



ACCESS TO INFORMATION AND COMMUNICATION TECHNOLOGY: A PRECURSOR FOR INCREASED RICE PRODUCTIVITY IN GHANA

Summary:

Information is regarded as one of the most valuable resource in agricultural productivity. This policy brief examines some modern approaches in ICT, practical uses for ICT in value chain development, lessons learned from the field, and the considerations for application in the rice value chain of Ghana. The Policy brief also makes recommendation for the establishment of special weather station with the sole mandate of providing farmers particularly rice farmers with timely and reliable information to boost rice production and reduce losses.

The brief further recommends the adoption of Virtual Trading Floors (VTFs) to bridge the gap between supply and demand of rice as well as leveraging the rice value chain to obtain optimum commodity standards.

1. INTRODUCTION

Population growth as well as rapid urbanization and growth in income per capita, has led to structural changes in consumers' behaviour and an increase in the demand for rice. This "rice diet transition" is a phenomenon, which has been observed in other West African countries in some cases as early as the 1970s (Nigeria) and started in Ghana in the early 1990s. Ghana's rice consumption has seen tremendous increase over the last two decade with per capita rice consumption rising from 17.5 kg to 38.0 kg. It is estimated that by 2018, rice consumption will grow to 63 kg as a result of rapid population growth and urbanization.

“Meeting and sustaining the demand for rice in Ghana is heavily dependent on the effective communication linkages between the various rice value chain actors and or major stakeholders”.

A research conducted by JAK Foundation on the policy priorities and need of rice value chain actors in Ghana identified access to information within the sector as one of the core needs that could stimulate growth of the sector. Information is regarded as one of the most valuable resource in

agricultural productivity.

Information and communications technology (ICT) offers a growing number of ways to exploit opportunities and address constraints to value chain growth and competitiveness. This policy brief describes some modern approaches in ICT, practical uses for ICT in value chain development, lessons learned from the field, and the considerations for application in the domestic rice value chain.

2. IMPLICATIONS OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) IN THE RICE VALUE CHAIN

With the booming of mobile, wireless, and internet, ICT has found a foothold even in poor smallholder farmers and in their activities.

Many of the questions asked by farmers including questions on how to increase yields, access markets, and adapt to weather conditions can now be answered faster, with greater ease, and increased accuracy. “Some practical ways through which ICT can and has been employed to mitigate the challenges of production, access to market and finance are discussed as follows”:

2.1. ICT Applications for Rice Production Systems Management

ICT applications for production systems management mainly aim to improve data collection, processing and reporting through simple and affordable means that help farmers/producers to make decisions that will improve or protect their revenue. Typically, information services through ICT serve four main purposes: productivity enhancement for short and long term effects, crisis management in the short term, and field risk management in the long term.

2.1.1. Short-term productivity information services

Short-term productivity information services entail providing information mainly to end beneficiaries, such as farmers, to help them improve their crop yields in the near-to-medium term, and are the most common types of information service available. These productivity services provide information that is generally quick and easy to access and use such as current or forecasted weather information, and is frequently sent out by the information provider to subscribers without much interaction between the provider and the consumer¹.

¹ FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

These services are especially important to farmers who already know and understand a great deal about their crops and farming techniques but who occasionally need timely information to improve their productivity. This kind of information, such as the exact timing of the oncoming monsoon season, is often difficult to access in remote rural areas, and without timely technical information, farmers are forced to make decisions based on rules of thumb, past experience, local rumours and instinct².

An example of the above intervention is the Project e-Sagu of the International Institute of Information Technology (IIIT) in Hyderabad, India. “Crop advice from experts using digital photos enables farmers to receive advice on planting, monitoring and harvesting crops and on pesticide and fertilizer usage based on digital photos taken by the farmers themselves”³

2.1.2. Crisis management information services

Crisis management information services essentially help prevent losses, rather than raising productivity. These services often serve as an alert system enabling farmers to react quickly before an oncoming event (often weather or crop-disease based) reaches them⁴.

Kumar (2011)⁵ reported an example of such interventions about alerting farmers about potential weather and pest disasters. Weather and pest information for farmers in Turkey is presented in Box 1.

² FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

³ http://web2py.iiit.ac.in/research_centres/default/view_area/11

⁴ FAO, 2013. ICT uses for inclusive agricultural value chains. Rome

⁵ Kumar, S. 2011. Using cell phones to reduce harvest losses. Nourishing the Planet blog, 24 March 2011.

World Watch Institute (available at <http://blogsworldwatch.org/nourishingtheplanet/using-cell-phonesto-reduce-harvest-losses-agriculture-agriculture-and-rural-development-climate-change-farmers-farmingfood-security-kyrgyzstan-nourishing-the-planet-pesticide-technology-turkey-world/>).

