Plugging PDS Pilferage

A Study of an SMS-based Monitoring Project

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The targeted public distribution system is fraught with leakages. With the Food Security Act in place now, policymakers face a greater challenge in curtailing leakages and improving delivery on a much larger scale. This article studies a project in Uttar Pradesh which uses mobile phone SMS to monitor PDS supplies and finds an enthusiastic response from the users, even if the project itself has not worked well.

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The targeted public distribution System (TPDS) is one of India's largest anti-poverty programmes, with a total financial outlay over Rs 582 billion in the financial year 2009-10, or 1.3% of gross domestic product (GDP) (GoI 2011). In the programme, entitled households have the right to purchase grain, kerosene, and potentially other goods at below market rates from their local fair price (FP) shop. The brunt of benefits is targeted towards below-poverty-line (BPL) households. The scale of the programme is massive, with over 65 million BPL households entitled to benefits and over 4,50,000 FP shops throughout the country (ibid). This scale is likely to expand over the coming years, as the current government has passed the National Food Security Act (FSA) that entitles around two-thirds of the population to 5 kg of subsidised grain per person.

While the goal of food security has wide support, there are serious concerns about corruption in the TPDS. Specifically, ration shop holders and others in the supply chain face clear incentives to sell grain and kerosene on the black market at prevailing prices, rather than through FP shops at the legally mandated below market rates. Estimates for 2007-08 suggest that the fraction of grain diverted from the intended recipients is almost 44% across India, which is actually an improvement over previous years (Khera 2011a). A 2005 study estimates that for every Rs 3.65 spent by the Government of India, only Re 1 reaches BPL households (PEO 2005).

There is a very contentious debate among academics and policymakers about reforming the programme. One camp is of the view that the current TPDS should be abandoned. Instead, a move to cash transfers or voucher-based systems (where vouchers can be redeemed in private shops) is being hailed as a solution to combat the massive leakage (see, e g, Kotwal et al 2011; Chaudhuri and Somanathan 2011). It is certainly possible to phase in cash transfers by providing beneficiaries a choice between transfers and the current system (Muralidharan et al 2011).

On the other hand, the status quo camp envisions broadening the benefits of the existing programme by enlarging the generosity, extending coverage, and improving programme delivery. Supporters point to evidence from a recent survey of 1,227 households across nine states suggesting that the PDS has made marked improvement in recent years. Khera (2011b) shows that surveyed BPL households get 84%-88% of their full entitlements on average, with only 25% of households not getting their full entitlement. Delivery appears particularly good in states, where the PDS entitlement is nearly universal and concerted measures have been taken to improve PDS functioning (ibid).

For either approach to succeed, ensuring efficient delivery to the proper beneficiaries will require cost-effective methods of monitoring and enforcement. Using the household survey data from Uttar Pradesh, Nagavarapu and Sekhri (2013) have demonstrated that increasing the generosity of the PDS without improving monitoring and enforcement will increase the incentives of the shopkeepers to black market and actually lower the take-up of many vulnerable beneficiaries through increased diversion. In fact, Khera (2011b) shows that two of the most successful states, Tamil Nadu and Chhattisgarh, have made concerted improvements to the delivery system that may ensure greater monitoring and transparency. If PDS coverage is extended as proposed in the FSA, traditional monitoring and enforcement costs alone can skyrocket and make the cost of efficient PDS delivery prohibitive in some areas. Thus, cost-effective ways in which monitoring can be ramped up across the country need to be pondered over.

Information and communication technologies (ICTs), such as short message service (SMS) on cell phones, can provide one cost-effective approach by providing information at an extremely low cost. The potential for such technologies to improve economic outcomes has received much attention from academics (Aker and Mbiti 2010). But some studies examining information dissemination through more conventional means like newspapers make clear that ICTs have much potential for improving public service delivery as well.

The SMS technology could play an important role in the PDS. The PDS shopkeepers often report stock-outs to households even when the goods have been lifted from the godowns and sent to the shop. The information problem the households have is that they cannot tell (1) if the goods were delivered to the shop, and (2) if they were, how much was delivered and when. Therefore, the households do not have verifiable information on whether the stock-out is genuine. Even if they can observe delivery to the shop, they cannot determine if the shopkeeper received full entitlements for catering to all beneficiaries or not. Thus, on receiving information that the village's quota for goods and the respective quantity have been dispatched, the households have verifiable information. Based on this information, they can take action, which may entail either going to the shop on the day of delivery to obtain goods, or – if the entitlement is refused – confronting the shopkeeper or reporting him so he can be rebuked either formally or informally through means of community-based sanctions.

