



## USING ICT TO PROVIDE AGRICULTURE MARKET PRICE INFORMATION IN AFRICA

### INTRODUCTION

This briefing paper on ICT applications that provide market price information to those within agriculture value chains is one of a series of papers to help USAID missions and their implementing partners in sub-Saharan Africa use ICT more successfully to improve the impact of their agriculture development projects.<sup>1</sup>

Market price information, also known as MIS, (including commodity prices by crop, by market, as well as wholesale and retail prices) helps actors in agriculture value chains make informed decisions that promote efficient production and trade. It is especially valuable for producers that sell in local and regional markets. Such crucial information helps these producers to negotiate with traders, determine what markets to sell to, store their crops until prices increase, or even plan future crops.

Companies interested in providing market price information services face challenges—upfront investment costs can be high and on-going expenses can be significant to keep information updated by trusted enumerators for timely and accurate commercial prices. A company that depends on individual subscriptions or transaction fees may lose money because individual users can easily share the information. It is critical for the service provider to select a business model to allow it to break even or, ideally, make a profit so the service can sustain itself and be scaled to 1,000s if not 100,000s of farmers. Governments may

<sup>1</sup> ICT means information and communications technologies including cell phone and Internet services, radio, and a wide range of digital devices and related tools including cameras, GIS, and a wide range of hand-held computing devices.

choose to subsidize the service—or the basic service for certain users—and other services may be offered on a fee basis. Development organizations can and do work with companies to share the risks and development costs of such services and adapt their business models to make them sustainable and scalable.

### USING CELL PHONES ALONE

Before focusing on ICT applications that can make market price information easier to obtain, it is important to understand the potential of cell phone communication by itself as an effective means for producers and traders to learn market prices. Although some subscription-based market information services can be more efficient, it is important to understand the impact of an “organic” approach for producers, traders, and other market actors to receive market information, especially given how elusive sustainable and scalable business models for subscription services have been in sub-Saharan Africa to date.

Several documented examples exist of the impact of traders and farmers simply using mobile phone technologies on their own to exchange price information. In Kerala, India, a study found that mobile phone coverage alone led to significant market efficiencies: the difference in prices across markets declined, as did waste; fishermen’s profits increased by 9 percent and consumer prices declined by 4 percent.<sup>2</sup> In Niger, a similar 2010 study of the effect of mobile phone service penetration on grain prices found

<sup>2</sup> Jensen, Robert T., “The Digital Provide: Information (Technology), Market Performance and Welfare in South Indian Fisheries Sector,” *Quarterly Journal of Economics*, 122(3): 879-924, (2007)

reduced market price dispersion across markets by 10 percent.<sup>3</sup> The study also found that grain traders began trading in more markets once they had cell phones, had more market contacts, and their profits increased by 29 percent.

The Japan International Cooperation Agency (JICA) conducted a similar study of the banana market in 2009 and found that as mobile phone markets expanded their coverage in Uganda, information flows rose and banana farmers—especially those furthest from markets—began participating more in markets and their profits increased by 10 percent.<sup>4</sup>

In short, there are several studies showing that mobile phone service coverage alone can have significant impacts on market efficiencies, a finding to remember as donors consider subsidizing more formal market information systems.

### TYPES OF MARKET INFORMATION SERVICES

Examples of market price information services are presented in four categories, according to the type of provider: 1) mobile network operators, 2) third-party service providers, and 3) buyers providing market and price information to producers, and 4) MIS services offered by governments. See the box on the following page for some key prerequisites across provider type.

