

INFORMATION COMMUNICATION TECHNOLOGIES AND MARKETING DECISIONS AMONG SMALL SCALE FARMERS IN KENYA: REVIEW OF EVIDENCE

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Abstract

This paper examines how Information and Communication Technologies (ICTs) are being used to facilitate decision making in agricultural sector among small scale farmers in Kenya. The use of ICTs in agriculture has ignited much interest over the past decade. To take advantage of the rapid expansion of ICTs in developing countries, the agricultural sector is increasingly turning its attention to ICTs in making decision of agricultural produce, pricing, promotion and distribution of farm produce. Nevertheless, most African countries have not yet devoted adequate attention in providing their citizens with the necessary access to information, especially in rural areas, where 70-80% of the African population lives. The paper reviews literature on ICTs and marketing decisions of farmers. It is argued that ICTs have a significant effect on the viable marketing decisions of small scale farmers in Kenya.

Keywords: ICTs, Marketing Decisions, Marketing Information Channels, Mobile Phone Usage, Small Scale Farmers

INTRODUCTION

Agriculture plays a crucial role in the Kenyan economic growth and development. There is a strong relationship between ICTs and agriculture and therefore ICT is the largest platform from which farmers can actively participate in making vital decisions for economic development. Nevertheless, agriculture contributes significantly to Kenyan economy (Agricultural Sector Development Strategy ASDS, 2009-2020). The agriculture sector contributes 25 percent of Kenya's total GDP and employs over 40 percent of the total population and over 70 percent of the rural people. The good performance of this sector ensures good performance of the entire economy. Therefore the policy and institutional frameworks governing the agricultural sector play a vital role in the development of the whole economy. The target for economic growth of above 6.6 percent is required to achieve the twin objectives of economic growth and poverty reduction. Similarly, growth rates above 7 percent per annum are required for agricultural transformation so as to propel the economy to an industrialized status (Strategy for Revitalizing Agriculture, SRA, and 2004-2014). Unfortunately, most African countries have not devoted adequate attention to providing their citizens with access to information, especially in rural areas, where 70-80% of the African population lives (Okello, *et al.*, 2010)

The relatively low involvement by small scale farmers and the need to support economic growth through access to markets both local and international are of concern to governments and researchers and more so in developing countries like Kenya which must compete in the globalized agricultural markets with developed countries (National Agribusiness Strategy, Kenya, 2012). Munyua & Stilwell (2009) established that 80 percent of farmers in Kenya are small holders, who produce for subsistence and for sale. These farmers face many barriers to attain full agricultural production including poor access to agricultural information, inadequate markets and market information. Kalusopa (2004) observed that most rural communities and small-scale agricultural producers in the developing countries are now influenced by global economic, environmental and political trends which place small-scale farmers squarely in the middle of global market realities. In their annual report publication of 2009, Oxfam International, a global Non Governmental Organization in poverty reduction, observed that small-scale farmers are often marginalized by their lack of access to information about both growing conditions and markets. Together they limit the producers' ability to take risks, and reduce the scope for realizing a profit.

Kibet *et al.*, (2011) states that for a long time, farmers in, Kenya have been receiving low farm incomes from maize and wheat production which are mainly relied on as source of food and income. This has resulted in high poverty levels in the county mainly attributed to lack of proper market information to enable the farmers make decisions that will improve their farming

productivity and income. Every year the farmers have had to demonstrate in the streets demanding that the government purchase their maize harvest at a reasonable price to avoid exploitation by middlemen who buy at very low prices. Equipping farmers with effective market information will enable them make market decisions that will enable them increase their income. Over the years, deliberate though ineffective, efforts have been made by donors and African countries to increase agricultural productivity and market performance without much to show for it (Spurk *et al.*, 2013). The failure can be attributed to the casual treatment of information delivery by most African governments thus the farmers seldom feel the impact of agricultural innovations and miss to access global or local markets available either because they have no access to such vital information or because it is poorly disseminated (World Bank, 2007).

