Harvesting communications technology for better farming

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This case study is based on anecdotal evidence about a real farmer which was collected as part of an impact assessment study done by IKSL, a communications venture of IFFCO, the Indian farmers' fertilizer cooperative. Mylarappa, a farmer from Belahaar in Dharwad district, owns five acres of land. He grows maize, sunflower, onion, wheat and millet and supplements his income with two cows and two buffaloes. However, the last few times one of his cows got pregnant, its uterus prolapsed. Despite paying the vet Rs800 (about seven dollars), it was too late to save the unborn calf.

Meanwhile, in a different part of Karnataka, a farmer found a solution to this problem. He found that prolapse can be prevented by inserting leaves of mimosa, commonly known as 'touch-me-not' or 'sensitive plant', into the cow's uterus and giving half a glass of mimosa juice along with its fodder – a solution that would have saved Mylarappa his cows.

Mylarappa's experience is representative of the experiences of many farmers. One of the key problems faced by farmers today is access to information about better methods of cultivation, animal husbandry or government schemes. While this is a recognised problem, most of the existing solutions have adopted an approach based on the assumption that farmers need to be 'educated'. Institutions promoting information often have a strong bias, for instance, to use fertilizers or to shun them completely, and to ignore the broader context in which farmers implement their recommendations.

However, a national survey of farmers found that among 16 different channels for gathering agriculture-related information, progressive farmers were rated as being the leading source of information for farmers. Other research show that farmers value input from fellow farmers ahead of top-down information. For example, a study of the usage of Avaaj Otalo (literally, "voice stoop"), an interactive voice application for small-scale farmers in Gujarat, showed that the most popular feature of Avaaj Otalo was a forum for asking questions and responding on a range of

agricultural topics, ahead of listening to announcements and radio archives.

IFFCO Kisan Sanchar Nigam Limited (IKSL), a venture of Indian Farmers Fertilizers Cooperative (IFFCO), has created a platform for farmers to share and use best practices. In order to do this, IKSL uses mobile phones which are ubiquitous in rural India.

This study shows how IKSL uses technology as a key enabler to bring together communities and aggregate indigenous knowledge among the rural poor. The study focuses on IKSL's content distribution and engagement with farmers. Through anecdotal evidence and select quantitative data, it captures the impact IKSL has had on farmers. The study also outlines how IKSL provides a platform that goes beyond just sharing best practices with farmers to support information sharing among communities and special interest groups at almost zero infrastructure costs.

Indian Farmers Fertilizer's co-operative comprises more than 40,000 cooperative societies and 60 million farmers. The farmers own IFFCO through their shares in their societies and are also consumers as they use fertilizers produced by IFFCO.

Providing relevant up-to date information is integral to IFFCO's activities. This is evident from IFFCO's mission, which is "to enable Indian farmers to prosper through timely supply of reliable, high quality agricultural inputs and services in an environmentally sustainable manner and to undertake other activities to improve their welfare".

Since 1976 IFFCO has run Farmer Service Centres (FSC) to combine farm implements and equipment along with technical know-how under one roof, right on the doorstep of farmers in IFFCO adopted villages. Since 1979 IFFCO has also promoted the Cooperative Rural Development Trust to educate and train to farmers on various aspects of crop production, horticulture, animal husbandry, farm machinery and so on.. Extension services such as field demonstrations, soil testing, and farmers' training programmes are integral to the marketing activities of the co-operative.

At the same time, IFFCO has always been in the forefront of technology innovation. It has won many awards for effectively using technology for streamlining its processes, for example, e-procurement and supporting collaboration and sharing information Hence using technology to engage with farmers and share best practices with them was a natural next step.

IKSL was incorporated in 2007 as a joint venture company with IFFCO, Bharti Airtel and Star Global Resources Limited. Through its network of cooperative stores, IKSL sells 'green SIM cards' to farmers. Owners of the SIM card are sent five free one-minute long voice messages every day addressing a wide range of topics relevant to farmers, including agriculture, animal husbandry, health and government schemes. In addition to the regular messages, special programmes address general information needs and ensure interactive engagement with the farmers. Farmers also have a paid helpline to address any their specific queries.

Today, the IKSL subscriber base has over five million users and 35,589 cooperative societies have enrolled as IKSL retailers. It generates revenue through the sale of its products including the SIM card and recharge coupons and services such as the paid helpline.

