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ICT Update

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CTA

http://ictupdate.cta.int

Mobile apps deliver a broad range of information to **Ugandan** farmers

VHRI gives **West African** farmers data on soil fertility and land size

Information system sends RSS feeds to **Chilean** farmers via SMS

Farmer services

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ICT Update

ICT Update issue 53, February 2010.

ICT Update is a bimonthly printed bulletin with an accompanying web magazine (http://ictupdate.cta.int) and email newsletter. Each issue of ICT Update focuses on a specific theme relevant to ICTs for agricultural and rural development in African, Caribbean and Pacific (ACP) countries, and includes feature articles and annotated links to related web resources and projects. The next issue will be available in April 2010.

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Mixed Sources

Editorial

Serving the needs of farmers

To build a stable business, farmers regularly need information on a wide range of subjects. They need long- and short-term weather reports to choose the best time to plant and harvest. They need current information on the spread of pests and diseases that might threaten their crops. They need to get the latest tips and advice to make the most of their available land. And they need market data to find the right buyers at exactly the right time. But farmers don't want all the information; they only want what's relevant to their specific needs. And to help them, a few services are now providing agricultural information tailored to fit the particular working conditions of individual farmers.

In the Seeing is Believing-West Africa (SIBWA) project, scientists at ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) worked with local partners and farmers to interpret information from very high resolution imagery (VHRI) taken from satellites. When analyzed, the images can reveal the relative fertility of soil and give an accurate measurement of the exact shape and size of a field.

Although much of the information is gathered from many different sources, the farmer only has to deal with one point of delivery.

With this knowledge, farmers can determine the precise amount of fertilizer, pesticide and seeds needed to evenly cover their land. The project, working with communities in Mali, Ghana, Burkina Faso and Niger, provided each farmer with the images, maps and data relating to their specific field to help them to plan and manage the next season's crop.

Efficient

It is also crucial for farmers get their information quickly. In Uganda, the Grameen Foundation has developed a network of advisors, known as community knowledge workers (CKWs), to provide answers to specific agricultural queries. Using a range of applications installed on a mobile phone, the CKW can look up market data, access weather forecasts and give cultivation advice. The project trained trusted people already living in the community so that they can be contacted quickly and easily by farmers.

The CKW network has proven to be a useful link between farmers and agricultural researchers. The project tested the use of mobile phones and geographic information system (GIS) technology to investigate the spread of banana diseases in the country. The CKWs entered data from farmers into a mobile survey application, which they then sent to researchers along with GPS coordinates of each surveyed farm. Scientists were able to use the information to produce accurate maps detailing the occurrence of each disease and develop strategies to limit the spread.

In response to the demand for customized agricultural information, the mobile phone manufacturer Nokia has developed an application that delivers weather, crop and market information directly to the farmer's phone depending on their location and the crops they grow. The service, called Nokia Life Tools, analyzes thousands of pieces of information a day to provide farmers with a daily update. Farmers pay a subscription fee of just over US$1.00 a month for the service, which provides the data in the language of their choice.

Similarly, the DatAgro project in Chile uses new technology developed by DataDyne, a not-for-profit organization, to organize selected content from the internet into RSS feeds and deliver that to farmers via SMS.

Such services bring farmers a range of detailed information relevant to the crops they grow and the environment they live in. And, although much of the information is gathered from many different sources, the farmer only has to deal with one point of delivery, either an extension officer, a member of their community or a mobile phone. Farmers no longer have to look around for advice or filter out unwanted details; they can finally concentrate on getting the best out of their farms. ■

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A coordinated effort

Agricultural information services face major challenges in achieving their goals of making sure that farmers can find the precise information they need, when they need it, and in forms which they can understand. For the hundreds of millions of farmers who regularly seek new information to improve productivity and overcome hunger and poverty, the solution, as I see it, is to develop large, integrated networks that will connect the diverse sources of information to each other, and to the farmers through ICTs.

The strategy and framework for developing such networks already exist for Africa in the Comprehensive Africa Agriculture Development Programme (CAADP), in which the importance of ICTs in the collation and dissemination of agricultural information is clearly stated. The prospect for building effective agricultural information networks is underpinned by the collective commitment of African governments to investing 10% of their national budgets to developing agriculture.

Some ACP countries are already building national information services. But to be fully effective, these networks have to be linked across continents to provide access to global sources of information. One way to do this, and improve accessibility for farmers, is to develop centres of knowledge sited strategically in each country, according to the distribution of farming communities and their differing needs.

