m-Serving Indian agriculture

The author explains the thought process behind one of Nokia's upcoming application which will, among other things, give farmers access to localised and timely information without depending on GPRS

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China and India, the two most populous countries in the world, are both experiencing economic growth despite differences in the geographic distribution of their workforces. While majority of the Chinese now live in cities, India is still a predominantly rural society, with nearly two thirds of the population being rurally based. According to an estimate dating to 2006 (FAO database), agriculture is the main source of income for 58% of the Indian workforce.

Despite constituting a major source of income and an important area of export, several challenges characterise the farming practices of today's India. To name just a few, the government is experiencing difficulties in disseminating information regarding novel farming techniques and best practices in a country which is multilingual and divided into nearly three hundred agro-climatic zones. The market prices are not readily accessible to the farmers and further, the middle man is perceived to take a marked cut of the profits generated by sale of the agricultural produce.

In several cases, the crux of the problem lies in how to connect an individual farmer to other parties for better access to information or increased possibility to co-operate, be it other farmers, the local co-operative, the market place, or the government. Information should flow between the relevant stakeholders so as to effectivise the production process. With the mobile phone penetration increasing at a phenomenal rate in India, several players have turned to mobile technology as an answer to some of the challenges faced by the farmers. The national teledensity is reaching a very high level and the rural consumers are taking up mobile telephony at a fast pace. Hence, an increasing proportion of individuals in the

agricultural ecosystem have lately become users of information and communication technology (ICT). While the uptake of the PC and fixed Internet has been sluggish, the exponential growth of the mobile phone user base has led to a situation in which mobile Internet based information can reach the urban and rural masses and provide unforeseen utility across a range of verticals, including farming.

There are many recent examples of delivering information residing in the 'cloud' to farmers via mobile phone. Companies including IFFCO, Airtel, Reliance Communications, as well as Reuters have generated services delivering e.g. mandi prices to an individual farmer. Nokia is launching a global service in the first half of 2009 titled Life Tools, and one of its aims is to provide information and tips to the farmers. Life Tools provides information to the farmer that is relevant across the whole farming cycle, ranging from sowing to growing to harvesting to selling the produce. Nokia Life Tools has an icon-led, graphically rich interface. Presentation of information in tabular formats and the capability to display two different languages simultaneously on the same screen enhance usability. This service is designed to work wherever you can use a mobile phone without any hassles for settings or the need for GPRS. Behind the intuitive, rich Nokia Life Tools interface, updates are sent over SMS without the consumers even realising it.

Identifying long-term opportunities in agricultural mobile services

While several companies, including Nokia, are launching commercial products in the area of agricultural mobile Internet services, it is also important to adopt a long term perspective so as to be able to

Market Prices
Potential to earn more with regular updates of locally relevant market prices.

Weather
Plan your work better with daily updated local weather forecasts.

Input Prices
Spend wisely with information on relevant seed, fertilizer and pesticide prices.

News & Tips
Manage your work better with tips and information on the latest agricultural techniques and news.

Nokia Life Tools is a range of Agriculture, Education and Entertainment services designed especially for the consumers in small towns and rural areas of the emerging markets. Aimed at providing timely and relevant information customised to the user's location and personal preferences directly on their mobile devices, Nokia Life Tools is the first step towards bridging the digital divide.

identify new opportunities in this area. Nokia Research Centre (NRC) is a globally distributed research organisation conducting exploratory research focusing on what might be viable 5-10 years from now. The focus of its Bangalore-based unit is to investigate mobile growth opportunities concerning India and emerging markets in general. The setup is multidisciplinary, consisting of social scientists, designers and technologists. The mission of the research group is to investigate the extent to which mobile technology can improve the wellbeing of Indian consumers and communities. Nokia designs concepts that are grounded on understanding of user needs and we aim to take the concepts to the prototype level, so as to assess the impact of the technologies on the communities.

A project titled *Kisan* investigates the role of mobile technology in empowering farmers in an emerging market context such as India. During an initial phase of the project, our researchers set out to Karnataka and Maharashtra to study the everyday agricultural practices. One of the research questions was related to what kind of information is relevant to the farmers across the various stages of the farming cycle. The following table describes the summary of the information needs, as discovered by our researchers with the help of interviews and observations.

As can be noted, the type of information needed ranges from binary (e.g. weather forecasts) to highly complex (communicating about global trends in agricultural trade) and the source of the information varies from local to global. The long term research challenge is to create services that are highly personalised and location specific, taking into account the agro-climatic conditions, crop portfolio and aspirations of the particular farmer.

From competition to co-production

One of the main findings of the Kisan user study was the underlined importance of locally based collaborations. The most significant form of information dissemination among those studied was day-to-day social interaction among local farmers. Information and tips were exchanged as part of casual social encounters and the trust placed in connections concerning one's social network played an important role. A piece of information stemming from a local acquaintance was often valued more than that received from a government run agro-advice centre.