IKSL started operations in Karnataka in May 2008 and today has more than half a million subscribers in the state. Much has been written about the ubiquitous presence of mobile phones in India and solutions based on mobile telephony can provide a direct channel to those who need information through their own phones.

Six years after trying computer-based systems IFFCO switched to mobile phones and set up ISKL as a separate entity. Similarly, a computer-based system for managing information in a sugarcane cooperative in rural Maharashtra was replaced with an SMS based-mobile phone system after an eight month trial involving seven villages. It was found that all computer- based functionality could be replicated, and cell phones were less expensive and more popular with farmers. Initially, messages to farmers were provided through text messages. While text messages could be stored and read anytime irrespective of when they were delivered, they excluded illiterate farmers. IKSL then switched to the voice-based system. If a farmer misses a message or wants to listen to the messages again, he can call either the helpline or a 're-listen number', to listen to all the messages of the day at once. This service is charged at the rate of a regular call.

In order to provide the right content, IKSL focused on two key factors - authenticity and relevance. IKSL sources its information through links with agricultural universities and institutions, receiving input from faculty, crop calendars issued by agricultural departments, and journals of institutions such as the Indian Council for Agricultural research. A panel of experts

validates the content of the messages. For weather-based advisory inputs, IKSL collaborates with the Indian Metrological Department which supplies information at the state level.

To make sure that the information is sent to relevant farmers, IKSL analyses helpline calls to identify the needs of farmers from different parts of the state. For example, if more maize related questions are coming from a certain area, or if there are repeated questions about a particular pest, it is taken as an indication that messages on these topics must be provided. Apart from analysing the helpline calls, five randomly selected farmers are called every day to find out if they have implemented suggestions from IKSL and what benefits they have had in terms of yield and net income. These farmers are also asked what crops are being grown in their village or local area, and what stage the crops are at. These inputs also help assess the information needs of farmers.

A project associate is appointed for every seven districts whose sole job is to provide inputs and feedback from the field. The associate provides locally relevant information such as the venue and time of training sessions.

While these strategies help to segment consumers and share the right information, farmers have access to a helpline, charged at the rate of 50 paisa per minute (about one cent), for specific queries or unforeseen circumstances. The cost does not seem to have deterred farmers. The helpline receives about 40 calls per day, according to the Karnataka content team. Queries to the helpline are addressed within 24 hours.

In addition to farming related messages, messages relating to health, particularly concerning women and children, are broadcast through programmes such as *Angayalli Arogya* (health in your palm). Two doctors on the panel validate these messages, which attempt to provide useful information beyond agriculture..

All the messages are in the local language, and efforts are made to modify the dialect based on the region, to ensure clarity. The manner of presentation of the messages resembles All India Radio broadcasts as this is a mode farmers are familiar with. The content manager Ms. Shashikala stressed the need to use simple terms while describing crop diseases. “We describe the symptoms rather than use scientific jargon. For instance, we say the leaves dry up and there

are white dots left behind, rather than use the technical name of a plant disease."

IKSL makes a conscious effort to ensure the right tone is set during its engagement with the farmers and ensures that it goes beyond just delivering messages. Simple gestures such as enquiring whether they are free to talk when called, or giving good wishes for festivals, positively attuned the farmers towards the organization. Shashikala quoted instances where farmers, when they had a low air-time balance, would give missed calls to the IKSL staff. These calls were often made from chemists' shops to find out what veterinary medicines were to be bought and in what quantities.

In addition to sending messages, IKSL also arranged for local experts to visit the farmers directly. Through such means, IKSL came to play a role of a trusted advisor for the farmers to contact in case of emergencies. This, together with the quality of their content, built their credibility. IKSL often checks with the farmers to find out if their tips or answers to queries have been useful. Along with a random sampling of farmers to identify which of their best practices worked, IKSL conducts qualitative impact assessment studies to identify how useful their messages are.

In addition, they have a special quiz programme called *Jana Raitha* (intelligent farmer) that helps them understand if the delivered messages are being understood accurately. For example, a question could be "What is the appropriate time for applying pesticide?" The correct answer is "on the day of sowing or one or two days after sowing". Those who provide the right answers are selected through a lucky draw and win a bag as a prize. If a farmer answers correctly for three consecutive weeks, they win a bumper prize of Rs200 credit for calls. If questions about a particular message are not sufficiently answered, the message is repeated. A special quiz is conducted once every three months with questions related to the farming practices exclusively carried out by women, as well as nutrition-related questions.

