-type: none"> <li>1. Yes: 52.6%</li> <li>2. No: 47.4%</li> </ol>

## 9. Madhya Pradesh

<b>Respondent profile</b>	
Districts covered	Betul, Bhind, and Dhar
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 89.8%</li> <li>2. Sharecropper or tenant farmer: 4.4%</li> <li>3. Both (own land and lease land): 5.8%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 47.8%</li> <li>2. Cooperative: 52.2%</li> </ol>

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 50.7%</li> <li>2. Old manual system: 36.2%</li> <li>3. Indifferent (do not see much difference between the two): 13.1%</li> </ol>
<b>Training and awareness</b>	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 89.9%</li> <li>2. No: 10.1%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 79.0%</li> <li>2. No: 21.0%</li> </ol>

Compliance	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 65.0% 2. No: 16.0% 3. Not Sure: 19.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 59.0% 2. Receives dispatch ID first: 22.0% 3. Receives physical stock first: 19.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 53.6% 2. Two: 23.2 % 3. Three: 13.0% 4. Four or more: 10.2 %
Problem faced in managing transactions during the peak season	1. Yes: 60.9% 2. No: 39.1%
GRM	
Awareness of official toll-free number	1. Yes: 44.9% 2. No: 55.1%
Retailer satisfaction with the GRM	1. Yes: 71.4% 2. No: 28.6%
Cashless sale	
Preference for selling fertilizer in the cashless mode in the future	1. Yes: 62.3% 2. No: 37.7%

Farmer-level findings	
<b>Awareness and perception</b>	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 93.7% 2. No: 6.3%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 83.6% 2. The old system through <i>Aadhaar</i> and PoS: 12.9% 3. Indifferent or not sure: 3.5%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 88.0% (a.) Authentication successful: 99.0% (b.) Authentication failed: 1.0% (i.) Manual transaction: 0.6% (ii.) Fertilizer denied: 0.4% 2. Manual Transaction (latest transaction): 5.6% 3. Enrolment ID + EPIC/KCC: 5.6% 4. Fertilizer Denied: 0.8%



Average number of attempts for <i>Aadhaar</i> authentication	1. One: 85.4% 2. Two: 10.6% 3. Three: 3.2% 4. Four or more: 0.8%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 44.0% 2. No: 56.0%
Preference for DCT	1. Yes: 38.5% 2. No: 61.5 %

## 10. Maharashtra

Respondent profile	
Districts covered	Chandrapur, Nashik, and Palghar
Farmer profile	1. Landowner: 92.2% 2. Sharecropper or tenant farmer: 3.8% 3. Both (own land and lease land): 4.0%
Retailer profile	1. Private: 79.2% 2. Cooperative: 20.8%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 47.7% 2. Old manual system: 41.3% 3. Indifferent (do not see much difference between the two): 11.0%
Training and awareness	
Training received	1. Yes: 100.0% 2. No: 0.0%
Training sufficiency	1. Yes: 84.7% 2. No: 15.3%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 90.0% 2. No: 4.0% 3. Not sure: 6.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 18.0% 2. Receives dispatch ID first: 15.0% 3. Receives physical stock first: 67.0%

Transaction experience	
The average number of attempts to log in to PoS device	1. One: 40.3% 2. Two: 16.7% 3. Three: 22.2% 4. Four or more: 20.8%
Problem faced in managing transactions during the peak season	1. Yes: 77.8% 2. No: 22.2%
GRM	
Awareness of official toll-free number	1. Yes: 40.3% 2. No: 50.7%
Retailer satisfaction with the GRM	1. Yes: 38.5% 2. No: 61.5%
Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 77.8% 2. No: 22.2%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 91.5% 2. No: 8.5%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 83.3% 2. The old system through <i>Aadhaar</i> and PoS: 14.5% 3. Indifferent or not sure: 2.2%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 89.0% (a.) Authentication successful: 87.9% (b.) Authentication failed: 1.1% (i.) Manual transaction: 1.1% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 6.5% 3. Enrolment ID + EPIC/KCC: 3.0% 4. Fertilizer Denied: 1.5%
Average number of attempts for <i>Aadhaar</i> authentication	1. First: 99.0% 2. Second: 1.0% 3. Third: 0.0% 4. Four or more: 0.0%
Average transaction time using PoS	2 to 3 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 51.4% 2. No: 48.6%
Preference for DCT	1. Yes: 28.7% 2. No: 71.3 %