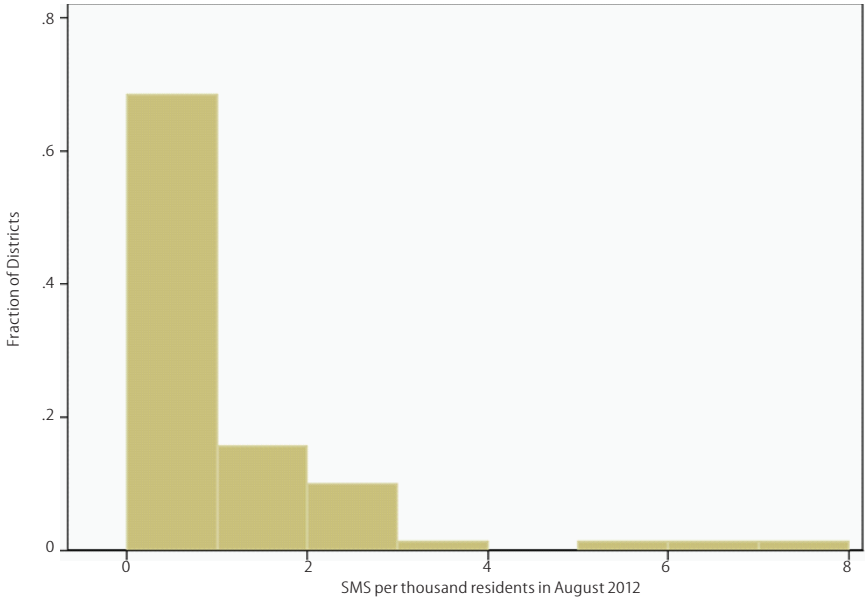
Receiving information through SMS on what was delivered, how much, and when, will lower the cost of acquiring this verifiable information for households. Under ideal circumstances, this will induce households to hold shopkeepers to account. Indeed, Khera (2011b) shows that Tamil Nadu and Chhattisgarh, two of the best-performing states in the PDS, have implemented an innovative use of SMS to provide information to beneficiaries. The caveat is that any information programme must have particular features that can ensure its success. This article discusses one such innovative programme introduced recently by the Government of Uttar Pradesh to shed light on how households might benefit and what features are vital for successful implementation.

Furthermore, from the overall cost-benefit perspective, it is imperative to understand if this information provision has network effects. On the cost side, if this information crowds out other, cheaper sources of information acquisition and dissemination such as information available from kinship networks, then it may not be very attractive. On the benefit side, if the information is shared among networks, then there might be a multiplier effect or network externalities. In such a scenario, the information would flow to more people than the number receiving the SMS. Examining these aspects of the programme is ultimately an empirical exercise. We provide very suggestive, first pass responses of the households about these two dimensions of the programme.

The SMS Programme

The Government of Uttar Pradesh recently commenced an innovative information dissemination programme in which households who signed up received information about the quantity of PDS goods delivered to PDS shopkeepers

Figure 1: Histogram of the Penetration Rates for Districts



by SMS. The SMS scheme was launched on 26 April 2010 and aimed to serve both urban and rural areas. The key design features of the programme were:

- The holders of ration cards were to be provided information about the availability of foodgrains and kerosene at their FP shops through SMS on their mobile phones.
- The SMS was to contain information about the quota of foodgrains and kerosene delivered, name of the FP shop owner, and the date of delivery.
- Timely delivery of information was stressed. The SMS was intended to go out the day the shopkeeper lifted the foodgrains from the godown.
- A minimum amount of dissemination was required for each shop. The programme intended that 10-15 above poverty line (APL), below poverty line (BPL) and Antodaya cardholders per shop would get the message.
- Participation was voluntary. Anyone who wanted to get the SMS could register their phone number with the Food and Civil Supplies Department and the concerning district supply officer (DSO).

This initiative began on a pilot basis in two districts – Jalaun and Bahraich – and subsequently expanded to all of Uttar Pradesh. In August 2012, a total of 2,33,396 people were receiving an SMS. However, there is a large amount of variation in successfully delivered messages across districts. For instance, among the 75 districts for which we have SMS data, 19 districts have zero SMS successfully delivered in August 2012. Moreover, this implies a surprisingly low penetration rate. To construct the penetration rate, we obtained district-level population numbers from the 2011 Census and found the number of messages delivered per thousand people. Penetration rates vary dramatically across districts. We show a histogram of the penetration rate for the districts of Uttar Pradesh in Figure 1.