Another factor that emphasised the importance of locally based social interaction was that local farming communities are highly co-operative, up until the point when the produce is sold. Information is exchanged freely during the sowing and growing phases and recommendations are provided without hesitations. A term that describes this behavioural pattern well is co-production. The weather conditions, soil type and types of crops grown are to great extent the same between members of the local farming communities. Hence,

Stage	Information needs
Plannng	Weather patterns - monitoring and early warnings of upcoming changes. Availability (and pre-booking) of labour. Market Trends that help plan the next crop/s.
Growing	Information on current agri-technologies and best practices for optimising produce. Location-specific advice for precision farming. Pest alerts and information - early warnings and detection; advice and recommendations on preventive measures, damage control. Tracking and managing resources (individual and collaborative).
Selling	Access to market prices and trends for local, national and international markets. Transportation logistics. Storage and warehousing possibilities.

Kisan study conducted by NRC India revealed that information related to farming was exchanged on daily basis, as part of casual social encounters. Instead of replacing such behaviour, is it possible for ICT to supplement this information exchange ?

Challenges in the design of agricultural services

The above sections have been concerned with highlighting the opportunities associated with using mobile forms of ICT to empower Indian farmers. The main argument is simple – since the mobile phone has become ubiquitous, even in the rural parts of this country, why not disseminate information and enable new forms of communication within the agricultural ecosystem with the help of mobile services? The challenges lying ahead are significant, however. From the perspective of the farmer, the user interface needs to be intuitive and support the local language.

India is characterised by low literacy levels - is it possible to move toward less textual user interface solutions, such as voice based interactions? From the point of view of the farming practices, will mobile technology be accepted as a new source of information, alongside the age-old practice of social exchange and face-to-face interaction? Will it only be the progressive farmers who adopt these new types of services or will we witness a wide scale adoption of agricultural mobile systems, across socio economic categories and geographic regions of India?

Regardless of the answers to these questions, it is clear that wireless communication has an advantage over the PC based systems. The wireless infrastructure is well developed across India (as opposed to the infrastructure supporting fixed Internet) and mobile telephony has been widely accepted by the rural population. These factors act as important enablers in the mission of empowering rural India with affordable and relevant mobile services. ∎

the information received from a local colleague is relevant and it makes a lot of sense to co-produce rather than compete. The opportunity, when it comes to designing novel types of services for this context, is related to harnessing this locally based social capital. Could we design mobile applications that disseminate information between users' mobile devices, during face-to-face encounters? Could we design communication solutions where local farmers can exchange tips, share resources and even collaborate when it comes to selling the produce?

India launches Agricultural Wikipedia

Indian scientists have launched an 'Agricultural Wikipedia' that will act as an online repository of agricultural information in the country. Indian Government initiative called 'Agropedia' was launched on 12 January 2009. The project called Agropedia aims to disseminate crop and region-specific information to farmers and agriculture extension workers.

Agropedia will also provide information for students and researchers. Currently, the website contains information on nine crops, including rice, wheat, chickpea, pigeon pea, vegetable pea, lychee, sugarcane, groundnut, and sorghum. Agriculture researchers will continuously add and validate the content by using open source tools as used in Wikipedia. The website will also contain blogs and forums on agriculture to exchange knowledge. The portal will help to communicate agricultural information and research findings to farmers, students and researchers. The INR 85 million project will be implemented over the next 30 months and is backed by the National Agricultural Innovation Project, a six-year government programme intended to modernise agriculture. The funding for the project is provided by the World Bank and the Indian Government with other six Indian agricultural and technology institutions partnered in the project to provide
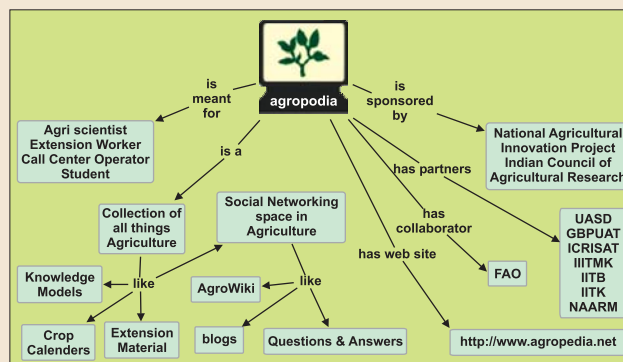
information and technological expertise. In the initial stage, the project will develop a mechanism to manage the vast repository of knowledge and later on it will develop ways to disseminate the knowledge.

While launching the project, V Balaji, Head of Knowledge Management and Sharing with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), a partner in the project, stated that it is hoped that even where farmers do not have no access to the Internet, the Agropedia information can be used as a basis for radio plays also.