## 11. Manipur

Respondent profile	
Districts covered	Imphal East, Imphal West, and Thoubal
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 64.3%</li> <li>2. Sharecropper or tenant farmer: 31.1%</li> <li>3. Both (own land and lease land): 4.6%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 86.2%</li> <li>2. Cooperative: 13.8%</li> </ol>

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 17.2%</li> <li>2. Old manual system: 75.9%</li> <li>3. Indifferent (do not see much difference between the two): 6.9%</li> </ol>
Training and awareness	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 93.1%</li> <li>2. No: 6.9%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 77.8%</li> <li>2. No: 22.2%</li> </ol>
Compliance	
a) Technological compliance	
PoS updated to the latest version	<ol style="list-style-type: none"> <li>1. Yes: 86.0%</li> <li>2. No: 7.0%</li> <li>3. Not sure: 7.0%</li> </ol>
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	<ol style="list-style-type: none"> <li>1. Receive both at the same time: 59.0%</li> <li>2. Receives dispatch ID first: 14.0%</li> <li>3. Receives physical stock first: 28.0%</li> </ol>
Transaction experience	
The average number of attempts to log in to PoS device	<ol style="list-style-type: none"> <li>1. One: 24.1%</li> <li>2. Two: 58.6%</li> <li>3. Three: 6.9%</li> <li>4. Four or more: 10.4%</li> </ol>
Problem faced in managing transactions during peak season	<ol style="list-style-type: none"> <li>1. Yes: 86.2%</li> <li>2. No: 13.8%</li> </ol>
GRM	
Awareness of official toll-free number	<ol style="list-style-type: none"> <li>1. Yes: 34.5%</li> <li>2. No: 65.5%</li> </ol>
Retailer satisfaction with the GRM	<ol style="list-style-type: none"> <li>1. Yes: 66.7%</li> <li>2. No: 33.3%</li> </ol>

Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 31.0% 2. No: 69.0%

### Farmer-level findings

#### Awareness and perception

Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 62.0% 2. No: 38.0%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 52.7% 2. The old system through <i>Aadhaar</i> and PoS: 38% 3. Indifferent or not sure: 9.3%

#### Transaction status and experience

Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 36.0% (a.) Authentication successful: 35.4% (b.) Authentication failed: 0.6% (i.) Manual transaction: 0.6% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 56.1% 3. Enrolment ID + EPIC/KCC: 6.7% 4. Fertilizer Denied: 1.2%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 92.6% 2. Two: 5.0% 3. Three: 2.4% 4. Four or more: 0.0%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 45.5% 2. No: 54.5%
Preference for DCT	1. Yes: 69.7% 2. No: 30.3%

## 12. Punjab

### Respondent profile

Districts covered	Mansa, Pathankot, and Rupnagar
Farmer profile	1. Landowner: 88.9% 2. Sharecropper or tenant farmer: 1.6% 3. Both (own land and lease land): 9.5%
Retailer profile	1. Private: 75.4% 2. Cooperative: 24.6%



<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	1. PoS-based system: 36.2% 2. Old manual system: 43.5% 3. Indifferent (do not see much difference between the two): 20.3%
<b>Training and awareness</b>	
Training received	1. Yes: 87.0% 2. No: 13.0%
Training sufficiency	1. Yes: 90.0% 2. No: 10.0%
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 81.0% 2. No: 7.0% 3. Not sure: 12.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 33.0% 2. Receives dispatch ID first: 12.0% 3. Receives physical stock first: 55.0%
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	1. One: 26.1% 2. Two: 31.9% 3. Three: 24.6% 4. Four or more: 17.4%
Problem faced in managing transactions during peak season	1. Yes: 73.9% 2. No: 26.1%
<b>GRM</b>	
Awareness of official toll-free number	1. Yes: 37.7% 2. No: 62.3%
Retailers satisfy with the GRM	1. Yes: 50.0% 2. No: 50%
<b>Cashless sale</b>	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 72.5% 2. No: 27.5%
<b>Farmer-level findings</b>	
<b>Awareness and perception</b>	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 93.7% 2. No: 6.3%

