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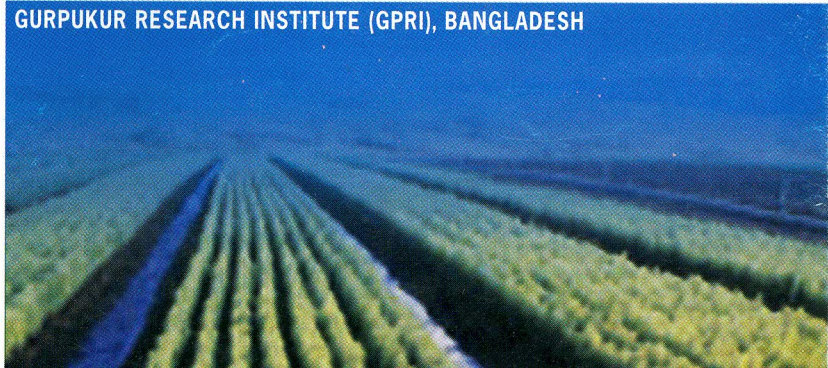


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## INFORMATION TECHNOLOGY IN AGRICULTURAL MARKETING\*

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### ABSTRACT

The market information services, especially those based on mobile phones, reduce asymmetries of information between traders and producers, reduce transaction costs, enable farmers to purchase inputs and enhance farmers' ability to fine-tune production strategies to match the accelerating rates of change in consumer demand and marketing channels. The latent utility of the technology is still being discovered and the scale of its impact is still being understood. It is difficult to anticipate the eventual balance between privately run agricultural information services and government services, but it is very likely that the optimum configuration could involve some kind of public-private arrangement. This study was made from May 2011 to January 2013 at Bangladesh Agricultural Research Council (BARC).

**Keywords:** ICT, IT, Agriculture, Marketing, AIS, Product, Consumers, Farmer, Transportation and Production.

### INTRODUCTION

E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (IT) in the rural domain, with a primary focus on agriculture (<http://en.wikipedia.org>). E-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows. E-Agriculture is one of the action lines identified in the declaration and plan of action of the World Summit on the Information Society (WSIS). The "Tunis Agenda for the Information Society," published on 18 November 2005, emphasizes the leading facilitating roles that UN agencies need to play in the implementation of the Geneva Plan of Action. The Food and Agriculture Organization of the United Nations (FAO) has been assigned the responsibility of organizing activities related to the action line under C.7 ICT Applications on E-Agriculture (<http://www.ictinagriculture.org>). The main phases of the agriculture industry include crop cultivation, water management, fertilizer application, pest management, harvesting, post-harvest handling, transport of food products, packaging, food preservation, food processing/value addition, quality management, food safety, food storage, and food marketing. This paper begins with an overview of the need for and impact of ICTs in agricultural marketing, especially from the perspectives of producers, consumers, and traders (Annerose, 2010). The overview concludes by reviewing lessons and envisaging future developments in ICTs for agricultural marketing, suggesting potential policy changes and active interventions to improve their utility.

### METHODOLOGY

This study for strengthening the Agricultural Marketing using ICT was made from May 2011 to January 2013. The study was made in Bangladesh Agricultural Research Council (BARC). The Books and journals of Agricultural Information Center of BARC was very much helping tools for this study. The

data of the paper is collected and accumulated from SAIC, FAO, BARC, AIS, BBS, and from the different journals.

## RESULTS AND DISCUSSION

### Farmers' changing information needs and sources

Farmers' information sources outside their immediate network have not always been reliable, but the situation is changing. Very often farmers' primary source of information continues to be progressive farmers (Fig. 1). Farmers give more credibility to information provided by other farmers considered to

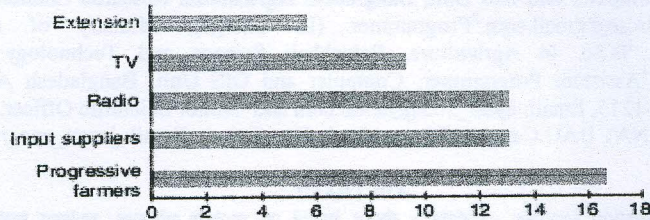


Fig. 1. Percentage of Farmers Relying on a Given Information Source from an average from developing countries.

have a similar status and cultural profile. According to market research by a private company in India, farmers' information priorities include accurate local weather forecasts, technical information sequenced according to the stage in the crop cycle, data on the costs of production and market supply and price information. These priorities shift during the production cycle for example, market information is of little interest until the start of the harvest. In practice, when a subscription-based agricultural information service was rolled out, farmers claimed that the market news service was the most valuable.