The residents of rural areas do rely on the PDS for meeting their nutritional needs. Despite this, the penetration is fairly low in rural and peri-urban settings. Gautam Budh Nagar has the highest penetration rate in August 2012, but this is only 7.3 per 1,000 people. Of the 70 districts with data on both population and SMS delivery, only 22 have more than one message delivered per 1,000 people, and 18 districts have zero SMS delivered.[1]

Survey Evidence

In order to understand how this programme was functioning, we conducted a field visit to assess this programme in October 2012. Specifically, our focus was on understanding:

(1) How effectively was the policy being implemented?, (2) what are the characteristics of the people who sign up and what type of people do not sign up?, (3) why is the penetration low and what can be done to increase the penetration? and (4) how would households use this SMS information if they received it?

We conducted site visits to 37 villages spread over 27 taluks in 14 districts of Uttar Pradesh. The World Bank administered the 1997-98 Survey of Living Conditions (SLC) in these villages, and Nagavarapu and Sekhri (2013) examined the functioning of the PDS in these villages using the SLC and supplementary survey data collected at the time of this SMS survey. The districts visited were Hameerpur, Mahoba, Bahraich, Faizabad, Siddharth Nagar, Basti, Sant Kabir Nagar, Jaunpur, Gazipur, Mirzapur, Chitrakoot, Allahabad, Kaushambi and Gorakhpur. The SMS penetration rate in these districts is given in Table 1.

Table 1: The SMS Penetration Rate

	Total Successful SMSs (2012)					SMS Per 1,000 Residents
District	April	May	June	July	August	in August 2012
Allahabad	0	60	1198	3,192	2,200	0.37
Basti	0	0	0	0	0	0.00
Behraich	1,363	540	313	970	611	0.18
Chitrakoot	0	66	124	0	0	0.00
Faizabad	7,578	8,120	9,222	7,058	5,862	2.37
Gazipur	45	1,310	1,883	2,929	3,682	1.02
Gorakhpur	556	124	105	105	0	0.00
Hameerpur	11	0	152	30	0	0.00
Jaunpur	1,820	3,497	10,215	3,239	3,743	0.84
Kaushambi	2,034	1,789	3,364	3,033	1,441	1.00
Mahoba	406	0	0	0	0	0.00
Mirzapur	4,089	7,023	7,780	7,835	6,613	2.65
Sant Kabir Nagar	2,348	2,134	5,176	1,684	2,415	1.41
Siddharth Nagar	0	0	0	0	0	0.00

We used the following two methods to collect the data: We conducted an in-person survey to collect quantitative and qualitative data; and we also conducted

focus group discussions to gain more detailed open-ended observations about the programme. For the in-person surveys, we interviewed 64 households in total (generally two per village). The households were randomly chosen for the in-person interviews and participation was voluntary.

Several questions in the survey assessed the background of respondents. Importantly, households do possess cell phones, so that they can receive the SMS. Only one household did not have a cell phone in this sample. While respondents had limited schooling, literacy was fairly high. Almost 70% of the population had only attended middle school, but 81% could read Hindi. Almost 62% could both read and write Hindi. Most households had a PDS shop nearby. Specifically, 80% of the respondents reported that there was a PDS shop in the village.

Findings

The highlights of the findings are:

(1) The majority of respondents have not signed up for the SMS, as they are unaware that this scheme exists. Of the four households who have signed up, a connection to the PDS shopkeeper is present for three of them.

(2) The majority of the respondents think that this is a useful scheme and should be implemented, while less than 2% thought it would not be useful.

(3) More than 50% of residents said they will share the information with others, so this is not very likely to crowd out other sources of information sharing, such as through social networks.

(4) The majority of respondents report that if they had this information, they would use it to take action if their shopkeeper reported a stock-out.

Findings from Interviews

Enrolment in the Programme: As one might predict from the table, enrolment in the programme was low. Out of the 64 respondents, only four had enrolled in getting SMS about the PDS delivery. Among those enrolled, three households had been informed about the programme by the shopkeeper and one by the village *pradhan*. The members, who enrolled in 2011 or 2012, stated that they personally knew the pradhan or the shopkeeper. No household voluntarily signed up to get this information.

Reasons for Non-Enrolment

Among households who were not enrolled in the SMS programme, 56 out of 60 responded and provided answers to our survey. Of these households 98% claim they are unaware of the scheme. Not having a cell phone due to extreme poverty, not caring about this information, and already having this information were not the major explanations for the low penetration of this programme.

Usefulness of the SMS Programme: We investigated whether this programme would be useful to households. Most households said it would be useful to obtain this information through SMS. We then asked what they would do with the SMS information, providing the households the opportunity to choose one or more of several options. Almost 98% claimed they would know when to go to the shop to get goods, 82.14% claimed that they would confront the shopkeeper if he refused to provide goods, and almost 30% stated that they would report non-delivery to government officials if they knew that shopkeeper had the goods. Almost 12% said they would get together with other households and demand their goods.