Box 1:**Weather and pest information for farmers in Turkey**

In Turkey, the agricultural department established five weather sites to monitor the need for pest control and frost prevention and now provides this information to farmers. Information about when pests are likely to be prevalent enables farmers to prevent possible attacks by placing pest traps and observing temperature levels. Using the information, these farmers have been able to reduce their use of pesticides by 50 percent – thus lowering expenses and improving crop productivity.

Source: Kumar (2011)

2.1.3. Long-term productivity information services

Long-term productivity information services cover topics that take longer to learn, and are often offered with other technologies and channels, such as face-to-face training or one-to-one support from local extension agents. Many such services are delivered in conjunction with long-term training, extension services, demonstrations and field visits⁶.

Benefits from these services are generally realized months or even years later. These services typically focus on education, often with a distance learning aspect⁷. They can also serve as tools for obtaining follow-up on services.

2.1.4. Risk management information services

Risk management information services are also long-term in scope and, as with crisis management services, they help farmers to avoid losses rather than increasing productivity. These types of service differ from crisis management services in

⁶ FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

⁷ A way of educating students, often through information technology, while the teacher/professor/content provider is in another location.

that they take longer to absorb and implement, and the benefits are realized much later than with crisis management⁸.

2.2. ICT for Market Access

Market access ICT services are categorised into: pricing services; virtual trading floors (VTFs); holistic trading services; and downstream administration/management. The most common services provide current market pricing for relevant agricultural products.

2.2.1. Simple pricing services

Simple pricing services generally entail a provider pushing out current market data on one or more agricultural products. Often these data are national or regional in scope, and so may not be entirely relevant for the farmer in the field, depending on his/her proximity to markets. Users (mainly farmers) generally have little interaction with the providers, and must digest the information to find and negotiate with buyers.

This service is typically the most common type of market access ICT service provided and simply replaces (or enhances) services that are often provided through print, radio or television⁹. These services offer price transparency and improved negotiating leverage for often-disempowered sellers (farmers).

Many of the more than 20 applications in the area of agricultural development facilitated by the FrontlineSMS software provide pricing information to farmers throughout Africa, Asia and Latin America. The advantage of FrontlineSMS is its use of simple, free and open-source software and ubiquitous cell-phone and laptop hardware technology. An example of these services is as described in Box 2.

⁸ FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

⁹ FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

Box 2:

Sending price information (and more) to remote, rural farmers in Cambodia:

In 2009, a team from the University of Canberra-Australia¹ helped put in place the Northwest Agricultural Marketing Association (NAMA)¹ information service in Pailin, Cambodia. The service provides price information, buyer contacts, weather information and farmer communications (e.g., meeting reminders) through FrontlineSMS software.

The NAMA service goes as far as rating good suppliers and buyers and providing information on seed and fertilizer costs. The team is now addressing the community's needs in a more holistic way through such services as providing basic health information to rural areas (e.g., health alerts and communications, and health-related information) and information to field extension agents (e.g., weather alerts and meeting alerts) through SMS messages (Fitzgerald, 2009)¹.

2.2.2.

2.2.3. Virtual Trading Floors (VTF):

VTFs are electronic market places where buyers and sellers connect over an electronic network as opposed to providing only static information, as pricing services do. The important difference between VTFs and more traditional trading floors is that the buyers and sellers do not have to be physically in the same location to make an exchange on a VTF.

Box 3:

Holistic Trading Services and Soko Hewani – the Supermarket on Air

The Kenya Agricultural Commodity Exchange (KACE), a for-profit entity established in 1997, developed the radio programme *Soko Hewani* (“the supermarket on air” in Swahili) to help users to sell and buy agricultural commodities (and to sell, buy and lease equipment). KACE reports that it can facilitate the provision of services for 13 traditional agricultural products, six types of livestock, dairy products such as eggs and milk, inputs such as fertilizer and seeds, and even fish and honey.

The matching involves not only purchasing of these products but also processing, packaging, transport of commodities, storage, grading, quality testing and finance. While the initial front-end delivery of the information is “low-tech” (via radio), there is a significant technology back-end to help the matching process. Agents of the KACE Market Call Centre use sophisticated ICT hardware and software to take in, process and respond to requests made around the clock. (Calls made after normal business hours are recorded and addressed the following day.) Each client buyer or seller pays a flat fee of KSh 100 (about US\$1.10) for each call made; no matter how long the call lasts; market clearing and other services entail additional fees. The process is as follows:

- Using a mobile phone, a client seller calls the Market Call Centre to place an offer to sell or offer lease an agricultural or other commodity, property or service.
- A client buyer on the other side of such a transaction seeking information on offers of services calls in via a mobile phone, uses the Web site through a subscription plan, or visits a KACE Market Resource Centre. Buyers can also make bids to buy or rent an agricultural commodity, property of service.