Preference of system for buying fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i>-based system through PoS: 51.7%</li> <li>2. The old system through <i>Aadhaar</i> and PoS: 41.0%</li> <li>3. Indifferent or not sure: 7.3%</li> </ol>
<b>Transaction status and experience</b>	
Mode of purchasing fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i> authenticated: 89.0% <ul style="list-style-type: none"> <li>(a.) Authentication successful: 99.6%</li> <li>(b.) Authentication failed: 0.4% <ul style="list-style-type: none"> <li>(i.) Manual transaction: 0.3%</li> <li>(ii.) Fertilizer denied: 0.1%</li> </ul> </li> </ul> </li> <li>2. Manual Transaction (latest transaction): 9.6%</li> <li>3. Enrolment ID + EPIC/KCC: 1.4%</li> <li>4. Fertilizer Denied: 0.0%</li> </ol>
Average number of attempts for <i>Aadhaar</i> authentication	<ol style="list-style-type: none"> <li>1. One: 59.0%</li> <li>2. Two: 22.0%</li> <li>3. Three: 8.0%</li> <li>4. Four or more: 11.0%</li> </ol>
Average transaction time using PoS	2 to 3 minutes
Preference to buy fertilizer using cashless mode in the future	<ol style="list-style-type: none"> <li>1. Yes: 39.9%</li> <li>2. No: 60.1%</li> </ol>
Preference for DCT	<ol style="list-style-type: none"> <li>1. Yes: 36.1%</li> <li>2. No: 64.9 %</li> </ol>

## 13. Rajasthan

<b>Respondent profile</b>	
Districts covered	Bhilwara, Dausa, and Jalore
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 98.6%</li> <li>2. Sharecropper or tenant farmer: 1.4%</li> <li>3. Both (own land and lease land): 0.0%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 59.4%</li> <li>2. Cooperative: 40.6%</li> </ol>

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 76.8%</li> <li>2. Old manual system: 20.3%</li> <li>3. Indifferent (do not see much difference between the two): 2.9%</li> </ol>
<b>Training and awareness</b>	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 89.9%</li> <li>2. No: 10.1%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 91.9%</li> <li>2. No: 8.1%</li> </ol>

Compliance	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 81.0% 2. No: 9.0% 3. Not sure: 10.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 43.0% 2. Receives dispatch ID first: 31.0% 3. Receives physical stock first: 25.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 47.8% 2. Two: 39.1% 3. Three: 8.7% 4. Four or more: 4.4%
Problem faced in managing transactions during peak season	1. Yes: 59.4% 2. No: 40.6%
GRM	
Awareness of official toll-free number	1. Yes: 37.7% 2. No: 62.3%
Retailers satisfy with the GRM	1. Yes: 66.7% 2. No: 33.3%
Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 81.2% 2. No: 18.8%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 99.2% 2. No: 0.8%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 97.4% 2. The old system through <i>Aadhaar</i> and PoS: 2.0% 3. Indifferent or not sure: 0.6%
Status and experience of transaction	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 100.0% (a.) Authentication successful: 99.5% (b.) Authentication failed: 0.5% (i.) Manual transaction: 0.4% (ii.) Fertilizer denied: 0.1% 2. Manual Transaction (latest transaction): 0.0% 3. Enrolment ID + EPIC/KCC: 0.0% 4. Fertilizer Denied: 0.0%

Average number of attempts for <i>Aadhaar</i> authentication	1. One: 85.0% 2. Two: 10.0% 3. Three: 5.0% 4. Four or more: 0.0%
Average transaction time using PoS	3 to 4 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 76.1% 2. No: 23.9%
Preference for DCT	1. Yes: 31.8% 2. No: 68.2%