IKSL has established a process for capturing and sharing indigenous best practices. Progressive farmers who have developed their own solutions to specific local problems are encouraged to share them with IKSL. These messages are often practical tips that other farmers could use. For instance, farmers recommended sprinkling human hair in the field to control the menace of pigs, who breathe very close to the ground. Inhaling the hair causes irritation and also the human smell

scares them away. This suggestion is then broadcast through messages to all IKSL customers, with the farmer given the credit and, with their permission, their contact details are also provided.

Progressive farmers also act as local representatives for IKSL in cases that require local intervention or understanding. For instance, they are involved in teleconferences, if the need arises, while answering helpline calls.

IKSL has also tried to create cropping communities to get farmers with similar interests together. Jothe Jotheyalli was one such experiment by IKSL Karnataka, intended to connect a group of farmers growing the same crop in different parts of the state via teleconference once a week, to exchange inputs with each other. Over time, it was realized that the program could not adequately cater to the numbers required. Around ten farmers could take part in a call but at times nearly 100 farmers wished to participate. The modified strategy now is to create VAS communities, where farmers growing a particular crop are transformed into a community for whom IKSL serves as a platform of exchange.

By April 2010, after three years of operations, IKSL had 4,011,642 subscribers in 18 different states. This was twenty times as many as its competitor Reuters Market Light (RML), which was started in the same year as IKSL. Between April and June 2010, IKSL added one million new subscribers, five times the overall subscriber base of RML in April 2010. IKSL has been able to leverage existing mobile infrastructure and support networks by partnering with Bharti Airtel. IKSL has a decentralized model for content creation. It appoints a content manager at the state level, who plans and implements programs. This ensures that the model can be extended across states and is tailor-made for customizing information provided to the farmers based on local needs.

In order to grow their subscriber base, IKSL relies on word of mouth and viral impact. One strategy adopted to do this is to create initiatives for existing subscribers, to convince other farmers to purchase the “green SIM card” as it is known among some farmers. For example, if a farmer manages to sign up ten other subscribers, he wins prizes such as additional talk time. Interactions with farmers provide evidence that the relevance of the messages and positive peer experiences have encouraged them to subscribe to IKSL.

Prema, a farmer on the outskirts of Bangalore decided to purchase a separate SIM card for herself, although her brother Gangadhar was an IKSL subscriber. She had called the helpline from her brother's number when a neighbour's cow had collapsed. A vet visited their house and revived the cow. The sense of satisfaction she felt at having been of help made Prema want to own a SIM card, to ensure she has access to the messages and helpline, even when Gangadhar was not home.

While IKSL today offers a solution to capture and share best practices with farmers, it can also be extended to address other information needs. Firstly, content providers are encouraged to use existing technology to share updates with the IKSL subscriber base. IKSL shares notifications on government schemes, health tips and employment opportunities with its five million subscribers.

Secondly, IKSL also supports sending specific information to a community with special interests, especially useful in fostering community groups. For instance, Self Help Groups (SHGs) can create and share information and updates via their mobiles.

IKSL has partnered with Initiatives for Development Foundation (IDF), an NGO that works towards gender and financial inclusion. They also promote sustainable agriculture. Through the Farmers' Field School (FFS) method, IDF has a project which teaches farmers to cultivate paddy and sugarcane using less water. 3,000 farmers are part of this. IKSL in Karnataka is creating a separate group called Sujivan for these farmers. In the broadcast to this group, specially customized messages are sent about the time and date of group meetings.

On 17 June 2010 the Network for Fish Quality Management and Sustainable Fishing (NETFISH) signed a Memorandum of Understanding with IKSL to send the NETFISH news over IKSL mobile connections to fishing communities, to inform them about market prices, availability of fish and off-shore weather conditions.

These are examples of ways that IKSL can develop from being a solution addressing farmers' informational needs to a platform that can create and disseminate content through the use of mobile phones.