<sup>3</sup> Aker, Jenny and Isaac Mbiti, “Mobile Phones and Economic Development in Africa,” *CGD Working Paper 211* (2010)

<sup>4</sup> Muto, Megumi & Yamano, Takashi, “The Impact of Mobile Phone Coverage Expansion on Market Participation: Panel Data Evidence from Uganda,” *World Development* (2009)

**Some Key Prerequisites** for scalable and sustainable market price information services include:

- One or more service provider companies with a large number of subscribers in rural areas and a willingness to invest in new products and services. It may be that a partnership with a mobile network operator (e.g., a cell phone service provider) can be helpful given the operator can use this value added service to reach new customers or reduce customer “churn” (e.g., customers switching between networks).
- A network of trusted market price enumerators to provide accurate and up-to-date commercial prices for the most important commodities in key markets. This calls for an on-going system to spot check the validity of the prices by independent sources.
- A way to regularly validate that users are actually finding the service *valuable* to help them increase their incomes or reduce costs (or whatever other impact metric is chosen). Measuring value will help service providers hone the service to the most important markets, commodities, and price types (e.g., wholesale, retail).
- A business model that enable services to sustain themselves and grow either through customer fees or on-going subsidies from government or from businesses (e.g., in exchange for advertising).
- A subsidy from government may also be helpful for startup costs, on-going operations or for a specific level of service (e.g., SMS queries) or for a set of target users (e.g., in a specific area or for specific commodities). Higher end services (e.g., “pushing” prices for certain markets or commodities to subscribers based on profiles) could be on a fee basis.

## I. Mobile network operators

**(MNOs).** Given MIS is provided via cell phone, MNO’s are always involved somehow in provision of MIS (and are likely partners to any service provider), but sometimes they are the primary service providers themselves. With strong competition for market share, MNOs in sub-Saharan Africa seek a variety of value-added services to attract customers; increase the minutes they buy; and reduce market “churn” (customers changing MNOs). Some MNOs offer services that allow farmers, traders, and other users to receive price alerts, weather and crop information. This information is accessed on a mobile phone in the form of interactive voice recognition (IVR), short message service (SMS), wireless application protocol (WAP) browsing, and Web-based Internet browsing. Users pay a fee for service to their mobile phone provider. Internet browsing is only available on higher end mobile hand sets and more advanced networks (and often not in rural areas) making SMS-based services the most accessible and popular today.

CellBazaar is an example of an MNO that offers market information services in Bangladesh. It provides a mobile phone-based “virtual marketplace” that allows Grameenphone users to buy and sell any number of goods (including agricultural products) and access market price information through IVR, SMS, WAP, and the Web. The company generates direct revenues through its SMS, WAP browsing and IVR fees, and indirect revenues from phone calls made to complete transactions. One of CellBazaar’s key challenges is to teach their rural customers to use mobile phones. To do this the company has partnered with Katalyst, a local market development project, to assist with the growth of mobile phone telephony for small and medium enterprises.<sup>5</sup>

Other examples of MNO services include instances where MNOs have partnered with their governments or other organizations to provide the service, including:

<sup>5</sup> Quadir, Kamal and Naeem Mohaiemen, “CellBazaar: A Market in Your Pocket.” MIT Innovations Case Study (2009)

- A partnership among Vodacom, the Government of Tanzania and the International Fund for Agriculture Development (IFAD) for farmers and traders to access the latest commodity prices via SMS<sup>6</sup>
- A similar collaboration among mobile phone company Celtel (now Zain), the Zambia National Farmers Union, and IFAD to provide commodity prices to farmers via SMS<sup>7</sup>.

It is not yet clear if these examples will be sustainable without ongoing donor support.

**2. Third-party providers of market information services.** Some companies are taking advantage of increasing mobile phone penetration in developing countries to develop ICT solutions targeted at customers working in agriculture value chains. These companies work through mobile phone networks and Internet service providers to offer an array of services that allow producers, traders, and others to get up-to-date price information, weather alerts, and other information. The information they provide can be accessed via mobile phone telephony (voice, SMS, WAP) and Internet portals.

Although there are several examples of third party market information services in sub-Saharan Africa, perhaps the two most prominent are Esoko and Manobi, which both have affiliations with USAID-funded programs and are still working to develop viable business models.