Glendenning *et al.*, (2010) analyzed the need for increased agricultural productivity in India and observed that market information content, the quality and dissemination channels and other characteristics of that information have hardly been researched at all. They further highlighted that it is still not understood why marginal and smallholder farmers do not access information more frequently and for that matter insist that more research be done to better understand the information needs and smallholder farmers' information-seeking behaviour. Furthermore there are hardly any studies that cover the entire range of market information channels available to the small scale farmers in Kenya and the effect each has on the marketing decision making of the smallholder farmers and the factors that enable the small scale farmers to use a specific channel.

The World Bank study of Kenya's extension efforts (2007) has pointed to the need for information to be adequate and responsive to farmers' needs and suggested that shortcomings in information to farmers might be a major hindering factor for adoption of innovations and market access by farmers. Moreover, other Kenyan studies in this field have so far failed to look at information and communication in any detail (Muyunga *et al.*, 2006). Interviews held by Spurk *et al.* (2013) with agricultural researchers and other experts in Kenya confirm that there are not many details known about the information flow between research, extension and farmers beyond the fact that information is often irregular, not systematically supervised and often not sufficiently specific for farmers.

Solano *et al.* (2003) argue that unless more efforts are placed on the study of the relative importance and the dynamics of the information flows and its sources and channels, suitable mechanisms for enabling market access and thus increase in income are unlikely to be found. African governments need to take new approaches to information dissemination and management that grow out from a clear understanding of what farmers information needs are and what information channels are effective for the farmers (FARA, 2006). This study aims to fill

the knowledge gap by investigating the ICTs used by the small scale farmers, the determinants of usage of the different ICTs and the effect of ICTs on marketing decision.

Information and Communication Technologies

ICT is an umbrella term for communication devices and applications such as print media, radio, television, mobile phone, computer hardware, computer software and network systems. It encompasses both traditional and new technologies which have converged to give efficiencies in information processing and communication (Litondo, 2013). ICTs refer to a diverse set of technological tools and resources to create, disseminate, store, bring value addition and manage information (Vikas, 2000). They have also been defined as an electronic means of capturing, processing, storing and communicating information (Heeks, 1999). New ICTs offer many possibilities for rural communities in communicating and exchanging information and have revolutionized the way people live, conduct business and social activities (Barntt, 1996 and Norrish, 1998). It must also be noted that the ability to use and adapt ICT is critical in generating and accessing wealth, power and knowledge furthermore mobile phone is the ICT that is preferred by the poor (Litondo, 2013).

Information and Communication Technologies and Farming

Ogutu, *et al.* (2012) points out that some of the sources or origins of market information in the agricultural sector in Kenya include ICT projects and Market Information Systems such as M-Farm, Kenya Agricultural Commodity Exchange (KACE), National Livestock Marketing Information System (NLMIS), Regional Agricultural Trade Intelligence Network (RATIN) and Drumnet. Situma (2013) indicates that M-Farm is a web based market information system enabled by a mobile handset which allows farmers to get information on retail prices of their products, buy their farm inputs directly from manufacturers and find market for their produce by SMS. *Shamba Shape up*, a TV programme in Kenya has utilized well edited video episodes which seek to guide small scale farmers in improved pest management, irrigation, cattle rearing and poultry keeping in an engaging yet informative way. Another source is the new E-farming text messaging service that provides farmers with advice on crop management, fertilizer use and maize breeds (Situma, 2013). Smartphone Applications developed locally by University students have come up with innovative ways of tackling farmers' problems (Sandra 2013). *Mkulimaleo* addresses challenges that small and medium scale farmers face in accessing information that influences their food production and market access. The market information ranges from best farming practices, pests and disease, climate and soil surveys and where

farmers can access financing. The application also provides a forum for farmers to interact and share information.