Farmers could visit these centres at anytime to have their questions answered. The centre would connect them by phone or PC to human or electronic moderators who would redirect their questions. The questions could go to databases, to agricultural advisors qualified in the relevant subject, or to other farmers who have coped successfully with the same problem. The answer could be provided through any appropriate media, e.g. print, electronic databases, the internet, video, audio files, or through web 2.0 tools such as Facebook, twitter, YouTube, etc.

The greatest advantage of these information centres would be that they would not have to attempt the impossible task of being a single source of all information for all farmers. They would connect farmers to authoritative sources; questions on viral diseases would be directed to veterinary or plant virologists, for example, while questions on insect pests would be referred to an entomologist. These specialists could be accessed wherever they are, including at the fifteen international agricultural research centers (IARCs) that have been collecting pertinent information on agriculture in developing regions since the 1970s.

Cooperation

The development of effective information networks would require a lot of coordination between agricultural advisers, scientists, other development specialists and the private sector. Companies such as Nokia, Vodaphone, and Zain, that already have large networks, could do more to make information available to farmers. They will be essential to the development of electronic agricultural advisory services, but they would also benefit by getting access to expanding markets in which to sell their products. They, in turn, could then pay for social or impact investments to develop the information infrastructure and software that would be needed to link the centres and create the information networks.

The agricultural advisory services would also have a vital role in contextualizing the information content that would be conveyed on the networks so that it will of most use to the end users. The public and private research centres in universities and agricultural research institutes would have a major responsibility to generate useful and reliable information content.

We, and several organizations in other ACP countries, are already working to develop agricultural information networks that meet the specific needs of farmers. Our efforts are still relatively small-scale, but we are determined to expand our services in the coming years. We will need a lot of support, however, and I think that is most likely to come from the commercial sector.

Farmers already know a lot about their production systems so their questions are usually very specific, related to their particular crop grown on a particular type of soil under particular climate conditions. And it will take a focused, coordinated effort by governments, businesses, NGOs and farmers to develop the necessary systems. We still have a long way to go, but I believe we have a good beginning already. ■

PAUL HARRISON / LINEAIR

Feature

Direct data on demand

A network of community knowledge workers (CKWs) in Uganda uses a suite of mobile applications to give farmers a broad range of information. The CKWs can provide farming advice, market data, pest- and disease-control training, plus weather forecasts.

Challenges such as poor infrastructure, high transportation costs and a lack of communication between scientists and farmers mean that the potential of agriculture in many ACP countries is not fully realized. Research organizations that work with rural communities find that they are unable to get the information they produce to farmers, because they do not have an effective, affordable system for communicating with them.

In Uganda, the Grameen Foundation, working with MTN Uganda and other partners and the organization's local initiative, AppLab, have developed a network of community knowledge workers (CKWs) who work directly with farmers. The CKWs provide that crucial link between agricultural research institutes, organizations serving farmers, private businesses working in the sector, and smallholder farmers.

The project team gave extensive training on agriculture and mobile technology to trusted people already living in the community. They provided each new CKW with a relatively simple Java-enabled mobile phone, fitted with a suite of applications to provide on-demand information on farming practices, market conditions, pest and disease control, weather forecasts, and a range of other issues important to farmers.

In February 2009, Grameen Foundation began a small pilot project in Bushenyi and Mbale districts of Uganda to test the CKW model. The project team recruited and trained 38 CKWs who, as they visited the farmers living in their respective communities, went on to complete over 6000 surveys and have more than 14,000 interactions with smallholder farmers during the nine-month project.

Customize

At the start of their training, the CKWs received a toolkit with the mobile phone, a car battery for phone charging, and training materials on how to use the phone. With access to several different information sources, the CKWs were equipped to answer a broad range of queries from farmers, and they could cross-reference and check their advice to make sure the farmers received the most precise and individually relevant answers.

Farmers routinely sought out CKWs to obtain information to help them treat pests and diseases, get accurate weather forecasts for planting, and details on how to earn more from their crops. Among the services available to the CKWs [see box] was the AppLab Question Box (AQB). When a farmer asks their CKW a question, he or she calls a telephone operator. The AQB operator searches pre-approved websites and a dedicated information database and then calls the CKW back, giving the answer in the language spoken by the farmer. When operators cannot find the answer to an agricultural question, they can contact an expert from Uganda's National Agricultural Research Organisation (NARO).

Throughout the pilot project, farmers used information from the hotline to address pest problems and nutrient deficiencies, and learn about planting, spacing, starting new enterprises and livestock care. The service proved to be a very useful resource. Farmers gave feedback saying that they had increased revenue and decreased losses, as they used the helpline information to treat livestock and plant diseases before their crops were destroyed or their animals were so sick that they had to be brought to the vet or slaughtered.