Esoko (formerly TradeNet) began in 2005 with funding from USAID/West Africa’s MISTOWA project.<sup>8</sup> A for-profit private company with private investors (as well as the IFC), Esoko has substantially enhanced its technical platform, services offered, and business model and

<sup>6</sup> “[Inventory of Innovative Farmer Advisory Services Using ICT](#),” Forum for Agricultural Research in Africa (February 2009)

<sup>7</sup> “[Trading Commodities via SMS](#),” IFAD Rural Poverty Portal.

<sup>8</sup> <http://www.esoko.com> and Magada, Dominique, “[Esoko - the new market info system for African farmers](#),” *AllBusiness* (May 1, 2009)

is providing services based on a tiered franchise/subscriber model to several countries in sub-Saharan Africa and works with several USAID projects including projects in Ghana, Burkina Faso, Cote d'Ivoire, Malawi. The company offers three tiers of services: 1) price alerts via SMS, 2) the ability for users (e.g., a livestock association) to relay information on prices, transport, input availability and more via SMS, and 3) the ability of users to develop management information systems for their operations.

Esoko also offers trade-related Web site options for customers. It has also just begun offering an inventory management service and a service to buyers to help them manage their suppliers. This mix of related services for traders and producers as well as large buyers may provide Esoko with a solid business model to reach the scale it is targeting. Esoko employs both system developers for the technology platform and field agents who track and submit prices and recruit subscribers. Esoko estimates that it requires 10,000 subscribers overall and 2,000 subscribers in any given country to be profitable. Though the long-term commercial viability of Esoko's business model is not yet proven, it is showing promise.

Although there have been no widespread studies of the value and impact of Esoko's service, it has done some targeted surveys of farmer users who have reported being able to negotiate more confidently their selling prices and selling their harvests in more distant markets—just the outcomes development agencies usually seek.

Like Esoko, Manobi is a private for-profit company that has evolved its services, software platform, and business model over several years in an attempt to find a sustainable, scalable, and hence, profitable approach.<sup>9</sup> It has had funding from various donor projects as well. Manobi provides basic SMS-based market information systems for farmers for free. It is also targeting large buyers, has worked on partnerships with a cell phone pro-

<sup>9</sup> [www.manobi.net](http://www.manobi.net) and "Pro-Development Innovative Applications," *African Economic Outlook* (2009)

vider (Sonatel), and has developed a scheme for cards for farmers with their plots measured by GPS, as well as traceability services to meet international requirements.

Reuters Market Light is another service provided by a private sector company, Reuters Group, in India. It allows farmers to access commodity prices, crop, and weather information via mobile phones. Farmers pay approximately \$5 per quarter for a subscription to the service. There are currently more than 75,000 subscribers. Since the launch of this service in 2007 there have been more than 250,000 cumulative subscribers.<sup>10</sup> Reuters employs several hundred content professionals who provide data on crops, markets, and weather information. Reuters expects that that it may take a few more years before the company breaks even with this service.<sup>11</sup>

Google launched a third party market information service model in Uganda in 2009. Google Trader, in which Google has partnered with telecom company MTN (with initial support from the Grameen Foundation), is an internet platform and SMS service that helps Ugandan farmers and traders to buy and sell goods.<sup>12</sup> Although the cost of a normal SMS message is 110 shillings (\$0.05), it costs 220 shillings to send and receive messages using Google Trader.<sup>13</sup> It is not yet clear if Google Trader will be sustainable without ongoing donor support. It is not a price information service per se, but does aim to offer a farmer more information about markets and more opportunities to sell products.

<sup>10</sup> Case Study: [Thomson Reuters: Reuters Market Light](#). *Business in the Community* (July 2010)

<sup>11</sup> Dingra, Rajiv, "Exclusive Interview with Amit Mehra – MD, Reuters Market Light – Enlightening Farmers," *Watblog* (Nov. 18, 2009)

<sup>12</sup> <http://google-africa.blogspot.com/2009/11/google-trader-now-on-web.html> and Grameen Foundation, Google, "MTN Launch Mobile Services for Uganda's Poor," *Microfinance Focus* (July 2, 2009)

<sup>13</sup> "Beyond Voice," *The Economist* (Sept 24, 2009)

**3. Buyers that provide market and price information to producers.** A number of private buyers and exporters of agricultural products have begun investing in Internet applications that allow farmers to access market information using their cell phones and from village Web kiosks. This information includes commodity prices being offered by the company, weather, recommended farming techniques, as well inputs and other goods that are available for sale. Buyers have found that directly providing this information to producers can help them: 1) buy needed commodities, 2) achieve better quality production, and 3) enhance a market for products and services they might offer.