Only 2% of households said that the SMS programme would not be useful to them, and these claimed that nothing would change because of it.

Information Sharing: We asked households about whom they would share information with, if they were to receive this SMS in the future. Household responses are summarised in Table 2. If the programme is made more visible and voluntary participation increases, people are likely to share the information with others. Thus, providing this information to a few households can have network externalities.

Table 2: SMS Penetration

Households Reporting Sharing Information with Following People	%
Tell members of my sub-caste	51.79
Tell members of my caste who are not my sub-caste	48.21
Tell others from not my caste	45.64

Handling Stock-outs: We asked households what they would do if they had the SMS information stating delivery amounts and date of delivery, and the shopkeeper told them he is stocked out. The large majority of respondents report they would take some action, as seen in Table 3. The households' preferred course of action would be to take it up with the shopkeeper or pradhan, followed by reporting to the government or their caste networks (as shopkeepers might be informally chastised).

Table 3: Preferred Course of Action

How Will You Handle Stock-Outs If You Have the SMS Information	%
Do nothing, too costly in time and effort	1.79
Do nothing, do not want to offend shopkeeper	0
We will take it up with shopkeepers	66.7
We will report to our caste folks	28.57
We will report to the pradhan	51.79
We will report to the government official	44.64

Who Should Receive SMS?

Finally, we asked households who should obtain this information. Households preferred that this information be given to people (70%) as opposed to the pradhan (22%) or other government officials (2%).

Focus-Group Findings

During the course of more open-ended discussions with villagers in the field visit, we observed the following issues with implementation of the programme.

(1) The DSO asks the shopkeepers to recruit households who will get the SMS. Each shopkeeper, village pradhan or food inspector is asked to recruit at least 10 individuals for getting the message and they provide names of people they know. The availability of the programme

is not made more centrally visible to encourage voluntary participation.

(2) The SMS are sent in English, rather than Hindi. We observed an actual text message sent to a villager. The format of the message is as follows:

> Namaskar Ration Delivered to Your FPS, Gram Panchayat – XXX Block – YYY District – ZZZ on 27 July 2012 Wheat = 53.130 Qt. Rice = 27.720 Qt. Kerosene = 0.00 Ltr. Dall = 0.00 Ltr.

(3) Households are not aware of the total amount of each good that should legally be delivered to the shop. Therefore, genuine shortages cannot be determined by the content and the receiver has no way to determine a shopkeeper's malfeasance if he is underserved (obtains quantity below entitlement).

Discussion

Our fieldwork suggests that SMS information delivery can be a cost-effective way of increasing monitoring and making the system more transparent. Recipients can benefit from the information that is provided to them. However, careful attention needs to be paid to the design.

Based on our fieldwork, we concluded that a number of changes could enhance the effectiveness of this programme:

(1) Instead of channelling registration through shopkeepers, it could be done in a more decentralised way in the village.

(2) The message should be sent in Hindi instead of English as most households are not conversant with English.

(3) The message should provide an assessment of how many people's entitlements are covered by the quota delivered.

(4) There ought to be a mechanism for reporting non-delivery of the message (preferably text or low cost phone call).

(5) Campaigns to advertise the programme ought to be organised. The DSO's office can organise field days to promote the programme. They can also post the existence of this SMS programme on the shop noticeboard.

Subsequent to the survey conducted by us, the Food and Civil Supplies Department is planning to change the programme to address many of these issues. These plans include the possibility of mass awareness drives that can encourage all BPL cardholders to enlist in the programme by providing their cell phone number to the department, delivering the messages in Hindi, and the sending of other PDS-relevant policy information besides just the delivery of the quota.

More research examining the features and impacts of a well-designed system would be a way forward to determining if this can be scaled up nationwide. In addition, a careful cost-benefit analysis is warranted. The cost calculation will need to include direct costs to the departments implementing this programme, indirect costs to households of signing up for and receiving the information, and opportunity costs of information crowd out (if any). On the benefits side, the direct benefits to households who receive information by SMS and indirect benefits to those who may receive this information from the SMS recipient will have to be taken into account.

The tangible goal of increase in take-up of PDS commodities and reduction of leakage could be realised if systematic and effective monitoring is in place. However, the monitoring and enforcement necessary to make the PDS work effectively in its current design is often not in place, perhaps because of prohibitively high costs. If the PDS is to reach its goal of food security – either in its current form or in the use of cash transfers or vouchers – low-cost monitoring mechanisms must be discovered and effectively implemented. The SMS information delivery could be a very promising lever to serve this end if it is implemented properly.

NOTE

1 During our field visit, the commissioner of food and civil supplies articulated concerns about low penetration rates and requested that we determine the characteristics of people who sign up for the programme.

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