- Each call is answered by a KACE agent, who registers the information, which is entered into the main database where it can remain for up to 14 days until fulfilled. (Eventually, KACE plans to enable such enquiries to be made via SMS and not just live calls.)

KACE selects a small number of verified offers and bids for the *Soko Hewani* radio programme, which is broadcast through several local radio stations across the country. The broadcast lasts for 15 minutes each day. Interested parties call KACE back to accept or negotiate the broadcasted offer.

KACE reports the main benefits for stakeholders as:

- Achieving a better price for services;
- Saving on search costs;
- Reaching a wider audience of potential buyers/sellers;
- Avoiding exploitive intermediaries.

Source: Mukhebi (2011)¹

2.2.4. Holistic Trading Services – Virtual Trading Floors

Holistic trading services essentially provide the same services as do pricing information services and VTFs but they offer additional assistance beyond the simple economics of purchasing and buying agricultural products. This assistance can entail services such as weather information, technical information on agricultural practices, and long-term education. Holistic service packages can link not only suppliers and buyers but also parties involved in logistics, transportation, processing and storage. Often, holistic ICT providers also offer access to financial services¹⁰

2.2.5. Downstream (and upstream) Administration

In the context of this document, downstream administration essentially entails any ICT solution that helps direct value chain players beyond farmer producers – such as input suppliers, cooperatives, aggregators, processors and transport companies – to manage their businesses more efficiently. Examples include:

- Accounting systems for cooperatives, to improve financial management and reduce fraud and errors;
- Systems that monitor the level of moisture or temperature for products stored in a warehouse, to avoid spoilage;
- Databases of input suppliers for farmer customer management, such as Kickstart, Kenya’s use of FrontlineSMS (Box 2) to reach potential farmer customers (Kilo, 2009)¹¹;
- Export traceability solutions that track produce through the entire value chain, from farmer to end consumer.

2.3. ICT for Financial Inclusion

Many studies have shown that farmers in the developing world can and do use financial services extensively, such as savings groups or local moneylenders, even if no formal or semi-formal financial institutions are available. With the help of ICT, formal (i.e., banks) and semi-formal institutions (such as NGO microfinance institutions [MFIs]) can extend their reach if they provide their services in ways that satisfy the primary needs of the rural poor¹²:

- i. Convenience, such as short distances, appropriate opening hours and low documentation needs;
- ii. Security, such as a strong brand, good systems and ethical field staff

¹⁰ FAO, 2013. ICT uses for inclusive agricultural value chains. Rome

¹¹ Kilo, R. 2009. An SMS “kickstart” for Kenyan farmers. FrontlineSMS blog, 27 October 2009 (available at www.frontlinesms.com/2009/10/27/an-sms-kickstart-for-kenyan-farmers/).

¹² FAO. 2013. ICT

- iii. Flexibility, such as few withdrawal/deposit restrictions and appropriate products that match agricultural cycles; and
- iv. Low cost (Rutherford, 1999)¹³.

Box 4:

Keeping it simple through basic ICT – ACDI/VOCA and access to agricultural credit in Honduras

Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance's (ACDI/VOCA's) activities for improving access to agricultural credit in Honduras provided credit management ICT tools (and training) to improve credit disbursement and administration for retail input suppliers. The technology used was simple off-the-shelf accounting software packages (QuickBooks) and tools that ACDI/VOCA had modified from other microcredit programmes, including an Excel-based cash flow analysis tool and an Access based loan portfolio management tool.

These tools were not only inexpensive to implement and use but also improved the lending and collections process and reduced delinquencies through improved monitoring. This also helped improve the funding coordination and communication processes of the larger input distributors providing the financing (which often received the funding from banks), while the retailers acted as intermediaries in providing credit directly to farmers and monitoring. With the improved administration, the retailers began to negotiate better terms from the distributors, including for wholesale credit funds. *Source: AZMJ (2011)¹; Grace (2011)¹.*

3. RECOMMENDATIONS FOR POLICY MAKERS

- ❖ Establish weather station(s) with the sole mandate of providing farmers with timely and reliable information to boost production and reduce losses. In the wake of climate change and unpredictable weather, this would be useful in:
 - Alerting and supporting rice producers/farmers about potential weather and pest disasters.
 - Advising farmers on: when to plant, monitor and harvest crops as well as the application of pesticides and fertilizer.
- ❖ Adopt virtual trading floors for the following reasons:
 - Creation of a market that would bridge the gap between supply and demand of rice.
 - Ensure that produce is of the right standards through the leverage of processing, packaging, transportation, storage, grading and quality testing of produce by a certified body.

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¹³ Rutherford, S. 1999. The poor and their money: An essay about financial services and poor people. Manchester, UK, University of Manchester and New Delhi, Department for International Development (available at <http://www.jointokyo.org/mfdl/readings/PoorMoney.pdf>).