This category of market information service is the most likely to be sustainable and scalable because buyers are funding it themselves and have the built-in business discipline of providing only those services that accrue benefits to them and their suppliers. However, given that these services are provided by one large buyer in each case, they do not usually offer a wide array of market price information for farmers.

e-Choupal in India is perhaps the oldest example of a buyer providing ICT-enabled market information service, in this case by ITC, an international agribusiness company.<sup>14</sup> ITC began this service in 2000 to provide transparent price information to farmers and to educate farmers regarding better seeds and inputs (which it then sells to them). The system is a network of simple Internet kiosks in thousands of Indian villages (currently 6,500 across 10 states). ITC is steadily expanding its services and using its "channel" to farmers to sell related services, such as selling weather insurance. The service provides prices from two sources: ITC itself and the closest one or two government-mandated "mandis" or marketplaces. ITC finds it worthwhile to provide this information because it benefits from lower net cost of procurement and higher quality products (because better inputs are used). Farmers benefit because they increase productivity and receive

<sup>14</sup> World Resources Institute, "e-Choupal India Case Study," (August 2003)

higher prices. e-Choupal is an important example of how a large corporation can find it financially beneficial to offer a market information service that also benefits smallholder farmers.

Other examples of buyers using ICT to provide market information to producers can be seen in numerous outgrowing operations, where companies provide a wide range of information to the producers with whom they contract, including prices, planting and spraying times, procurement schedules, as well as credit. These same companies also use ICT applications to monitor their production and procurement operations with their network of outgrowers.

#### 4. Government provision of MIS.

Many governments have collected market prices and quantities available for decades for food security purposes. Prices are usually collected by government agents to track trends across months, quarters and years and have proven very useful for their intended purpose. Governments have also worked regionally to track such trends. The prices collected have not been intended to be used for commercial decisions but many governments also have begun offering them as market information services via SMS. Jamaica (JA-MIS) and Rwanda (eSoko)<sup>15</sup> are just two examples of such services. OMA (Agricultural Market Information System) in Mali is another example of such a government market price service organization that has worked with USAID projects for years.<sup>16</sup> It is not yet clear whether the information provided to farmers and market actors via these services is useful in helping them to make commercial decisions, increasing their incomes or providing them with the confidence to reach (directly or via traders) more distant markets.

Governments often see providing such market information as a public good as do many donor projects. Still it is important that when governments provide the service, they still provide the same discipline to ensure *real value* is being provided to target users and that public funds are being used to reach those the government intends to help. For example, say a government is targeting smallholder farmers. It may be that the best way to do this is to subsidize the provision of a basic SMS service with additional services provided on a fee basis to help the service become sustainable and scalable.

Governments providing such services need to confirm that the price information provided—from government agents or otherwise—is trusted by target users for commercial decisions and hones in on the information most useful to these users – by market, commodity and type of price (e.g., wholesale or retail).

To increase the probability of sustainability and scalability, governments can consider ways to provide the service as a public-private partnership or, alternatively, outsource it to third party providers to ensure that the service is provided as efficiently and with the results intended with strong incentives built in to confirm the services provided have the intended benefits.