According to (Okello, *et al.*, 2010) mobile phone-enabled services provides opportunities to extend the reach of agricultural services to the poorest and marginalized due to the widespread access to mobiles among geographically dispersed users from diverse socioeconomic backgrounds. However, judging from the limited evidence gathered to date, the poorest and marginalized are less likely to benefit from ICTs as a result of lower income and education levels as well as social imbalances, such as gender inequalities. Also, the challenges they encounter when adopting new agricultural technologies are particularly severe and often complex, thus making it even more urgent to integrate ICT services in agriculture. Significant research gaps remain in this area which will need to be filled in order to increase the effectiveness and expand the reach of ICT in agriculture (Aker, 2010). To date, most of the researches have focused on mobile phones and the empirical evidence on the impacts but success factors of ICT services in general and on agricultural technology adoption in particular are still limited. Moreover, as phone sharing remains a reality in particular in rural areas, the associated dynamics need to be better understood, including within households, communities and organized groups such as social groups and cooperatives. More research is also needed to differentiate between users from different income and social groups when assessing the effectiveness of ICT services in order to better understand and address the particular opportunities and challenges of the poor. In marginal areas, the actors that aim to enhance technology innovation in agriculture may need to explore direct engagement in ICT channels, rather than wait for specialized service providers to come along and expand their reach in such areas (Silva and Ratnadiwakara, 2010).

Hemmer and Heinzl (2012) established that the information seeker's dispositional personality traits such as age, gender and marital status have an influence on the selection and use of appropriate information channel. Litondo and Ntale (2013) indicate that education level is the main determinant of mobile phone usage for business and also influences strategic choices. They went further to stipulate that the neighbours' education level has a significant effect on the mobile usage in business. Cost of sourcing the information is also another determinant of channel information channel usage, Williamson (1975) in his Transaction Cost Theory supports the idea that networks are cheaper source to access Information. Morris (1998) underscores the importance of Market Information for business survival by enabling effective market decisions. Kizito (2009) argues that market information is vital to enable farmers make informed decisions about what to grow, to which markets produce should be sent, what price to sell and whether to store it or not with the main objective of profitability.

Market Information Channels

Market Information sources and channels for small scale farmers can generally be categorized into two broad areas namely Social Networks and Information and Communication Technologies (ICT). Mbura (2014) notes that networks consists of a set of actors and their structural and content relations where each regularly and for a sustained period interacts for the purpose of gaining economic advantages in accessing information and other resources. Mitchell (1969) argues that what matters in networks is both intensity (structure) and interconnectedness (content) of the members of the network observed that characteristics of networks have different potential to the access of information resource, and a need to determine which of these characteristics (Aldrich and Zimmer, 1986, Jack, Dodd and Anderson 2008, Rutashobya, Alan and Nilsson, 2009, Yan, 2013, Aldrich and Zimmer, 1986).

Marketing Decisions

Fremount *et. al.* (1970) describe marketing decision-making as conscious and human process, involving both individual and social phenomenon based upon factual and value premises, which concludes with a choice of one behavioural activity from among one or more alternatives with the intention of moving toward some desired state of affairs. It represents a course of behaviour or action about what must or must not be done (Herbert, 1960). Decision- making is the selecting of action from among alternatives to achieve a specific objective or solve specific problem (Donald, 1963).

Kotler (2006) states that marketing decision making includes the selection from alternatives course of actions. Small scale farmers are constantly at crossroads and have to make decisions on what farm products to produce, the market to serve, agricultural products to grow, who would be the potential buyers, how to differentiate from competitors, what price to sell at or the perceived value and how to interact with the market. These decision indicators form a model commonly referred to as the 4Ps of marketing that include Product, Place, Price and Promotion. The 4Ps model was first expressed in 1960, by Jerome McCarthy and was made leading-edge by Philip Kotler in his book Principles of Marketing in 1967. In simple terms, the model states that marketing decision are aimed at Putting the right product in the right place, at the right price, at the right time. This model is appropriate for small scale farmers in making marketing decision on what agricultural product the market wants, what price to sale the farm products, how to promote and distribute the agricultural products. Kotler and Armstrong (2013) ascertain that Market Information and channels allows making and implementing the necessary decisions easier and faster, in this case the decision makers are the small scale farmers. This study will use the 4Ps model of marketing decisions.