The widespread adoption of IKSL green SIM cards is a strong indicator of the benefits IKSL has provided to farmers. In a study conducted in Kolar, with a small sample of 30 farmers in both

experimental and control groups, a 65% gap was identified in the skill and knowledge levels of the farmers across the two groups. In addition, IKSL conducts qualitative impact assessment studies to understand both the financial and social impact of its messages on its farmers.

IKSL's recommendations have helped customers reduce costs of treatments and improve revenue on their crops and animals. Anecdotal evidence from the impact studies and insights from primary research have been categorized to illustrate the financial impact that IKSL has had on customers.

Farmers confirm that IKSL provided solutions that were far more cost effective to implement than local recommendations. For instance, Moodalagiriyappa who grows maize paid over Rs4,500 to remove weeds from his farm since none of the local approaches worked. The recommended fertilizer from IKSL cost him Rs480.

Similarly, Shivkumar had black spots in his groundnut crops. The chemist recommended chemicals that cost him Rs3,000. He called the IKSL helpline and was able to address the problem by buying chemicals for Rs300.

The experience of Puttabuddhi underlines the cost of expertise in rural areas. His cows often suffered from mastitis. Every time they fell ill, Puttabuddhi paid for the doctor in the neighbourhood to travel to his village to look at the cow, including the bus charge, doctor fees and other expenses. He finally called the IKSL helpline and was advised to mix ground aloe vera with turmeric powder and apply the paste in the infected region. This cost him nothing and solved the problem.

Eriswamy had the same experience when his sheep suffered from foot and mouth disease. He used to ask the local vet to treat the sheep but had to cover the cost of travel and food. IKSL recommended he use malt, baking soda and an ointment and he was able to cure the disease for Rs80 or well under two dollars.

Shivalingegowda was concerned that his cows produced very little milk. He received a voice message from IKSL on how to improve yield by giving them soaked broken maize and groundnut cake. After 20 days the yield from his cows had doubled.

Kumar was selling silk cocoons in his own district where he never made a profit. A message from IKSL told him that the price was fifty rupees more in a nearby district. It cost him Rs50 for travel but earned a profit of Rs2,000.

Farmers have also been able to get a better price on their animals by curing infections in their animals which reduced their selling price. Sadashiva's cow had a skin infection due to a wound that the cow incurred when burning the horns. He was offered only 10000 rupees, but IKSL recommended that he continuously clean the wound and apply a specific medicine. The wound was cured in a month and he sold his cow for 40000 rupees.

These anecdotes, though not based on scientific research studies, highlight the systemic issues faced by farmers today including a lack of local expertise, knowledge of market prices and knowledge of cost-effective (and free) best practices. IKSL has been able to bridge this gap and provide direct financial benefits to the farmers. As is clear, the use of the IKSL SIM card has helped farmers access information directly rather than depend on chemists. The voice-based messages and helpline service provide farmers with direct information without any middlemen.

Unlike the computer kiosk or the chemist shop, biases of class, caste and gender do not play a role when the information is "direct to ear" through the mobile phone. Women, who may hesitate to approach kiosks, form a core base of IKSL subscribers. There are also special schemes such as reservation of prizes for women in the 'Jana Raitha' contest to encourage their participation.

Farmers have started to accept the suggestions provided through the IKSL platform based largely on social networks - positive experiences of one farmer influences his friends and relatives to trust the source of information. Apart from the creation of networks at ground level, the creation of cropping communities has helped build useful networks that can help farmers improve their methods of cultivation.

Additionally the ability to rope in local experts and their identification of farmers as "IKSL farmers" has helped create a social prestige value in associating with the organization. Thus, it can be said that IKSL has been able to create a social network of farmers.

While IKSL has made significant strides in increasing the adoption of its products and services among the farmers, it faces stiff competition in the telecom sector. As a co-operative entering into the telecom sector, IKSL needs to transform across its nationwide co-operative network to ensured sustained leadership in this space.

Rural areas represent a growth opportunity for the Telecom sector and farmers, especially, are a lucrative market segment. Hence, there is increased competition among Telecom vendors and all major vendors have introduced similar services; some of these are described below.