### LESSONS LEARNED SO FAR

There are many examples of failed ICT-enabled market information initiatives heavily subsidized by donors (and governments) with no realistic plan for sustainability and scalability or any measure of the value realized. Several models may prove sustainable and scalable. For now, some lessons learned include:

- Service providers (be they for-profit companies, governments or public-private partnerships) need to focus on what *real value* is provided to target users –measuring it regularly and seeking user feedback on how to improve services. Occasional “stakeholder” workshops are probably not sufficient. Instead, service providers should employ “hard nosed” market research techniques to figure out *if* prices and information offered are trusted and useable by farmers for commercial decisions and, *if not*, how to focus services to offer real value.
- Combining services—both free and fee based— holds promise of increasing the likelihood of sustainability which can lead to the chance for true scalability to 100,000s of farmers if not millions.
- Donors may play the role of a “facilitator” to assist with startup funding. Any assistance should focus on figuring out sustainable business and technical models upfront, not simply at the end of projects, and ensure service providers tap technical platforms and business models that can be adapted from elsewhere.
- Governments and donors may decide that provision of market price services warrants on-going subsidies but such subsidies should be honed to target intended beneficiaries and any such approach needs to include on-going assessments of significant impact— or *value*—for such beneficiaries.

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<sup>15</sup> Not to be confused with Esoko, the for-profit service mentioned above, this service is actually provided using the Voxiva-Rwanda software platform which is used for a variety of other SMS-based services in Rwanda and elsewhere.

<sup>16</sup> [http://www.aec.msu.edu/fs2/mali\\_pasidma/index.htm](http://www.aec.msu.edu/fs2/mali_pasidma/index.htm) and <http://www.oma.gov.ml/>

- To make such services more sustainable, market price information can often be combined with other information valued by farmers, such as weather and information on the volume and price of actual wholesale transactions.
- No service should overlook other “channels” that may be most useful to targeted users, including radio, newspapers, and simply prices on chalkboards in markets or at farm supply stores.
- If governments provide such services “piggy backing” on prices collected for food security purposes, they need to confirm that such prices are truly useful for commercial purposes as well.
- Smallholder farmers are much more likely to be able to use market price information to decide *when* to sell (e.g., waiting for prices to increase after harvest) if they have viable ways to store their harvests with minimal losses. Hence, market price information service is probably much more valuable when combined with efforts to increase drying and storage options for these farmers.

## CONCLUSIONS

As demonstrated above, there are many examples of market actors in developing countries that are using ICT to provide improved access to market price information, including several promising examples in sub-Saharan Africa. The target should be services that can reach and truly benefit 10,000s, 100,000s or even millions of farmers, increasing their incomes and providing them with the information and confidence to negotiate better prices. The goal is not to eliminate “middlemen” but to balance the asymmetry now in access to market price information. The biggest challenge remains finding viable business models to make these services scalable and sustainable without on-going donor support. There may be good arguments for government subsidies but such subsidies should not be an excuse to forgo the discipline of ensuring the services offer true benefits for targeted beneficiaries. Luckily there are promising business models emerging that governments, NGO’s, and for-profit firms can tap.

## RESOURCES

[“Worth a Hill of Soybeans.”](#) *The Economist* (January 7, 2010)

Aker, Jenny, [“Does Digital Divide or Provide? The Impact of Cell Phones on Grain Markets in Niger.”](#) *Center for Global Development* (January 2008)

[“Inventory of Innovative Farmer Advisory Services Using ICT,”](#) Forum for Agricultural Research in Africa (February 2009)

Jensen, Robert, [“The Digital Provide: Information \(Technology\), Market Performance, and Welfare in the South Indian Fisheries Sector,”](#) *The Quarterly Journal of Economics* (August 2007)

[“Beyond voice: New uses for mobile phones could launch another wave of development.”](#) *The Economist* (September 24, 2009)

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This series of papers is supported by USAID’s Fostering Agriculture Competitiveness Employing Information Communication Technologies (FACET) project under the Financial Integration, Economic Leveraging, Broad-Based Dissemination and Support Leaders with Associates award (FIELD-Support LWA). FACET offers on-demand field support to help missions with the challenges of using these ICT interventions in agricultural development. To learn more about field support options, contact Judy Payne, ICT Advisor, ([jpayne@usaid.gov](mailto:jpayne@usaid.gov)).