



E-Zaraat – agricultural extension turns to tablets

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ICT-based services in Pakistan's Vehari district improved the reach and efficiency of extension services and gave farmers improved advice on good agricultural practice. Improved data captured from tablet computers allowed better monitoring of how, where and when staff were helping smallholder farmers.

Summary

In Punjab province, home to more than half of Pakistan's cultivated land, the agricultural extension department has only managed to provide information and advisory services to around 10% of the farming population. Working in partnership with the Punjab Department of Agriculture, with funding from the Department for International Development (DFID), CABI has designed and piloted an IT based system to support extension activities in three districts, in order to extend this reach. In one of the districts, Vehari, a full-scale pilot was conducted between 2011 and 2013 involving extension staff from headquarters down to field level.

The IT-based system, known as E-Zaraat, includes the development of a central database for the recording and analysis of field observations, a mobile application for submission of data from the field, and provision of mobile tablets to extension staff and training in their use for both sending and receiving information. E-Zaraat has also established a farmers' helpline, whose call service agents have access to a newly created database containing over 700 frequently asked questions on key crops such as cotton, wheat and a range of other crops.

Through intensive training, coaching and online help, the new system has been successfully adopted by extension staff, with significant benefits in terms of staff morale and performance and improved communication between farmers and the extension services, with knock-on benefits in crop yields and profitability. Major improvements have been observed in the coverage and effectiveness of extension services, data capture, retrieval and monitoring of staff activities. In the Vehari district

coverage by the extension services has improved such that around 19% of farmers are now being reached. Senior extension staff in Punjab are currently looking to extend the system to other districts in the province, while the World Bank has drawn on the experience of E-Zaraat in introducing an IT-based system within an agricultural growth project in Sindh province.

Key highlights

- The project has developed 450 advisory text messages for various crops, primarily wheat and cotton.
- In the Vehari district, advisory messages are now reaching 50,000 farmers, 19% of farmers in the district.
- Profitability of wheat production increased by 2.02% among beneficiary farmers between 2011 and 2012. Profitability among a control group of farmers declined by 5.58% in the same period.
- By accessing information and photographs from the Internet, extension staff have improved their capacity to diagnose plant diseases.
- Speed of communication between field staff and extension headquarters has markedly improved. Field data are submitted within only a few hours of a field visit, compared to several days or even weeks previously.
- Use of a 'GPS stamp' confirms the actual location of field data recording, enabling accurate monitoring of field staff activities.
- The unit cost of reaching farmers with extension advice has been reduced. While staff numbers and budgets have remained static, the number of farmers reached has increased from 18,000 to 50,000 in the Vehari district alone.



Context

Agriculturally, Punjab is the most important of Pakistan's four provinces; its soils are very fertile, its irrigation systems are relatively well developed and it contains 57% of the total cultivated land of the country. Nevertheless, farmers in the province face significant challenges including soil erosion, water scarcity, dependence on traditional farming practices and a lack of credit facilities and organized marketing. These problems are compounded by low levels of literacy, shortages of financial capital, population pressures and lifestyle changes.

The Provincial Agricultural Extension Department is the main source of information for farmers on production issues. The Department's mission is to improve the earnings and livelihoods of farmers by enhancing their ability to grow crops on a scientific basis. In attempting to reach 25,000 villages and over 4 million farming families, it employs face-to-face meetings and mass media, both in print and electronic formats. However, it estimates that less than 10% of farmers in Punjab have benefited from its work, owing to a number of factors: farms are small and spread across huge distances; the Department itself lacks basic equipment; and extension officers typically suffer from poor levels of training and low motivation.

Objectives

The E-Zaraat (E-Agriculture in Urdu) project aimed to increase the reach of Punjab's extension department from 10 to 30% of farmers in three districts: Vehari, Sargodha and Sialkot. These were strategically chosen to encompass the best known areas for four key crops: cotton and wheat in Vehari, citrus and wheat in Sargodha, and rice and wheat in Sialkot. These crops are of critical importance to the economy of the country and the livelihoods of the rural poor. The project aimed to give farmers access to timely, credible and useable agricultural advisory services through the use of ICTs. While initially, the project had planned to test the new technologies with a limited number of extension officers in each district, this was scaled up to a full implementation in the Vehari district involving all field extension staff and select staff from the provincial headquarters. This was done at the request of the Directorate General of Agriculture Extension and Adaptive Research (DG AE & AR).