## 14. Tamil Nadu

Respondent profile	
Districts covered	Cuddalore, Nilgiris, and Tuticorin
Farmer profile	1. Landowner: 79.4% 2. Sharecropper or tenant farmer: 14.5% 3. Both (own land and lease land): 6.1%
Retailer profile	1. Private: 64.3% 2. Cooperative: 35.7%

Retailer-level findings	
Preference	
Preference of system for fertilizer sale	1. PoS-based system: 47.1% 2. Old manual system: 41.4% 3. Indifferent (do not see much difference between the two): 11.5%
Training and awareness	
Training received	1. Yes: 95.7% 2. No: 4.3%
Training sufficiency	1. Yes: 86.6% 2. No: 13.4%
Compliance	
a) Technological compliance	
PoS updated to the latest version	1. Yes: 96.0% 2. No: 1.0% 3. Not sure: 3.0%
b) Operational compliance	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 80.0% 2. Receives dispatch ID first: 14.0% 3. Receives physical stock first: 6.0%



Transaction experience	
The average number of attempts to log in to PoS device	1. One: 31.4% 2. Two: 30.0% 3. Three: 8.6% 4. Four or more: 30.0%
Problem faced in managing transactions during peak season	1. Yes: 60.0% 2. No: 40.0%
GRM	
Awareness of official toll-free number	1. Yes: 25.7% 2. No: 74.3%
Retailer satisfaction with the GRM	1. Yes: 50.0% 2. No: 50.0%
Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 51.4% 2. No: 48.6%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 87.3% 2. No: 12.7%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 51.3% 2. The old system through <i>Aadhaar</i> and PoS: 41.6% 3. Indifferent or not sure: 4.1%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 73.0% (a.) Authentication successful: 99.7% (b.) Authentication failed: 0.3% (i.) Manual transaction: 0.3% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 26.0% 3. Enrolment ID + EPIC/KCC: 0.5% 4. Fertilizer Denied: 0.5%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 85.2% 2. Two: 12.3% 3. Three: 2.0% 4. Four or more: 0.5%
Average transaction time using PoS	5 to 6 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 41.6% 2. No: 58.4%
Preference for DCT	1. Yes: 40.4% 2. No: 59.6%

## 15. Telangana

Respondent profile	
Districts covered	Adilabad, Jayashankar, and Nalgonda
Farmer profile	1. Landowner: 81.2% 2. Sharecropper or tenant farmer: 1.6% 3. Both (own land and lease land): 17.2%
Retailer profile	1. Private: 89.9% 2. Cooperative: 10.1%

Retailer-level findings	
<b>Preference</b>	
Preference of system for fertilizer sale	1. PoS-based system: 68.1% 2. Old manual system: 26.1% 3. Indifferent (do not see much difference between the two): 5.8%
<b>Training and awareness</b>	
Training received	1. Yes: 87.0% 2. No: 13.0%
Training sufficiency	1. Yes: 91.7% 2. No: 8.3%
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 87.0% 2. No: 10.0% 3. Not sure: 3%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 36.0% 2. Receives dispatch ID first: 6.0% 3. Receives physical stock first: 58.0%
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	1. One: 65.2% 2. Two: 20.3% 3. Three: 7.2% 4. Four or more: 7.2%
Problem faced in managing transactions during peak season	1. Yes: 42.0% 2. No: 58.0%
<b>GRM</b>	
Awareness of official toll-free number	1. Yes: 24.6% 2. No: 75.4%
Retailer satisfaction with the GRM	1. Yes: 100.0% 2. No: 0.0%

Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 53.6% 2. No: 46.4%
Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 99.5% 2. No: 0.5%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 51.3% 2. The old system through <i>Aadhaar</i> and PoS: 41.6% 3. Indifferent or not sure: 4.1%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 73.0% (a.) Authentication successful: 99.7% (b.) Authentication failed: 0.3% (i.) Manual transaction: 0.3% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 26.0% 3. Enrolment ID + EPIC/KCC: 0.5% 4. Fertilizer Denied: 0.5%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 85.2% 2. Two: 12.3% 3. Three: 2.0% 4. Four or more: 0.5%
Average transaction time using PoS	5 to 6 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 41.6% 2. No: 58.4%
Preference for DCT	1. Yes: 40.4% 2. No: 59.6%