Connect

As well as providing information to farmers on request, the CKW project developed and tested a Community Level Crop Disease Surveillance system (CLCDS). The system made use of both mobile phones and GIS (geographic information system) technology to link the local CKW network to scientists to enable them to identify, map, monitor and control banana diseases within farming communities.

Despite the existence of advanced control techniques, a number of diseases have devastated Uganda's national banana trade and have jeopardized the food security and livelihoods of millions of people in East Africa. The disease surveillance system allowed a two-way exchange of information, where the network of CKWs could communicate directly with researchers and farmers. By sharing information in this way, it was possible for the scientists to get a good overview of the spread of diseases and develop strategies to fight them.

Over the course of two months, 38 CKWs used mobile phones and GPS receivers to collect nearly 3000 surveys documenting the presence of the three banana diseases in the two pilot districts. They gathered information on farm characteristics, knowledge of control methods, and the demand for agricultural information by using mobile survey tools that had been previously installed on their phones. They could allocate the GPS coordinates to each completed survey questionnaire and add photos of the specific disease symptoms they found on the plants. The CKWs then saved the information on their phones and sent it over the mobile network (using GPRS) to the central database.

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CHARLES STURGE / ALAMY

Once CKWs submitted their survey results, scientists could access and view the data directly from the web and download the results for analysis. The surveys provided substantial data showing the spatial distribution of banana disease incidence in the communities. The team of scientists viewed thousands of digital photos of disease symptoms which CKWs submitted with their surveys.

Developers of the CLCDS phone application designed it so that the survey itself became a diagnostic tool. Based on the farmers' responses, a 'pop-up' window opened on the phone's browser that showed information on disease identification, including photographs illustrating disease symptoms. These files, stored internally on the CKWs mobile phones, contained the specific control measures necessary to prevent the spread of the diagnosed banana disease.

With access to such specific information, the CKWs trained all of the survey respondents in scientific methods for banana disease detection, preventative measures and control procedures. The first and most crucial step to controlling any disease is its correct and rapid identification. Only after a farmer has recognized the symptoms and identified the disease can they adopt the appropriate control methods.

Providing detailed disease control information was, therefore, a critical component of the CLCDS. The training took place mainly through on-farm demonstrations and the distribution and explanation of farmer reference guides targeting banana disease and pest management. CKWs physically demonstrated how to properly sterilize tools, prepare clean planting materials, and differentiate between various banana disease symptoms and potential causes.

By the end of the two-month pilot period, CKWs had trained over 3000 farmers in the appropriate methods for banana disease identification, preventative measures and control procedures. But CLCDS also showed how a mobile survey system could enhance scientists' ability to monitor disease outbreaks as they happened, and to then deliver information to farmers in remote areas through the CKWs, particularly to areas where extension officers and agricultural researchers do not regularly visit.

Having up-to-date information that included details of the exact locations of a disease, agricultural experts could develop a plan of preventative measures and allow the rapid dispersal of information that would decrease the spread of the disease. The GIS data could then help the scientists to pinpoint sites to collect plant samples of new or suspicious disease reports for subsequent diagnosis in the laboratory.

Target

An evaluation at the end of the pilot project revealed that the farmers and the CKWs valued the on-demand aspect of the mobile services. One CKW from Mbale pointed out that even though farmers can get weather information from the radio, those reports only come at a certain time and could be easily missed. The phone, however, is 'a direct pipeline to information', which can be accessed at any time.

Similarly, the farmers appreciated the breadth of market data, which covered prices from several markets across the country. Previously, local radio announcements were limited to nearby markets and depended on other farmers providing the information. This

Community Knowledge Workers phone applications

The CKWs could access seven different information services from their mobile phones:

- **Google SMS Farmer's Friend**
  A database of locally relevant organic tips and advice, plus a three-day and seasonal weather forecast. The CKW can search the database through codes sent via SMS. Developed in partnership with MTN Uganda, Google and local NGO BROSDI, (see the feature on BROSDI in ICT Update issue 38 http://ictupdate.cta.int/en/Feature-Articles/New-crops-from-old-PCs)
- **Google SMS Trader**
  A user-generated trading bulletin that provides farmers with the contact details of traders and vice versa through SMS posting and notifications. Developed in partnership with MTN Uganda and Google.
- **AppLab Question Box**
  CKWs can phone this service to speak to an operator with access to an internet database and expert agricultural advice from the nation's leading research institute. Developed in partnership with US-based NGO Open Mind and Uganda's National Agricultural Research Organisation.
- **CKW Search**
  A series of forms, presented in Java, guides the user through a menu to search for agronomic techniques for banana and coffee production. Content provided by Uganda's National Agricultural Research Organisation, Uganda Coffee Development Authority, and the International Institute for Tropical Agriculture (IITA).
- **Input Supplier Directory**
  An SMS-based keyword search service that gives the location and contact details of shops offering specific agricultural inputs, such as seeds, pesticides and fertilizer. Content provided by Uganda National Input Dealer Association.
- **Banana Disease Control Tips**
  Pre-loaded HTML pages show control measures for specific banana diseases. Content provided by IITA.
- **Market Prices**
  An SMS-based keyword search service that gives retail and wholesale prices for 46 commodities in 20 markets. Information provided by FIT Uganda, a local market price provider.