### Changing sources of information for farmers

A number of initiatives by governments aim to provide market price services, driven by the view that greater price transparency is a public good. Price has been disseminated in many ways chalked on notice boards, broadcast by local radio stations, published in newspapers and (more recently) posted on websites. The information on these websites is confined mainly to product standards and specifications as well as market studies particularly of external markets but increasingly of local value chains including databases of contacts such as buyers, traders, agricultural processors, and input suppliers. To the extent that these sites become more accessible, their usefulness could increase, but at present they are out of reach for most rural people. Mobile phone applications are changing farmers' sources of market information. Agricultural applications support logistics with graphical presentations of available supplies and methods for traders to upload price and supply information directly. They facilitate marketing by linking buyers and sellers (CESS, 2007).

### Lessons and future developments

Quantitative evidence is increasingly available on how market information affects prices paid to farmers (Table 1). The results are generally positive in terms of farmers' income and prices. There is some evidence that consumer prices can be lowered; it is also clear that traders who have access to ICT and mobile phones can raise their margins (Egyir *et al.*, 2010).

The scale of the effect on farmers' prices appears to depend on a number of factors, including:

- The effectiveness of the informal market information networks that already exist.
- The stability of the price structure for example, whether the government controls prices for a staple crop or whether fixed contract pricing is widely used.
- How the product is sold for example, ICTs may have a greater effect where negotiation is part of the sales process and a lesser effect when sales are by auction.

- The type of product being marketed circumstantial evidence suggests that market information systems have a greater effect on prices of higher-value, less-perishable products such as onions, potatoes and pulses and a lesser effect on prices of extremely perish-able products such as leaf salad.

Table 1. Summary of ICT's impact on Farmer's prices and income, Trader's Margins and price to consumers (Goyal, 2008).

Location, Product, Medium (Study Authors)	Farmer	Trader	Consumer	Comments
Uganda maize, radio	+15%			Increase in price paid to farmers considered to be due to farmers' improved bargaining power
Peru, Range of Enterprises, public phones	+13%			Increase in farm income, but higher for nonfarm enterprises
India (West Bengal), potatoes, SMS	+19%			Yet to be published, but showed information to be important both in the form of SMS and as a price ticker board in markets
Philippines, range of crops, Mobile Phones	+11 to +17%			Effect on income among commercial as opposed to subsistence farmers, plus perceived increase in producers' trust of traders
India(Madhya Pradesh)soybeans, web based e-Choupal	+1-5 % (Average 1.6%)			Transfer of margin from traders to farmers, effects seen shortly after e-Choupal established
Sri Lanka, Vegetables, SMS	+23.4%			Appreciable price advantage over control over time plus benefits such as increased interaction with traders and exploring alternative crop options
India(Maharashtra), range of products, SMS	No Significant Effect			In this one year study, quantitative analysis did not show any overall price benefits, but this findings is thought to be due to sales in state by action; price benefits of 9% were observed with farm-gate sales and younger farmers
Morocco, range of crops, Mobile Phones	+21%			Small sample showed showed usual behavioral changes; higher- value enterprises took a more pro-active approach to marketing via mobile phone
India(Kerala), fisheries, Mobile Phones	+8%		-4%	Outlier in the sense that fish catches are highly variable and fishermen have their own boat transport
Uganda, Range of crops, SMS and Radio	Bananas +36% Beans +16.5% Maize +17% Coffee +19%			Awareness of market conditions and prices offers more active farmers opportunities for economic gain
Niger, grains, mobile phones		+29%	-3 to -4.5%	Traders increased margin by securing higher prices through greater capacity to search out better opportunities
Ghana, traders, Mobile Phones		+36%		Traders using mobile phones tended to set all higher prices but also tended to be larger-scale traders than nonusers
Kenya wholesaletraders, Mobile Phones		+57%		Improved trader margin through combination of cheaper buying prices and higher sale price