## 16. Tripura

Respondent profile	
Districts covered	Dhalai, South Tripura, and West Tripura
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 88.9%</li> <li>2. Sharecropper or tenant farmer: 8.5%</li> <li>3. Both (own land and lease land): 2.6%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 88.2%</li> <li>2. Cooperative: 11.2%</li> </ol>

Retailer-level findings	
<b>Preference</b>	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 50.0%</li> <li>2. Old manual system: 35.3%</li> <li>3. Indifferent (do not see much difference between the two): 14.7%</li> </ol>
<b>Training and awareness</b>	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 76.5%</li> <li>2. No: 23.5%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 73.1%</li> <li>2. No: 26.9%</li> </ol>
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	<ol style="list-style-type: none"> <li>1. Yes: 79.0%</li> <li>2. No: 9.0%</li> <li>3. Not Sure: 12.0%</li> </ol>
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	<ol style="list-style-type: none"> <li>1. Receive both at the same time: 73.5%</li> <li>2. Receives dispatch ID first: 14.7%</li> <li>3. Receives physical stock first: 11.8%</li> </ol>
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	<ol style="list-style-type: none"> <li>1. One: 20.6%</li> <li>2. Two: 32.4%</li> <li>3. Three: 38.2%</li> <li>4. Four or more: 8.8%</li> </ol>
Problem faced in managing transactions during peak season	<ol style="list-style-type: none"> <li>1. Yes: 67.6%</li> <li>2. No: 32.4%</li> </ol>
<b>GRM</b>	
Awareness of official toll-free number	<ol style="list-style-type: none"> <li>1. Yes: 26.5%</li> <li>2. No: 73.5%</li> </ol>
Retailer satisfaction with the GRM	<ol style="list-style-type: none"> <li>1. Yes: 100.0%</li> <li>2. No: 0.0%</li> </ol>

Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 58.8% 2. No: 41.2%

### Farmer-level findings

#### Awareness and perception

Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 90.3% 2. No: 9.7%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 76.1% 2. The old system through <i>Aadhaar</i> and PoS: 14.3% 3. Indifferent or not sure: 9.6%

#### Transaction status and experience

Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 79.0% (a.) Authentication successful: 77.9% (b.) Authentication failed: 1.1% (i.) Manual transaction: 1.1% (ii.) Fertilizer denied: 0% 2. Manual Transaction (latest transaction): 17.0% 3. Enrolment ID + EPIC/KCC: 2.4% 4. Fertilizer Denied: 1.6%
Average number of attempts for <i>Aadhaar</i> authentication	1. One: 99.5% 2. Two: 0.5% 3. Three: 0.0% 4. Four or more: 0.0%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 10.0% 2. No: 90.0%
Preference for DCT	1. Yes: 63.0% 2. No: 37.0%

## 17. Uttar Pradesh

### Respondent profile

Districts covered	Agra, Bareilly, and Sant Ravidas Nagar
Farmer profile	1. Landowner: 72.0% 2. Sharecropper or tenant farmer: 8.3% 3. Both (own land and lease land): 19.7%
Retailer profile	1. Private: 87.0% 2. Cooperative: 13.0%



<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	1. PoS-based system: 56.5% 2. Old manual system: 34.8% 3. Indifferent (do not see much difference between the two): 8.7%
<b>Training and awareness</b>	
Training received	1. Yes: 87.0% 2. No: 13.0%
Training sufficiency	1. Yes: 81.7% 2. No: 18.3%
<b>Compliance</b>	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 81.0% 2. No: 9.0% 3. Not Sure: 10.0%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 45.0% 2. Receives dispatch ID first: 20.0% 3. Receives physical stock first: 35.0%
<b>Transaction experience</b>	
The average number of attempts to log in to PoS device	1. One: 53.6% 2. Two: 23.3% 3. Three: 15.9% 4. Four or more: 7.2%
Problem faced in managing transactions during peak season	1. Yes: 60.9% 2. No: 39.1%
<b>GRM</b>	
Awareness of official toll-free number	1. Yes: 39.1% 2. No: 60.9%
Retailer satisfaction with the GRM	1. Yes: 60.0% 2. No: 40.0%
<b>Cashless sale</b>	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 69.6% 2. No: 30.4%
<b>Farmer-level findings</b>	
<b>Awareness and perception</b>	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 84.9% 2. No: 15.1%