For more details see the TechTip on page 11

GRAMEEN FOUNDATION

was often seen as unreliable by the famers, as they questioned the motives and reliability of the sources.

The project team also learned that CKWs used the mobile services to compare answers, give more complete information, or provide information covering multiple steps in the agricultural cycle. They could, for example, get post-harvest handling tips for coffee as well as check coffee prices in different markets. After advising clients on disease control methods during a survey, CKWs could use the mobile information services to give farmers information on how to establish new crops to supplement their income while they waited for their plantations to recover.

The team evaluating the project also polled farmers to compare the information provided by CKWs with that of existing agricultural extension services. Farmers unanimously answered that the CKW method was far superior, with many farmers saying that their local agricultural extension officer had never personally visited their farm to collect information or give advice.

Furthermore, most farmers interviewed did not know how to contact their local agricultural extension officer. This finding highlights the importance of the CKW outreach method, in which extension is carried out through trusted community members that villagers can find to ask advice in the local market, village or at a social function.

The CKW also acts as an interpreter for those farmers who do not speak English, who have lower literacy levels, who do not own phones, and who are less familiar with how to use services on their phones. And the CKWs are able to travel to farmers who, because of a lack of mobility due to age, disability, or lack of resources, are isolated in their villages and generally have little access to information.

Inclusive

The short length of the pilot meant that it was not possible to measure the impact on crop productivity or famers' incomes. But it was clear from the project evaluation that there is great potential for the initiative to serve female farmers in particular. Fewer female farmers have their own phones but do the bulk of work in the fields. Also, women in middle-class farming households are often left to manage farms when the men migrate to the cities to find jobs.

Based on the promising results from the pilot project, the Grameen Foundation will expand the Community Knowledge Worker Initiative across Uganda. The organization aims to build a CKW network capable of serving more than 200,000 smallholder farmers while developing a replicable model that can be used in other regions. Any expansion will, however, be integrated with the existing extension system so that CKWs strengthen the national agricultural extension framework. But Grameen Foundation has already begun working with partners to recruit, train and support a new group of CKWs, who will begin offering services in early 2010. ■

The view from above

The Seeing is Believing project uses very high resolution satellite imagery to give farmers in West Africa information on soil fertility and accurate land size.

Case study

Smallholder farmers in West Africa, and many other tropical regions, are experts in precision agriculture, and have been for many generations. Because they work on small areas of land in variable and unpredictable environments, they have traditionally relied on a wide range of tools, knowledge and information to be able to sustain their quality of life. But farmers often have only a limited view of their landscape, and will welcome any source offering a new perspective to help them in their work.

In June 2009, the Seeing is Believing-West Africa (SIBWA) project started working with six communities of farmers in the region – three in Mali, and one each in Ghana, Burkina Faso and Niger. Led by scientists at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the SIBWA team provided the farmers with very high resolution imagery (VHRI) of their land. The images are made by sensors on satellites and show a high level of detail. The images on Google Earth, for example, are VHRI quality.

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When ICRISAT acquire a VHRI, they use computer software to enhance the image, add extra layers of information and analyze the data that would be useful to the farmers – variations in soil fertility, land size and shape. Working with local NGOs and extension officers, the SIBWA team then visit the project sites to verify the information with the farmers.

ICRISAT further analyze the images using the feedback from the field research to build a database of information that they can use to develop an accurate map of each farm. SIBWA partners then translate the information into local languages and take the detailed maps back to the individual farmers, who can use them to plan and manage their crops for the coming growing season.

Indicators

Although a satellite cannot directly detect soil quality, it can record how the soil reflects light; its colour, in other words. But to get a more precise picture of soil fertility, the scientists can analyze the images when the crops are growing at their peak. The condition of the fully-grown plants can then give a good idea of the quality of the underlying soil.

The images, therefore, cannot give an exact figure for soil fertility, as in more traditional soil sampling and analysis techniques, but VHRI gives an accurate picture of relative fertility across the landscape, rather than just the results from a few sample points. While a single VHRI image costs between US$ 1000-1500, this method of analysis is often still cheaper than visiting every individual farmer's field and sending a comprehensive set of soil samples to the laboratory.

