The growing use of new generation, mobile-based, information and communication technologies (ICT) has expanded opportunities for food and agricultural marketing and rural financial service delivery among the smallholder farming community in Sub-Saharan Africa. Smallholder farmers in developing countries have struggled for many years under difficult conditions of poor access to input and product markets which has led to persistent low marketing margins. The exploitative tendencies of the middlemen have further worsened smallholder farmer’s welfare and thus perpetuate rural household income and asset poverty for decades.

With the advent of new mobile phones, smallholder farmers are able to access more lucrative long-distance markets, negotiate better trading terms for their products, and tap into financial markets which were traditionally reserved for the well-connected wealthy individuals or those with collateral assets. The mobile phone revolution sweeping across the African continent and the rest of the global world has empowered smallholder farmers in their decision making in numerous ways. For instance, mobile-based ICT has significantly improved the availability of marketing information, expanded marketing options, enhanced access to financial services, and raised agricultural knowledge as producers are in a better position to interact with other farmers, extension workers, researchers and government experts in real time. This special edition provides important and timely information on the adoption of mobile-based ICT by smallholder farmers in agricultural marketing and financial service delivery in selected countries in Sub-Saharan Africa.

The papers in this special issue are drawn from four countries in Sub-Saharan Africa namely, Ghana, Uganda, Malawi and Kenya. The papers report on key findings from studies based on International Development Research Centre (IDRC) funded rural projects that have focused on understanding the key factors affecting the adoption of mobile phone use for agricultural marketing and financial service delivery by smallholder farmers in the respective African countries. These studies are seminal in providing context specific explanation of what drives mobile-based ICT adoption for agricul-
tural marketing in Sub-Saharan Africa. The papers provide country specific details about the socio-economic context affecting mobile-ICT deployment and usage and also insights on respective regional differences. Therefore, the results from the four countries reported in this special edition of IJICTRDA indicate current developments, emerging challenges and future prospects of mobile-ICT usage among smallholder farmers in West, East and Southern Africa regions.

The first paper describes the nature of agricultural markets and the use of ICT-MIS in Ghana. The authors tried to determine the extent of maize price integration between rural markets in northern Ghana, and urban markets in Accra. Specifically, the study focused on how markets of agricultural commodities responded to the improved ICT-based market information services in Ghana since 2005. Monthly wholesale prices from 2001-2010, covering four markets in the Northern and Greater Accra regions were used to estimate a threshold autoregressive model to measure the level of spatial price integration between the four markets, and focusing on maize. In addition, data on market structure and conduct was collected from 486 marketers to explain performance indicators. Results showed that the speed of price transmission in maize markets increased by 6 percent after 2005, but there has not been a marked reduction in transactions costs. These findings suggest the fact that despite increased use of the mobile phone, market-based exchanges still rely heavily on visual inspection.

The second paper reports the results of a household study done in Mwanza, Dedza and Mzimba Districts of Malawi. The aim of this study was to assess drivers of adoption of mobile phone technology for agricultural marketing by smallholder farmers. The study used regression techniques to identify drivers of use and extent of use of mobile phones. Results show that use of mobile phone is positively affected by literacy, distance to local market, land sizes, current value of assets, crop income and region variations but negatively influenced by access to electricity. Intensity of mobile phone use is conditioned by gender, participation in agricultural projects, ownership of a mobile phone, current value of assets, distance to nearest public phone services and regional variations.

The third paper analyzes the determinants of awareness of ICT based projects in Uganda. Specifically the paper examines the intensity of use of mobile phones among smallholder farmers in two ICT project sites of Busoga Rural Open Source Development Initiative (BROSDI) and Women of Uganda Network (WOUGNET) in Mayuge and Apac districts. The study uses bi-variate logistic and zero-inflated negative binomial regression models to ascertain determinants of projects’ awareness and intensity of use of mobile phones.

The fourth paper examines the use of ICT tools and ICT-based services by rural grain traders in Kenya. It is based on data collected from 204 traders in Western and Rift Valley regions of Kenya. The results of this study indicate widespread use of ICT tools, especially the mobile phone by grain traders. The study also finds that these tools are used by grain traders to obtain market information including information on price, volume, and where to source and sell grains.