By all indications, the phone especially the mobile phone is the most powerful marketing tool available to farmers and traders. The latent utility of the technology is still being discovered, and the scale of its impact is still being understood. Even so, the studies reviewed throughout this module indicate the phone's potential for reducing asymmetries of information between traders and producers, lowering transaction costs and enhancing farmers' ability to fine-tune their production strategies to match the accelerating rates of change in consumer demand and marketing channels. The private sector is finding it difficult to develop a working business model to charge farmers for agricultural information and market services delivered through ICTs. Some governments are interested in purchasing SMS-based agricultural information services, either to empower their field extension officers or to provide holistic agricultural information services directly to farmers. The content can consist of technical, marketing, weather, costing, pest and disease alerts as well as information on government schemes. In the long run it is difficult to anticipate the eventual balance between privately run agricultural information services and government services. It is very likely that the optimum configuration could involve some kind of public-private arrangement. For example, the collection and analysis of information could be outsourced to the private sector which could use such a platform to create additional value-added services for the network of businesses and institutions that support the farming sector. Another option is for the agricultural department to create a database of farming clients and negotiate lower SMS costs.

Table 2. Current and future roles of ICT in Agricultural Marketing (Goyal, 2008).

Function delivered by ICT	Enabling or deliberate	Technology	Future
Real time market research	Enabling infrastructure	Fixed- line and mobile phones	Extending range of mobile phones and ICT, facilitated by infrastructure investment and policies
Co-ordination of logistics	Enabling infrastructure	Fixed line and mobile phones	Specialists applications, training/ producer organizations
Market information (price supply)	Deliberate: Public and private sector	Web- based and SMS	Applications and public-private sector partnership, plus training and organization
Market intelligence	Deliberate	Web- based	Application and development of market intelligence service, plus training and organizations
Inputs	Enabling infrastructure	Fixed- line and mobile phone	Target SMS messaged by private sector, e- vouchers for subsidies

This platform can be used to deliver a fast, targeted and holistic package of information services consisting of public-good information and also private-sector messages to the farming community. Such a service has the potential of creating a cadre of smaller-scale commercial farmers, who will be better adapted to changing agricultural markets, trained in the use of modern information systems, and able to access services and receive advice via their mobile phones. Table 2 summarizes the role of ICT in agricultural marketing, based on whether the ICT consists of enabling infra-structure such as telephones or deliberate applications. It also suggests what the future is likely to hold.

#### Mobile Phone as a marketing tool

Although the mobile phone's main purpose among the public is for social interaction, it is proving to be a powerful marketing tool. Learning to exploit the economic benefits of the mobile phone is a skill that takes some time to develop. Younger users are typically better able to exploit the mobile phone's business advantages. A building body of knowledge, summarized in the section that follows, indicates that phones, especially mobile phones, have a positive impact on agricultural incomes. The evidence suggests that farmers use mobile phones to tap into a wider range of knowledge and information than they could access previously. Farmers build up a network of contacts and draw on this wider experience and expertise to obtain critical information more rapidly (Jaleta and Gardebroek, 2007). Essentially the

mobile phone, its special applications, and the Internet (although to a lesser extent currently) are becoming management tools for farmers, specifically in relation to marketing. Research data are emerging on just how much farmers are starting to use mobile phones to assist in marketing their production. For example, work in Bangladesh, China, India, and Vietnam showed that now about 80 percent of farmers own mobile phones (Minten, Reardon and Chen n.d.). They use them to speak to multiple traders to establish prices and market demand. More than half concluded selling arrangements and prices on the phone (the exception was rice farmers in China) (Ferris *et al.*, 2008). This work illustrates just how much phone access is driving change in marketing systems. Greater access to information and buyers steadily adds to farmers' market knowledge and gives them greater confidence to diversify into higher-value (often perishable) products. The additional knowledge translates into a more accurate understanding of demand and an enhanced ability to control production and manage supply chains. Farmers' behavior is changing and their farming is becoming more commercial (Goyal, 2008). Trends emerging around the use of mobile phones include: (1) farmers deal directly with wholesalers or larger-scale intermediaries rather than small-scale intermediaries; (2) farmers conduct market searches over a wider number of markets and (3) farmers develop a broader net-work of contacts than their peers who do not own mobile phones.

Greater access to information seems to help farmers make better decisions around:

- **Transportation and logistics:** Farmers begin to leverage economies of scale. They can organize and coordinate among themselves and (larger-scale) truckers to consolidate volume. Greater coordination also occurs around the timing of aggregation, collection, and volumes. Larger volumes can lower costs and enable farmers to realize higher prices.
- **Price and location:** An ability to compare prices increases farmers' power to negotiate with traders. It also enhances farmers' ability to change the time and place of marketing to capture a better price.
- **Supply and demand:** Farmers gain greater control over their production and product sales by finding new sources of demand, improve their ability to adjust supply and quality to market conditions and learn about quality, grades and product presentation.
- **Diversification of their product base:** Over the longer term, a better understanding of market demand and consumer trends helps farmers diversify into higher-value crops and capture greater value.
- **Access to inputs:** Farmers can make more informed decisions about which inputs are better or cheaper to buy and when and where to best obtain them.