The cost of satellite imagery has decreased rapidly in recent years as more sources have become available, but SIBWA used images and data from two other ICRISAT research programmes. The technology and data was already available, but they had not been brought together and applied to the issues affecting small-scale farmers before.

With this overview of the soil quality, farmers can organize the distribution of fertilizer throughout their fields and plan which crops should go in which areas. Many farmers also do not know the exact size of their land, but the SIBWA team worked with the farmers to determine the area of each field. The farmers can then use this data to calculate the precise amounts of seeds, pesticides and fertilizers they need to buy.

Knowing the size and shape of fields can also help rural communities to plan for future developments and investments and if, for example, the land is suitable for mechanization. Small and fragmented fields, and fields with an awkward shape, are difficult to work with a tractor or even animal traction. There is a minimum size above which it becomes cost-effective to use a tractor and it is a simple process to determine that from the image before the community invests in any new equipment.

Another advantage of VHRI is that it shows the direction of furrows on the field and areas where farmers use contour tillage, which is when farmers plough a ridge along the contour lines of the land. Farmers use this method to encourage water infiltration and reduce soil erosion. From the satellite imagery, farmers could monitor whether they were following the contour lines accurately and efficiently. SIBWA involved local NGOs specialized in technology and extension services in each community to help farmers make use of the available data.

After only six months since the start of the project, it is too soon to see the benefits, but the team expects that the farmers will consider the data when planning for the new growing season. SIBWA looks forward to a time when farmers routinely use information from VHRI. That may be in five or ten years time, but the images, data and analysis techniques are already well developed, and the results are clearly valuable to small-scale farmers. There is no reason why they should have to wait so long. ■


DATADYNE

From the web to the phone

In Chile, the Mobile Information Project takes advantage of the growing ubiquity of mobile phones to deliver agricultural information from the web directly to farmers.

Case study

Susana owns a small farm a few hours away from Santiago, Chile. Despite her proximity to the capital city, she doesn't have access to the internet or to relevant news updates. But she does have a mobile phone. Today, across the world, people like Susana are walking around with miniature computers in their pocket; even the cheapest mobile phones have formidable processing power. And the Mobile Information Project (MIP) takes advantage of this fact to provide farmers with the information they need.

DataDyne, a not-for-profit organization based in the United States, developed the MIP software. The program organizes searchable content from the internet into news feeds (RSS) and then passes that content on to farmers via SMS messages. The program designers developed the system to work smoothly on simple, low-cost mobile phones, and to operate effectively even over slow networks with intermittent connectivity. Most prepaid mobile users in developing countries have these types of phones and often only have access to lower-quality networks.

Since early 2009, we at DataDyne have been working with a cooperative of agricultural producers in the Cachapoal Valley, two hours south of Santiago, Chile, on a project called DatAgro. The cooperative, called Cooperativa Campesina Intercomunal Peumo (Coopeumo), is made up of 346 small-scale farmers, the majority of whom work with maize, but who cultivate other crops as well. The region is recognized for its good soil quality and suitable climate, and the local economy relies heavily on agriculture and related industries.

Choice

However, it is an enormous challenge to increase agricultural productivity. This is largely due to the lack of government support for small-scale farmers in the region, who do not have the same resources as the large agro-industries. To be more competitive, small-scale farmers need support to enhance their productivity levels and to enter export markets.

In particular, farmers need timely information on emerging weather patterns for their region, along with

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information on farming inputs including soil conditions, the quality of seeds, market prices, local infrastructure and global pressures. Studies carried out in 2008 showed that the majority of Coopeumo's smallholder farmers consider an internet connection as essential.

Improved access to specific market-, technology- and climate-related information, along with cultivation advice, would make farming easier and more productive, and help farmers make better-informed decisions, such as what to plant and when. And, while it may take some time before the internet reaches Coopeumo's farmers, the MIP software delivers the same information directly to their mobile phones.

Coopeumo farmers now receive details on weather, news, sports and more via SMS messages. The information comes from several sources. Two of our partners, UNESCO and the Fund for Agrarian Innovation, create messages based on work they have already done, but which they were not previously able to share with the community. The *El Mostrador* and *El Mercurio* newspapers also send up-to-date news to the system that can then be forwarded to farmers. And users can customize which message feeds they subscribe to, and can rate the messages they find the most helpful.

In less than a year, the DatAgro service has already had success with the Coopeumo farmers. One member, Hugo Tobar, says his entire crop for 2009 was saved by an SMS message from one of our partners. Just before he intended to plant, he received a message that urged him to wait because of impending bad weather.

Thankfully, he did wait, because for the next week there was torrential rain that would have washed his seedlings away. Hugo's story demonstrates how a little bit of timely information can help farmers plan and quickly adapt to changing circumstances.