Operator	Business Model
Reuters Market Light (RML)	Reuters Market Light offers Indian farmers local price information, news and weather updates. RML uses SMS communication and is available in 10 states with 200,000 subscribers.
Mandi on Mobile	Mandi on Mobile was started by the Uttar Pradesh Agricultural Marketing Board with Bharat Sanchar Nigam Limited (BSNL).It is voice-based; farmers can obtain the market prices of 108 commodities
KRIBHCO Reliance Kisan Ltd.	KRIBHCO Reliance Kisan Ltd. is a joint venture between Reliance Communications and Krishak Bharati Cooperative Ltd. It will market its telecom and non-telecom service to farmers.
Mandi Bhav	Mandi Bhav is offered by Tata Teleservices and Impetus Technologies, which provides prices to farmers. It is planned to cover prices from 3,000 local markets for about 500 commodities.
Idea Krishi	IDEA Krishi gives prices, advice and weather information to farmers in Uttar Pradesh, by voice with an SMS alert. For Rs. 30 per month, it provides voice content and specific user information by SMS.
BSNL & NFL Venture	BSNL and National Fertilizers Ltd plan to offer crop information, weather forecasts, soil tests and health information in local languages, initially in Madhya Pradesh and Chhattisgarh.
mKrishi	mKrishi is an initiative of Tata Consultancy Services (TCS), which allows farmers to send queries to experts in their local languages through a mobile and to receive personalised answers.

RCOM + BBC	RCOM partnered with BBC News to broadcast news and weather reports in Hindi, Tamil, Urdu and Bangla to rural India, with data for water level monitoring, and for milk, fish and poultry cooperatives.
Krishi Voucher card	Krishi Voucher card is offered by Reliance and Idea Cellular to improive crop information in Maharashtra and Goa. Clients will buy one month Krishi pre-paid vouchers for Rs. 75.
Behtar Zindagi Rural IVR Service	This provides district weather forecasts and advice on various crops in 18 regional languages. The Indian Meteorological Department provides weather forecasts and advice.

While it still has the highest number of subscribers, IFFCO faces increasing challenges in enrolling customers who actively use their services. In addition, due to the price wars that are inherent to the telecom sector, IKSL cannot keep consistent business terms with its customers. The cost of the Green SIM cards and phone calls are often changed, sometimes resulting in misunderstanding and dissatisfaction among customers.

While the cooperative stores provide an excellent network for IFFCO to sell their products, there are challenges in getting them to appreciate IKSL's business. Since they are the primary channel for selling the IKSL products and services to the farmers, it is important for the stores to act as the face of the organization and explain the benefits to the farmers. However, these stores have been selling fertilizers and other agricultural produce over the years and not all cooperative stores treat selling SIM cards as an integral part of their function.

This is especially challenging given the dynamic nature of business in the telecom sector, where it is essential for these stores to make quick decisions and clearly state the value of the IKSL SIM cards. IKSL today engages with the cooperative stores by emphasizing the objective of the cooperatives as a means to provide services to the customers and how making relevant information available is an essential part of this endeavour.

According to the existing arrangement between IKSL and Airtel, IKSL is responsible for enrolling customers and ensuring that they have the right identification documents. This has become especially important given the stringent norms on establishing identity during the

distribution of phone connections.

However, this process is especially challenging in rural areas where many farmers do not have the right documents. Also mobile phones are treated as belonging to a family rather than an individual. Farmers often buy a SIM card and hand it over to their son or daughter. During verification, this causes confusion and the connections are not activated.

Managing such exceptions and communicating effectively with the farmers to take them through the process of registration has emphasized the need for stronger operational efficiency within IKSL.

Another lesson learnt during the past two years has been the need for offline engagement with farmers. Apart from field visits and feedback collection, farmers have repeatedly requested field-training programmes that help them get focused training on specific topics. In collaboration with the agricultural department, IKSL has initiated training programmes in the cultivation of potato and tomato and more training sessions are planned.

To return to the problem that we outlined in the beginning of the study, how else could Mylarappa who wanted to save his cows connect with a farmer miles away who knew how to do it? IKSL has played this role of being a platform for bringing these two farmers and many others together to share best practices. Today IKSL has becomes a channel to communicate with over five million farmers, not just about farming but any information that is relevant to them.

It has provided communities the power to not only consume information but to create and share it. This technology enables communities to come together and achieve the true potential of aggregation. The IKSL experience demonstrates that it is not just technology that brings people together. One needs the right process, relevant content, effective delivery, clear and actionable strategies for engagement and constant feedback to be effective in winning adoption and trust among the communities.