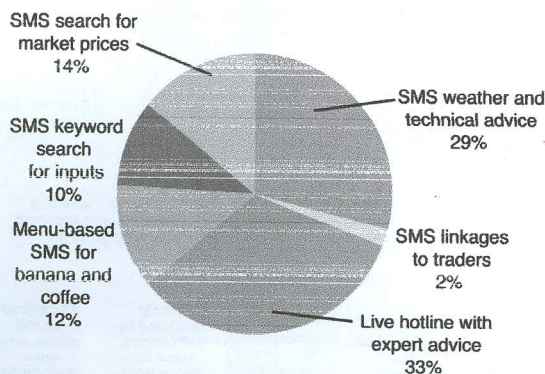


Fig. 3. Impacts of ICTs on agricultural marketing occur along the links in value chains.

Fig. 3 illustrates where the impacts of ICTs on agricultural marketing occur along the links in value chains, thus indicating the information required and the technology involved. The diagram has two key messages. First, ICT potentially has an impact on the management of every step in the production

marketing chain, from planning to sales. Second, almost all of these functions are likely to be carried out by mobile phone (<http://en.wikipedia.org>). Other potential services, such as market price information, market intelligence, and specific cell-phone-based applications, largely perform support and secondary functions that make farmers' mobile phones more useful.

The experiences in using ICTs to improve access to market information reveal that ICT s contributes to:

- Reduced logistics and transportation costs. Farmers obtain the latest information with a phone call instead of making a long trip to a market. They can coordinate with other local farmers to use one large truck rather than several smaller ones to deliver their products.
- Improved negotiation power. Farmers' increase their power to negotiate, particularly with traders, based on their ability to understand pricing in multiple markets, to cut out intermediaries, and to sell directly to larger-scale buyers.
- More sophisticated marketing plans based on price information. For example, farmers can modify the date of marketing, product permitting, or switch to alternate markets, transport and regulation permitting.
- Broader and deeper networks. Farmers communicate by phone with traders and farmers outside of their immediate geography as opposed to making a physical trip. The ability to communicate more easily and to triangulate information creates deeper trust in key trading relationships.
- Innovative partnerships. For example, partnerships are facilitated and built among groups of producers, or by virtue of direct communication with corporations and traders, or through the ability to supply product based on just-in-time and/or quality needs.
- Informed use of inputs. Farmers improve their capacity to raise yields through better use of inputs and/or use of better inputs. They can identify sources of inputs, obtain them more cheaply and are better able to buy and apply them at the optimal times.
- Improved farm business management. Farmers can become better managers through better information about which inputs to use, new knowledge about grades and standards for produce and increased interaction with corporations, traders and other farmers.

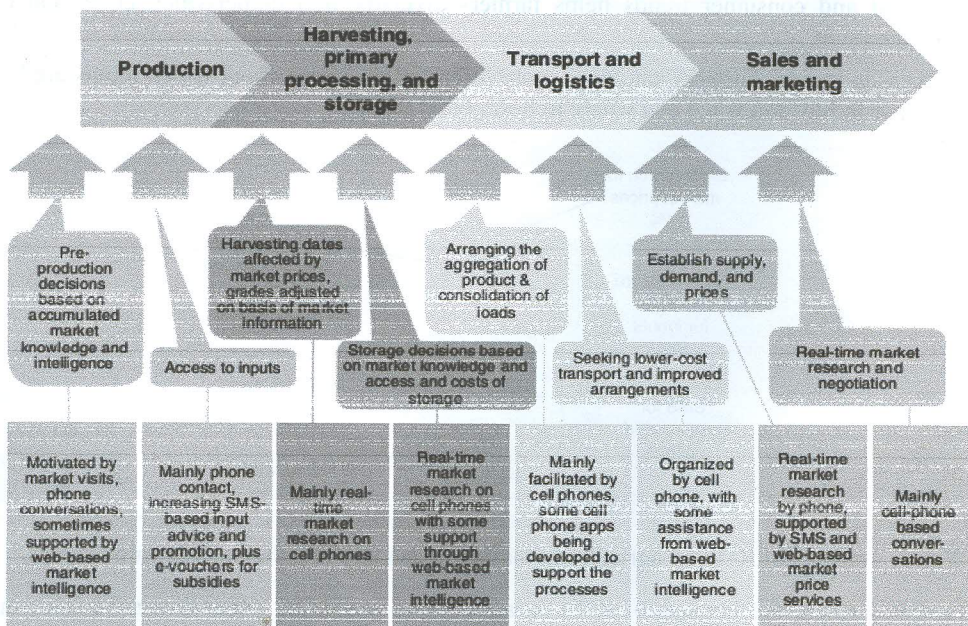


Fig. 2. ICT Inputs to Marketing along the Agricultural Value Chain.