Findings

To improve the quality of agricultural extension and extend it to a greater numbers of farmers, the project worked on several fronts. Firstly, it was important to improve the flow, timeliness and detail of information that was being sent from the farmers' fields back to the extension headquarters, in order to improve the department's ability to respond. For this, extension workers were supplied with 7 inch tablets loaded with a data-gathering mobile application, and trained in their use. The application allows collection and transmission of data from the field under a series of categories, including rainfall recordings, soil micronutrient status, pest and disease incidence, irrigation practices and fertilizer usage. The application also records the time and GPS location of the data recorder, known as a 'GSP stamp'.

The mobile app is linked to a web-based Management Information System (MIS), which has been supplied to the provincial extension department. This includes all the data that is gathered using the mobile app, plus additional information entered at provincial level. It thus provides the information needed to plan extension work programmes and develop advisory bulletins, as well as improved monitoring of extension staff activities. Training in use of the system has been given to the DG-AE & AR and the extension staff from 36 districts of Punjab.

Another major element of the E-Zaraat approach is the creation of the Kisan Dost (farmer friend) helpline, based on a call centre model. To help them respond to farmers' queries, call centre staff have access to a database of FAQ's (frequently asked questions). This was developed during initial workshops with extension workers, through a baseline survey in the three target districts, and by reviewing previous extension advisories. Subsequently, it has been added to, based on new queries asked by farmers, and now amounts to over 530 answers relating to cotton, wheat, rice and citrus, plus over 220 answers for non-target crops such as sugarcane, maize, onion and sunflower. If an answer is not available from the database, the call service agent (CSA) diverts the call to a local extension agent; it then becomes a conference call, the CSA remaining on the line so that they can hear the discussion and update the list of FAQs accordingly. If the query is still not resolved, it is sent to the Adaptive Research Cell of the extension department, with the CSA following up to ensure an answer is delivered to the farmer and the database is updated.

While the helpline enables farmers to request information, the E-Zaraat project also includes two systems to 'push' farming updates, through sending of voice messages and texts. All messages are

sent in the local language, Urdu, and are currently provided to 1500 farmers who have registered to receive the service. Both the voice and text messages are derived from the fortnightly agro-advisories developed by the DG AE & AR, and from the frequently asked questions.

Impact

Provision of tablets to extension officers and training in their use has proved to be both motivating and empowering. While the generally low proficiency in IT skills among the staff was initially a major challenge, this was overcome through training, coaching sessions and online help. As a result, their degree of acceptance of the new technology has been very high. For the first time, extension officers can deliver accurate, real-time reporting of their field activities to their managers and can flag up issues related to the health of crops in their area. They also gained access, using the tablets, to other online extension resources, including photos of pest and diseases damage. By sharing these with farmers, they have markedly improved the accuracy of their field diagnoses. Having the skills and technology to access online information, including the E-Zaraat database, has been a major motivating factor for extension staff. “We are connected to the Internet. We can keep abreast with changing technologies and keep pace with a fast changing world,” says an agricultural officer from Pipli. “It has been a dream in the Department to have a comprehensive database for quick access and reference,” comments the cotton inspector (CI) from Mailsi. “This dream has been realised through E-Zaraat”. In Vehari, the District Officer observes that the district had, in the 1980s, been a leading cotton producer in the country, but had since been overtaken by other districts. “E-Zaraat has now given us a new ray of hope that we can regain our lost pride,” he says.

This improved motivation and confidence has led to a culture of continuous learning among extension staff. This has enabled them to use the new technologies for activities not initially envisaged by the project. One extension officer, for example, reports how a group of women have been helped with vegetable production: “Many women are engaged in kitchen gardening. Last year, we downloaded some pictures of kitchen gardening from the Internet by using the tablets and developed a training module and delivered it to 25 women, with the help of a local NGO, in Sharqi Colony of Vehari city”.