'Our farmers can now find information about supply prices, product prices, the weather, and what's going on in international markets,' says Ricardo Danessi, executive manager of Coopeumo. 'That's important, because today, everything that goes on outside Chile also affects us. When there's an excess of production in one place, the prices go down here. Or when there is a sudden disaster or catastrophe somewhere else, the prices improve here. When demand goes up in China or India, the prices here get better. Everything is related in this connected world, and small-scale farmers aren't left out of that reality.'

Opportunity

Now more than ever, there is a strong focus on connecting communities to digital information. Internet connectivity rates are rising slowly, but mobile penetration rates are increasing rapidly across the world. Mobiles, therefore, provide people living in rural communities with the opportunity to access information.

The main challenge lies in being able to provide the right content for each individual user's needs. Further complicating this is the need to be able to send information without requiring a human editor, who will bottleneck the process. In other words, MIP has solved the challenge of sending information from the internet via SMS messages; we now need to ensure that the content sent is valuable to the user.

Another limitation is that text messages transmit a maximum of 160 characters. This makes it difficult to ensure that SMS messages contain useful information. Even when a system chooses relevant information successfully, there is no guarantee that the first 160 characters of the message will accurately convey its meaning.

The farmers have stressed the importance of the information they receive and the convenience of the MIP platform. The project is now expanding beyond the beta testing stage, and we are working with local partners to continue and expand DatAgro. MIP technology can also be used for applications besides agriculture. Currently, it is being used in a joint project with the Pan American Health Organization to send messages about the management of childhood illnesses to doctors and nurses in Lima, Peru.

Basic, low-end mobile phones are the main point of access for information for impoverished communities across the world, but they seldom have access to the internet because of the high cost of access. Almost all mobile phones can, however, receive SMS messages, which can be used to provide farmers with agricultural information that can be used to improve productivity and their businesses. The challenge is to develop a reliable and scalable way to send relevant, internet-based information by SMS messages. There is a huge opportunity to reach a large number of people with basic, but essential, information via their mobiles. ■

Related links

Mobile Information Project
MIP is a tool for creating news channels on even the most basic mobile phones. Using the program, organizations can route RSS feeds to SMS messages and reach a variety of people with targeted messages.
➜ **www.datadyne.org/programs/mip**

DatAgro
The DatAgro project takes advantage of the high penetration rate of mobile phones in Latin America to allow rural farming cooperatives in Latin America, beginning with Chile, to define the types of information most critical to their lives and livelihoods and receive it via text messages.
➜ **www.datadyne.org/programs/mip/datagro**

Cooperativa Campesina Intercomunal Peumo Ltda
Coopeumo rural cooperative works with around 400 small-scale farmers, in four counties of the sixth region of Chile. The farmers grow mainly fruit, including avocados, oranges, lemons and grapefruits, and cultivate vegetable and cereal crops such as maize.
➜ **www.coopeumo.cl**

Susana learns how to use the DatAgro phone application


DATADYNE

Customized information

Nokia Life Tools delivers customized information to farmers in India and Indonesia based on their location, language and crops. The company hopes to expand the service to Africa in 2010.

Case study

As a result of feedback from users in rural areas, the mobile phone manufacturer Nokia has developed an information service to provide farmers with agricultural advice, weather forecasts and market data. The company developed the service, known as Nokia Life Tools, after a consultation with users who said they would be interested in a service that delivered up to date, relevant information directly to their mobile phones. They were willing to pay a small subscription fee for a service that provided information to meet their specific needs.

'Most farmers, and other people living outside the main urban areas, are very comfortable using mobile phones,' says Hemant Madan, director of product and portfolio management in emerging markets services at Nokia. 'As the penetration rates of mobiles increase in non-urban areas, we have to serve the needs of consumers and this was the service that many people were demanding.'

The service was tested in one state in India in early 2009, then expanded as a commercial enterprise the following June to provide agricultural information to customers in 18 Indian states. It was then launched in Indonesia in November that year.

Farmers in India pay 60 rupees (US$1.30) per month and receive automatic updates every day. When a farmer subscribes, which can be done directly from their mobile phone, he or she gives their location, which crops they grow and their preferred language. 'We are able to get the location information either from the network data or by asking for the postal code,' explains Hemant. 'Based on that, we can ask the customer which crops they are interested in. We have a database of all the crops that grow in the country and which ones are relevant to a particular postal code.'

The user gets a filtered list of crops to choose from – up to a maximum of three – and then selects from a list of 11 languages for customers in India. In Indonesia, the service is provided in Bahasa, the most common language. The service starts to deliver the daily information directly to the application on the customer's mobile phone. The messages are sent via the SMS network because that system has the widest reach, including to rural areas, but they do not arrive in the phone's usual SMS inbox. Instead, the customer reads the details from the menu of the Life Tools application, which uses Java to display the text in easy to read forms and tables.