Preference of system for buying fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i>-based system through PoS: 66.4%</li> <li>2. The old system through <i>Aadhaar</i> and PoS: 24.5%</li> <li>3. Indifferent or not sure: 9.1%</li> </ol>
<b>Transaction status and experience</b>	
Mode of purchasing fertilizer	<ol style="list-style-type: none"> <li>1. <i>Aadhaar</i> authenticated: 86.0% <ul style="list-style-type: none"> <li>(a.) Authentication successful: 86.0%</li> <li>(b.) Authentication failed: 0.0% <ul style="list-style-type: none"> <li>(i.) Manual transaction: 0.0%</li> <li>(ii.) Fertilizer denied: 0.0%</li> </ul> </li> </ul> </li> <li>2. Manual Transaction (latest transaction): 13.5%</li> <li>3. Enrolment ID + EPIC/KCC: 0.1%</li> <li>4. Fertilizer Denied: 0.46%</li> </ol>
Average number of attempts for <i>Aadhaar</i> authentication	<ol style="list-style-type: none"> <li>1. One: 88.0%</li> <li>2. Two: 10.0%</li> <li>3. Three: 2.0%</li> <li>4. Four or more: 0.0%</li> </ol>
Average transaction time using PoS	2 to 3 minutes
Preference to buy fertilizer using cashless mode in the future	<ol style="list-style-type: none"> <li>1. Yes: 35.4%</li> <li>2. No: 64.6%</li> </ol>
Preference for DCT	<ol style="list-style-type: none"> <li>1. Yes: 35.9%</li> <li>2. No: 64.1%</li> </ol>

## 18. West Bengal

<b>Respondent profile</b>	
Districts covered	Bardhaman, Dinajpur Uttar, and Howrah
Farmer profile	<ol style="list-style-type: none"> <li>1. Landowner: 73.7%</li> <li>2. Sharecropper or tenant farmer: 12.7%</li> <li>3. Both (own land and lease land): 13.6%</li> </ol>
Retailer profile	<ol style="list-style-type: none"> <li>1. Private: 87.0%</li> <li>2. Cooperative: 13.0%</li> </ol>

<b>Retailer-level findings</b>	
<b>Preference</b>	
Preference of system for fertilizer sale	<ol style="list-style-type: none"> <li>1. PoS-based system: 60.9%</li> <li>2. Old manual system: 36.2%</li> <li>3. Indifferent (do not see much difference between the two): 2.9%</li> </ol>
<b>Training and awareness</b>	
Training received	<ol style="list-style-type: none"> <li>1. Yes: 65.2%</li> <li>2. No: 34.8%</li> </ol>
Training sufficiency	<ol style="list-style-type: none"> <li>1. Yes: 75.6%</li> <li>2. No: 24.4%</li> </ol>

Compliance	
<b>a) Technological compliance</b>	
PoS updated to the latest version	1. Yes: 72.4% 2. No: 7.2% 3. Not Sure: 20.4%
<b>b) Operational compliance</b>	
Receipt of physical stock and dispatch ID for acknowledgment	1. Receive both at the same time: 22.0% 2. Receives dispatch ID first: 10.0% 3. Receives physical stock first: 68.0%
Transaction experience	
The average number of attempts to log in to PoS device	1. One: 69.6% 2. Two: 21.7% 3. Three: 8.7% 4. Four or more: 0.0%
Problem faced in managing transactions during peak season	1. Yes: 66.7% 2. No: 33.3%
GRM	
Awareness of official toll-free number	1. Yes: 50.0% 2. No: 50.0%
Retailer satisfaction with the GRM	1. Yes: 56.3% 2. No: 43.7%
Cashless sale	
Preference for selling fertilizer in a cashless mode in the future	1. Yes: 65.2% 2. No: 34.8%