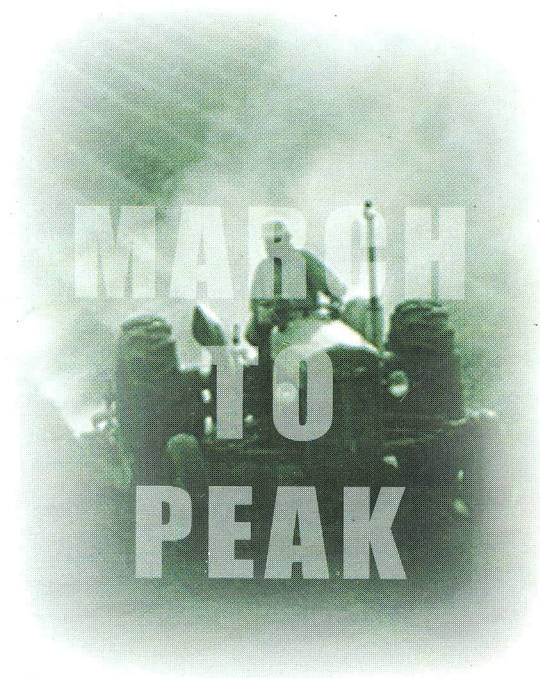
## CONCLUSION

ICTs can play a key role in improving the availability of agricultural production and market information in developing countries. ICT-based market information systems have a proven track record for improving rural livelihoods in middle income developing countries where they have been introduced. However, these systems are generally limited in scale and have not been effectively replicated beyond the local level. Also, relatively few schemes exist in smaller countries that lack the economies of scale of an India, a China or a Bangladesh. Furthermore, while internet-based market information systems work well in more developed, literate markets, other media, such as mobile phones or community radio, could be appropriate alternatives in least developed countries (LDCs), especially in sub-Saharan Africa.

## REFERENCES

- Aker, J. C. 2008. "Does Digital Divide or Provide? The Impact of Mobile phones on Grain Markets in Niger." Center for Global Development Working Paper No. 154. <http://www.cgdev.org/content/publications/detail/894410>, accessed January 2011.
- Annerose, D. 2010. "ICT for Social and Economic Development." Presentation by Manobi at the World Bank, Washington, DC, August.
- CESS (Centre for Economic and Social Studies). 2007. Preparatory Study for the Multi-State Agricultural Competitiveness Project. Unpublished study, CESS, Hyderabad.
- Egyir, I. S., R. Al-Hassan and J. K. Abakah. 2010. The Effect of ICT-based Market Information Services on the Performance of Agricultural Markets: Experiences from Ghana. Unpublished draft report, University of Ghana, Legon.
- Ferris, S., P. Engoru, and E. Kaganzi. 2008. "Making Market Information Services Work Better for the Poor in Uganda." CAPRI Working Paper No. 77. Washington, DC: CGIAR System wide Program on Collective Action and Property Rights (CAPRI).
- Goyal, A. 2008. "Information Technology and Rural Markets: Theory and Evidence from a Unique Intervention in Central India." University of Maryland, College Park. [http://en.wikipedia.org/wiki/ICT\\_in\\_agriculture](http://en.wikipedia.org/wiki/ICT_in_agriculture)
- <http://www.ictinagriculture.org/sourcebook/module-9-strengthening-agricultural-marketing#mobilemarketing>
- Jaleta, M., and G. Gardebroek. 2007. "Farm-gate Tomato Price Negotiations under Asymmetric Information." *Agricultural Economics* 36(2):245-51.
- Kaganzi, E., S. Ferris, J. Barham, A. Abenakyo, P. Sanginga and J. Njuki. 2008. "Sustaining Linkages to High Value Markets through Collective Action in Uganda: The Case of the Nyabyumba Potato Farmers." CAPRI Working Paper No. 75. Washington, DC: CGIAR System wide Program on Collective Action and Property Rights (CAPRI).





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