However, the service is currently only available on 11 phone models produced by Nokia, but the company continues to expand the range of compatible devices.

Applicable

Farmers have responded well to the service. Most appreciate the fact that the information is customized to their location and crops.

The information provided by the service is also relevant to the season and to the stage of crop growth. Getting the information at the right time – on how to protect a crop, which crops to grow in that area, how to treat the soil between crop cycles – helps farmers to make the right decisions about what to plant and when, and to reduce losses and optimize income. But a lot of work goes on behind the scenes to provide this level of personalized data to every subscriber.

'For the agricultural service in India alone, we handle about 10,000 pieces of information a day,' says Hemant. 'Government agencies and businesses supply the raw information. Another partner company then processes the details, tags each piece of information with location or crop, and an editorial desk translates that into news feeds which are then matched to the subscribers' profiles.'

'For example,' adds Hemant, 'a farmer in the Indian state of Maharashtra who grows potatoes would get the price of potatoes from the three most relevant nearby markets, rather than the price from somewhere far away like Delhi. But for a farmer growing flowers, it might well be interesting to get the prices from a larger city market that sets the prices for the rest of the country. From the information we gather, we are able to determine the most relevant markets for the crops that the farmers are growing and provide the information accordingly.'

As well as the agricultural service, Nokia Life Tools also offers an education service, which provides English language learning, general knowledge and exam preparation tips. And there is an entertainment service giving news, astrological reports and sports coverage. Nokia is currently looking at ways to expand their service and hopes to introduce it to more Asian countries, and into Africa, later in 2010. ■

Related links

Nokia Life Tools
➜ www.nokia.co.in/explore-services/nokialifetools

Nokia Life Tools agricultural service
➜ www.nokia.co.in/explore-services/nokialifetools/main/features

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Crop management advice

There are several services which farmers can directly access to help them to maintain their crops and get the best from their products at harvest time. Featured here are Farmer's Friend, available via SMS and on the web, and infonet-biovision, which farmers can access from the web or on a CD-ROM.

Farmer's Friend

Farmer's Friend was of the services used to answer farmers' questions in the Grameen Foundation's Community Knowledge Workers (CKW) initiative [see page 4]. From the range of applications available to the CKWs, this was the most popular as users received instant, practical answers on a wide range of topics.

The service is not restricted to the project, however. Anyone can search the Farmer's Friend database of agricultural information by sending an SMS message with a short question or a few keywords. The service then sends back an SMS with the answer. Although the SMS service is currently only available in Uganda, farmers living elsewhere can access the service from the web.

The search process

From the web: Enter the following address into your browser:
www.google.co.ug/mobile

Type the question or keywords into the search field and click the 'SMS' button. The answer will appear in the screen area of the mobile phone image on the right.
From a mobile phone: To access the SMS service, you need a mobile phone with text messaging functions. The service is currently only available via MTN Uganda and costs 110 Ugandan shillings (approx: US$0.05) for each SMS.

To request information, start a new message, type in the question or keywords and send it to 6001.

Searches should be as specific as possible. Do not send a single word like 'disease'; try to mention at least the type of crop, for example: banana disease.

Or enter the name of the disease, if you know what it is, and what it is you want to know about it.
For example:
'How do I treat bacterial wilt in bananas'?

Since SMS messages are restricted to 160 characters per message, it might be simpler to request more complex information using keywords, for example: 'banana bacterial wilt treat' or 'banana bacterial wilt symptoms'.

Sample query:
Keywords: 'cabbage pests'

Reply: 'Cabbage affected by pests may show signs like: spotted, patched leaves and stems. To prevent, remove weak plants because they are easily attacked, clear the garden of rubbish and weeds which are breeding places for insects. Use clean and dry mulch without pests. Onions should be intercropped with other plants to repel cabbage butterfly, mice. Reply: 1 Aphids. 2 Loopers. 3 Snails. 4 Mealy bugs. 5 Leafminers.'

If the user thinks the cabbage plants are affected by aphids they can reply to the message by sending '1' to get more information.

Infonet-biovision

Infonet-biovision is a free online database and CD-ROM that provides practical agricultural information. It was initially developed for crops and the environment of East Africa, but it is also useful for farmers in other tropical regions.

The database contains comprehensive details on soil and water management, pest control methods and the organic management of more than 40 common vegetable, fruit and grain crops. There is also information on how to identify, prevent and cure dozens of pests and diseases.

Getting started

From the web: Open your browser and enter the address:
www.infonet-biovision.org

From the CD-ROM: Place the disc in the CD / DVD drive of your computer. It should start automatically and open at the home page.

