ICTs role in improving market access for small scale farmers

Small scale farmers in developing countries are often characterised by their spatial dispersion, and lack of organisation into farmers organizations. These factors bring them to a situation in which they do not produce sufficient quantities to meet demands of large buyers, they lack of bargaining power and skills, they lack of information about the true value of their products, and they travel long distances in the uncertainty of finding a market for their production. The uncertainty of income and repeated failures in selling their products at a profit can cause the unavailability of capital to buy farm inputs such as fertilizer, pesticides, and improved technologies leading to a decrease in production and product quality. Small-scale farmer thus enter poverty cycles as a consequence of poor market access.

ICTs for improving market access for small scale farmers can be grouped in those establishing a market information system and network for transaction security and others to facilitate traceability of agricultural produce.

Recent development projects have been using ICTs as the means to reduce the asymmetry in information among the market players and to create linkages/networks between the actors in the chain that ultimately benefit small scale farmers. Many of these projects have in common the use mobile phones to make information on prices arrive to the small-scale producers. This is usually done through intermediaries that post the information they receive by SMS on information boards and thus make this information available to farmers. In countries where mobile phones are widely spread and SMS are less costly SMS are directly sent to producers.

In these pilots, sometimes focussed on pilot regions only, the degree of integration of the different actors in the market chain and the form in how the services are established varies, though. Public funded projects based on one-to-one applications have shown good results during project phase but show problems of sustainability when project funding phases out, the public sector does not take over funding and expectations of producers are to receive the information free.

The Rural Knowledge Network (RKN) pilot project in East Africa jointly with related initiatives for market access (First Mile) address this issue by integrating all the actors in the market chain in a way that would provide all of them a profit margin. Linkages are not made by “employees” of public institutions or NGOs, but by local enterprises and entrepreneurs.

The commercial partners in the network are: Information Board Managers (frontline market intelligence service ate the producer level), Market Access Companies (local market brokering service), Transaction Security Brokers (business counselling and brokering service), and a National Marketing Company (service for transaction security and R&D on markets and business operations). Together this network collects market intelligence; share good ideas, experiences, lessons; act as broker in deal making, linking input suppliers to technical and financial advice; explore new crops, new markets, and new value addition; convene key player collaboration and a negotiation table; and organize the collection produce, bulking and distribution.

The business models foresee that all the actors charge fees or take commissions for their services that include relevant information and knowledge provision on markets to
producers/sellers and on produce to potential buyers and transaction security services. The model works when the network covers a large scale, sources high volumes at low margins.

Given the existent network and the role of each type of player, different communication forms were established using diverse information technologies. SMS and web based communications (through laptop with SIM-card enabled modems) are used for information exchange between markets enumerators, Information Board Managers, and market access companies at regional and national level and supported by mobile payment systems; internet platforms enable brokerage, advising, business-to-business learning, and lesson learnt documentation and sharing; telephone and e-mail facilitate one-to-one communications.

The challenge in building such a system focusing on pro poor business development is the start up-capital. Most rural actors cannot afford to buy ICTs, and microcredits are often not available for such technology at suitable conditions. Additionally pre-commercial efforts are required in order to identify the possible commercial relationships and forms of business. Initial public or project investments are needed, to provide training and mentoring to entrepreneurs, to provide lease and rental services through a network platform and for pre-commercial efforts.

**Traceability challenges for small farmers and the ICTs role in providing solutions**

Traceability is defined by the International Organization for Standardization (ISO) as the “ability to trace the history, application, or location of that which is under consideration.” This definition is quite broad not specifying a standard measurement for “that which is under consideration” (a grain of wheat or a truckload), a standard location size (field, farm, or county), a list of processes that must be identified (pesticide applications or animal welfare), or a standard identification technology (adapted from USDA).

Some regions in the world like the European Union have made traceability compulsory within their borders. From January 2005 the regulation 178/2002/EC requires food and beverage manufacturers to trace products throughout the production cycle. These regulations usually only aim at allowing easy recall of products that are have shown some safety hazard rather than directly preventing food safety risks. However, some private initiatives go further and incorporate detailed information on the process of manufacture of each product. A traceability system for fair-trade coffee would extend only to information on price and terms of trade between coffee growers and processors. For some health hazards, such as Bovine Spongiform Encephalopathy (BSE, or mad cow disease), ensuring food safety requires establishing safety measures at the farm. For other health hazards, such as food borne pathogens, firms may need to establish a number of critical control points along the entire production and distribution chain (adapted form USDA).

These traceability schemes not only defend retailers from potential risks, but they also differentiate and market foods with subtle or undetectable quality attributes. This creates a market protection system in an open market system that protects large corporations with high levels of organization and economies of scale.
On the other hand, small-scale unorganised farmers are blocked from gaining access to international markets, as to the already known problems of small-scale farming accrues the need to register data on traceability and being able to pass it along the chain.

ICT solutions have been trying to address the needs for information collection, storage and transferability brought about by the different traceability requirements. These solutions range from simple electronic coding systems, that provide an identification code to each product on a barcode system, to complex information storage on manufacturing procedures, which georeference the provenience of the inputs by field plot and have functions to provide information to support appropriate farm tasks such as application of pesticides and fertilizers. These can also use of cutting-edge technologies like radio-frequency identification systems (RFID).

An example of an advanced traceability system is described by Sugahara (2007). In this system the production record system uses Internet-enabled mobile phones and the distribution record system uses RFID tags and readers. Finally there an information disclosure system for consumers on the internet, so that the consumers that purchase these products can browse a product's data by entering the product's ID on a website.

Using mobile phones that access a web server, farmers can easily input their production process data such as farm activities and material applications (pesticides, fertilizers, etc.) on their cultivated fields during outdoor work. Unique ID numbers are given to products and ID labels or tags are attached to them. RFID technology is used to identify individual products and record their transit data in the distribution process more efficiently and quickly. IDs of RFID tags are registered and related to the production data on the database in advance. Before the shipment of the products, these tags are attached to a product lot such as a package, box, container or pallet. Finally, the users can browse the data on the individual products via the Internet, by reading the RFID tags, barcodes or ID number adapted from (Sugahara, 2007)

The description above makes clear the disadvantage that traceability requirements can bring regarding the competitiveness of small-scale farmers in developing countries, that will not be able to penetrate into market in which consumers demand for a high degree of information disclosure.

ICTs development, and local agents network and capacity building projects, will have to resolve the issue of adaptation of traceability systems to farmers that have neither the financial nor the knowledge means to adopt them. Farmer communities working in fair trade or organic farming certification systems could serve as pilots, as they are familiarised with data collection and standards compliance. The centralization of information and service provider level along with the use of mobile phones for data registration on the field can be a possible approach.