Farmer-level findings	
Awareness and perception	
Awareness of <i>Aadhaar</i> being mandatory for fertilizer purchase	1. Yes: 91.7% 2. No: 8.3%
Preference of system for buying fertilizer	1. <i>Aadhaar</i> -based system through PoS: 71.9% 2. The old system through <i>Aadhaar</i> and PoS: 23.5% 3. Indifferent or not sure: 4.6%
Transaction status and experience	
Mode of purchasing fertilizer	1. <i>Aadhaar</i> authenticated: 81.0% (a.) Authentication successful: 80.1% (b.) Authentication failed: 0.9% (i.) Manual transaction: 0.9% (ii.) Fertilizer denied: 0.0% 2. Manual Transaction (latest transaction): 17.1% 3. Enrolment ID + EPIC/KCC: 1.5% 4. Fertilizer Denied: 0.4%

Average number of attempts for <i>Aadhaar</i> authentication	1. One: 83.0% 2. Two: 12.0% 3. Three: 4.0% 4. Four or more: 1.0%
Average transaction time using PoS	4 to 5 minutes
Preference to buy fertilizer using cashless mode in the future	1. Yes: 33.1% 2. No: 66.9%
Preference for DCT	1. Yes: 54.1% 2. No: 45.9 %









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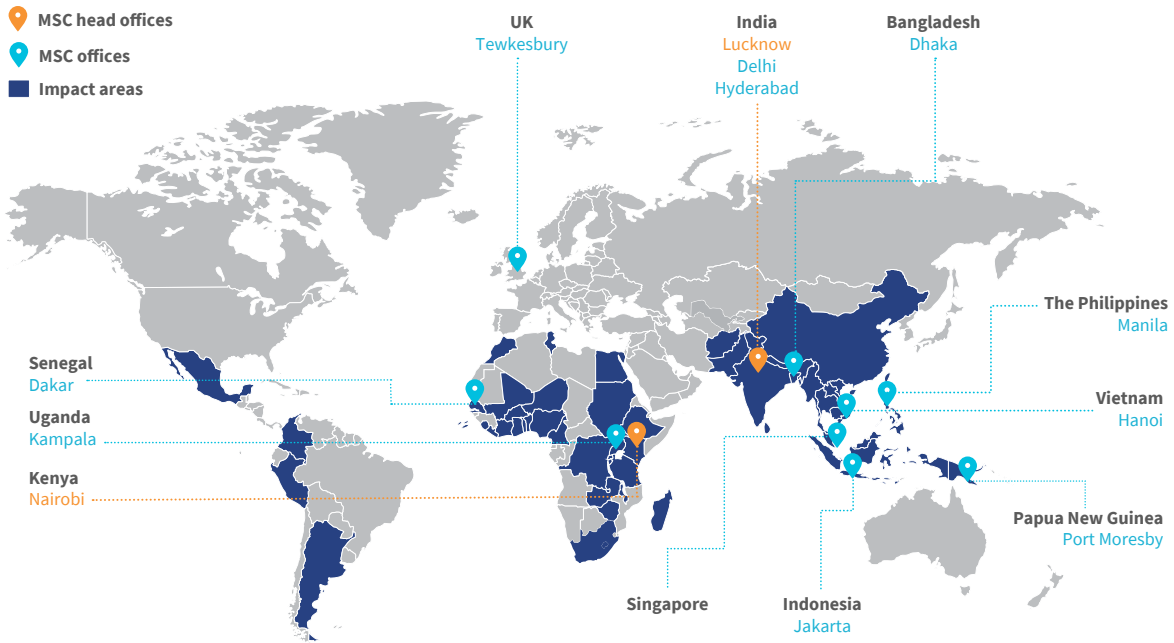
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