Collectively, the four studies highlight key insights on mobile phone adoption patterns, intensity of use, and emerging issues affecting smallholder farmers who have adopted the new generation technology tools. Some of the key issues that have emerged from the smallholder farmers’ use of mobile technology include the following among others:

- Positive role played by farmer groups in facilitating mobile-ICT adoption.
- Role of asset endowment in adoption of mobile phones.
- Gender disparities and its effect on adoption of mobile phones by smallholder farmers.
- Reduction of information asymmetries and improvements in market transparency.
- Role played by mobile phones in increasing levels of trust among transaction partners.
- Knowledge sharing among smallholder farmers and key agricultural stakeholders.
such as, researchers, extension workers, rural traders, and other agricultural industry experts.

- Opportunities for fair terms of trade or market exchange for smallholder farmers.
- Income earning opportunities arising from selling agricultural products beyond local or village markets.
- Improvements in commodity market performance through reduction in transaction costs.
- Growing awareness of mobile phone-based money transfer services among rural farmers.
- Better access to input markets that were previously out of reach of most smallholders.
- The different types of farm level investments supported by money remitted through money-transfer services.
- Enabling conditions for the adoption and diffusion of mobile-based ICT in rural areas.

The above mentioned transformations and value-creation arising from mobile phone usage highlight the various experiences of smallholder farmers in the different countries as they transact in both input and product markets. The problem of market failure attributed to information asymmetries that has affected millions of smallholders in Sub-Saharan Africa for decades is likely to decline as more farmers adopt mobile phones that provide an opportunity to link into more lucrative geographically dispersed markets thus facilitate relatively more efficient price discovery mechanism.

The four studies are both timely and vital in several ways. First, the studies help us understand not only the key motivational factors behind mobile phone adoption in the context of the African agriculture, but also the key drivers affecting intensity of use of these technologies. Information on the intensity of mobile phone usage will in turn provide useful insights and knowledge about the sustainability of deploying such new generation technologies in smallholder agriculture. Second, service providers are likely to benefit from a sound knowledge of demographic characteristics of adopters and non-adopters identified by these empirical studies as it helps in designing current and future market penetration and segmentation strategies. Third, the studies also play a pivotal role in sorting out the effect of gender disparities on mobile phone usage and relative access to household assets among smallholder farmers in Sub-Saharan Africa. Finally, and perhaps fundamentally most important, is the need to ascertain clearly the benefits arising from using the modern technologies in the long run to link smallholder farmers to both regional and global markets. Given that the adoption of new generation mobile phones is still evolving in most African countries or regions of the developing world, further empirical studies are required in this area in the future.

There are some important lessons that can be drawn from the excellent work of these researchers. The studies provide an opportunity to engage policy makers on strategies to stimulate adoption of mobile phones by smallholder farmers for agricultural marketing and financial service delivery. These studies which are based on four different countries in Sub-Saharan Africa provide key insights on opportunities and challenges associated with deploying similar mobile-based ICT in the agricultural sector of lagging regions of developed nations. Evidence from these studies can be used to promote interventions designed to enhance ICT literacy of smallholder farmers in Sub-Saharan Africa and around the world. Further, the successful adoption of mobile-based ICT for agricultural marketing and financial service delivery requires investment in rural support infrastructure.

In conclusion, a key take-away lesson is for governments and private sector in developing nations to provide the necessary back-borne infrastructure required to support the widespread adoption and diffusion of mobile-based ICT for agriculture, lower tariff rates, and help farmers optimize benefits derived from using such new generation mobile technologies. The widespread use of mobile-based ICT has
the potential to provide an escape route out of poverty for millions of smallholder farmers in Sub-Saharan Africa and the developing world provided the necessary conditions and investment incentives are made available. The empirical evidence presented by the four studies indicate that smallholder farmers are willing, and able to use new generation mobile phones to tap into lucrative input and product markets to improve the performance of their agribusiness enterprises and thereby uplift their standards of living.

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