Crops

Click on the 'PLANT' image on the left-hand side of the page. Click on 'crops, fruits, vegetables and grains' to see the list of names and images of all the featured crops, which includes avocado, cabbage, groundnut, pigeon peas and wheat.

Scroll down to find the crop you are looking for and click on the image.

The page provides background information on the crop, covering geographical distribution, common varieties, and nutritional and climate data. It then goes on to give more detailed information on land preparation and management, propagation and planting, treatment of seeds, crop husbandry, harvesting and even typical fresh produce requirements demanded by many markets.

Pests and diseases

Click the link 'pests and diseases' on the 'PLANT' page to see a range of images and names of pests and diseases found in many tropical countries, including bacterial wilt, banana weevil, late blight, nematodes and even a list of pests that affect produce in storage.

Each page contains general information on the geographical distribution of the pest or disease, brief details of its biology and life-cycle, plus photographs to aid identification. There is then a detailed explanation of how to recognize the symptoms, monitor for infection, and how to prevent and control infections, including non-chemical treatment methods.


MARIEKE VAN DER VELDEN / ILRI

The content of the database was developed by scientists and local experts in consultation with farmers who gave practical feedback on the techniques and processes described. Infonet-biovision also provides limited information on medicinal plants, fruit and vegetable processing, natural pest control methods, soil and water management, and animal husbandry. ■

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Integrating info systems

Have mobile phones replaced extension officers as the main source of information for farmers?

➜ There are certainly far fewer agricultural extension officers, either from government departments or other organizations, than there used to be, but mobile phones haven't replaced them. In fact, phones complement their work. Extension officers often don't have the very latest information, so they use their mobile phones to access agricultural services to get the most up-to-date details and pass them on to the farmer.

FINNBARR WEBSTER / ALAMY

Extension officers still have an important role to play. It can be expensive for a farmer to directly access some information services. If the extension officer already has that information, he or she can easily pass it on without the farmer having to pay extra. Farmers also often need more explanation than is provided by the information service and most prefer to have their questions answered by another person. Human interaction remains very important.

Are other types of technology also needed to deliver information to farmers?

➜ NAFIS, the National Farmers Information Service here in Kenya, conducted a study that showed the most effective way to get information to farmers is to use a range of technologies; radio, internet and mobile phones together with extension officers. Each of these information sources have their limitations: SMS can only carry 160 characters per message; the web can provide a great amount of information, but it isn't as readily available as a mobile phone. If all these technologies are available together they can complement and support each other. The farmer can then access the information in a way that suits that individual best.

For example, you can use SMS to tell people what time a certain radio programme begins. The same information broadcast in that radio programme can be made available through a telephone dial-up system, plus the audio and text can be put on the web. Print publications are also needed as farmers can keep them and access them when needed, while voice services can reach people with lower literacy abilities or who would prefer their information in another language.

Would one farmer access all of these information sources? Or is each type of technology targeted to different people?

➜ Farmers use different services for different things. SMS is very useful for delivering market information; the farmer can easily see, for example, the price of beans at the nearest market. 160 characters are enough to provide that information. But if the farmer wants more detailed information then he or she would probably have to use one of the other methods.

What future developments can we expect?

➜ I think more services will be speech-based because voice is the natural way to communicate. Mobile phones are popular because people can communicate on a one-to-one basis through speech. The hardware and the programming technology aren't available yet, but major manufacturers and researchers around the world are working on developing efficient and cost-effective technology that could deliver speech services. Storage systems already exist that can cope with the large amount of data that these services would need, and data transfer systems are already fast enough to deliver them to mobile phones, for example, so it might not take too long to develop such services.

Will farmers still use mobile phones to access their information?

➜ I think they will, yes. It is interesting to see that the only piece of technology in many rural households, apart from a radio, is a mobile phone. And the phone is becoming even more important for the simple reason that it is easier to carry than a radio. In fact, many mobile phones also have a radio so people are already carrying both technologies in one device.

Farmers are comfortable using their phones to get market, weather and other information. A phone is easier to use than a computer, cheaper and more easily accessible. The internet is also increasingly available on phones, and while it is expensive now, I think that will continue to expand. And, as researchers develop more services to bring information from the web as speech, I cannot imagine that farmers will prefer to carry a computer than a phone to their field. All these technologies are naturally converging to fit into a mobile phone. Phones have radio, text, internet, cameras, as well as audio and voice capabilities, and I am convinced that speech will become the dominant service in the years to come. ■

Related resources

National Farmer Information Service
NAFIS provides agricultural and livestock information to Kenyan farmers via the phone and on the web.
➜ **www.nafis.go.ke**