The E-Zaraat programme has changed the focus of the extension service towards small and medium scale farmers who had previously been less well served, and has extended the reach of the extension service to a much greater number of beneficiaries. Advisory messages are now reaching 50,000 farmers in the Vehari district alone, meaning that extension services are now covering almost 19% of farmers in the district; prior to the project, they were reaching 18,000 farmers. Feedback from farmers indicates that they most appreciate the text messaging service, as they can store the messages on their phones to review when needed, and can also forward them to their fellow farmers. The Executive District Officer (Agriculture) comments, “The communication gap between farmers and the Department has narrowed down. Farmers send their queries through the helpline or emails. We transmit answers in the least amount of time”.

For those working at various levels in the extension department, the programme has brought many advantages. The use of tablets has created much greater mobility and convenience. When planning meetings are held, there is no need to bring large quantities of paperwork; all the information is available electronically. The speed of reporting within the central extension department has also been much improved. "We used to transmit reports 15 days after the event; now we send within 2 hours of the event or activity," says a Deputy District Officer. For the DG AE & AR, one important improvement has been in monitoring extension service performance. Previously, when paper forms were manually completed, there was much greater potential for officers to falsify data. Now, the system records the GPS coordinates of the data sender, verifying that they are at the site being reported on. For the field officer, the new system is both quicker and easier, and their data can be passed up the entire chain of command without the need for re- entering, as was the practice previously.

In terms of improvements in crop production, E-Zaraat targeted two major crops in the Vehari district: cotton and wheat. An impact evaluation found that in the case of wheat, project beneficiaries were able to use their resources more efficiently than a control group of farmers. Although their yield increased by only 1.91%, their profitability increased by 2% in comparison to the previous year, whereas profitability of the control group fell by 5.6%. This increase in profitability of the beneficiary farmers could be attributed to more efficient management of resources in the face of rising costs of inputs, which control group farmers have struggled to cope with. The Director of the Agriculture Extension Services in the region explained his understanding of the process by which the project created impact: "More skilled extension staff means more capacity building of the farmers. Thus farmers are direct beneficiaries of this project. They are getting better advice, which is positively affecting the yield. In this way, we will be able to narrow down yield gaps. It is expected that benefits would multiply in the seasons to come".

Way forward

Both extension staff and evaluation exercises have raised a number of areas where the E-Zaraat model could be improved. Making the helpline service free of charge to callers would be very significant, enhancing the 'demand-driven' part of the communication system. Being able to extend the E-Zaraat technology and training to field assistants, the next tier of extension staff below the agricultural officers, would also strengthen the effectiveness and impact of the system on the ground. Other issues, such as improving internet speeds and monitoring the performance of system users have also been raised. Looking more widely, the system is currently only properly available in the Vehari district; there is therefore considerable potential to extend its benefits to many other areas, both within Punjab province and beyond.

Many of these issues are already being addressed. In terms of call charges, the DG AE & AR has committed to providing a cost free 0800 telephone number and office space for the helpline, to support it in increasing its reach to all districts in Punjab. Overall, the project has attracted considerable interest across all levels in the extension department. As a result, the DG is keen to extend the project to the whole province and has requested the Punjab IT Board (PITB) to host the application and to provide it with a government URL – <http://www.e-zaraat.punjab.gov.pkw>. In support of this, a memorandum of understanding will be prepared between CABI and the Department of Agriculture to agree on key issues such as the rights to the data, and the hosting and support for the system.

Following discussions with the DG AE & AR, the PITB has agreed in principle to provide agricultural extension staff from HQ to AO level across Punjab with mobile tablets, and for AOs to receive smart phones. This, if it goes ahead, will substantially reduce the cost of providing hardware to implement E-Zaraat in the field. However, costs of equipment and the necessary training are high, and it is estimated that it will take around four years for the Department to develop the necessary infrastructure to run the project on its own, should the funding be made available.

The wider context

The World Bank requested a brief on the project and, based on that, has included ICT-based services on a pattern similar to E-Zaraat in its new agricultural growth project for Sindh province.

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