Small holder agriculture in Kenya

Agricultural sector in Kenya is characterized by the existence of both large scale and smallholder farmers. There are currently more than 5 million smallholder farmers who account for about 75% of the total agricultural production in the country (SRA 2004-2014). Smallholder agricultural production is largely characterized by growing of staple food like maize and beans, which are primarily targeted for own consumption with little marketable surplus. In Kenya, land holdings have become smaller due to population pressure, hence farmers have transformed from staple crop production to highly market-oriented crops. This agricultural transformation has been a vital development tool for achieving the Millennium Development Goal that calls for reduction of the percentage of people suffering from extreme poverty and hunger by 50% (Cervantes-Godoy and Dewbre, 2010).

Lipton, (2005) defined smallholders or small scale farmers as those with a low asset base, operating less than 2 hectares of cropland. These farmers tend to practice a mix commercial and subsistence production and the family of the farmer provides the majority of labour while the farm provides the principal source of income (Narayanan and Gulati, 2002). IFAD (2008) definition of a small scale farm as a farm of two hectares or less of land will be adopted. Small-scale farmers play different and often multifunctional roles. They are the key drivers of economy providing sources of employment, food security, poverty reduction and ecosystem services (Deininger and Squire, 1998). Munyua and Stilwell, (2009) established that of the farmers in Kenya, 80% are small holders, who produce for subsistence and for sale. These farmers face many barriers to attain full agricultural production including poor access to agricultural information, low output and productivity, weak institutional capacity and coordination, inadequate markets and market information. (Kalusopa, 2004) observed that most rural communities and small-scale agricultural producers in the developing countries are now influenced by global economic, environmental and political trends which place small-scale farmers squarely in the middle of global market realities (Richardson, 1997).

Research done by Oxfam International (2009) indicates that small-scale farmers are often marginalized by their lack of access to capital, credit and information about both growing conditions and markets which together they limit the farmers' ability to take risks, and reduce the scope for realizing a profit. A recent literature review on marginal farmers commissioned by the NGO Concern International included the statement: "We define marginal farmers as those who are farming yet hungry'. These are people, for whom farming is a major source of livelihood, yet they have insufficient assets to produce a surplus from their agricultural activities and whose non-farm activities are unreliable for them to rely on market purchases for adequate food intake (Kent & Poulton, 2008). Ballantyne (2009) asserts that more than ever, the developing world

needs reliable information and knowledge on agricultural issues. It needs this knowledge to be accessible and well communicated. On its own, more information is not enough: access is needed and this is where market information channels, ICTs included, come in. However, farmers as agricultural entrepreneurs must receive the information on time, and in a manner and format best suited to their needs and their ability to understand.

THEORETICAL FOUNDATION

This study anchored on Technology Acceptance Model (TAM) theory which has been widely cited by many scholars in explaining the usage of ICT in various fields (Heili and Assar, 2009; Ramdani and Kawalek, 2008; Hao, 2013). It is derived from the theory of reasoned action (TRA) and it explains how users come to accept and embrace technology. The model suggests that the factors that influence consumers' decision about how and when to use a new technology are perceived in usefulness. The degree at which a person believes that using a particular system would enhance his or her performance is perceived by ease of use. Thus, one will believe that using a particular system would be free from effort (Davis, 1989). However TAM has been continuously upgraded to include other factors to help explain and predict the acceptance of new technology apart from using only perceived usefulness and perceived ease of use. TAM has been upgraded by incorporating Adjez's (1991) theory of planned behavior (TPB) and Roger's (1995) diffusion of innovation to include the subjective norms and perceived behavioural control.

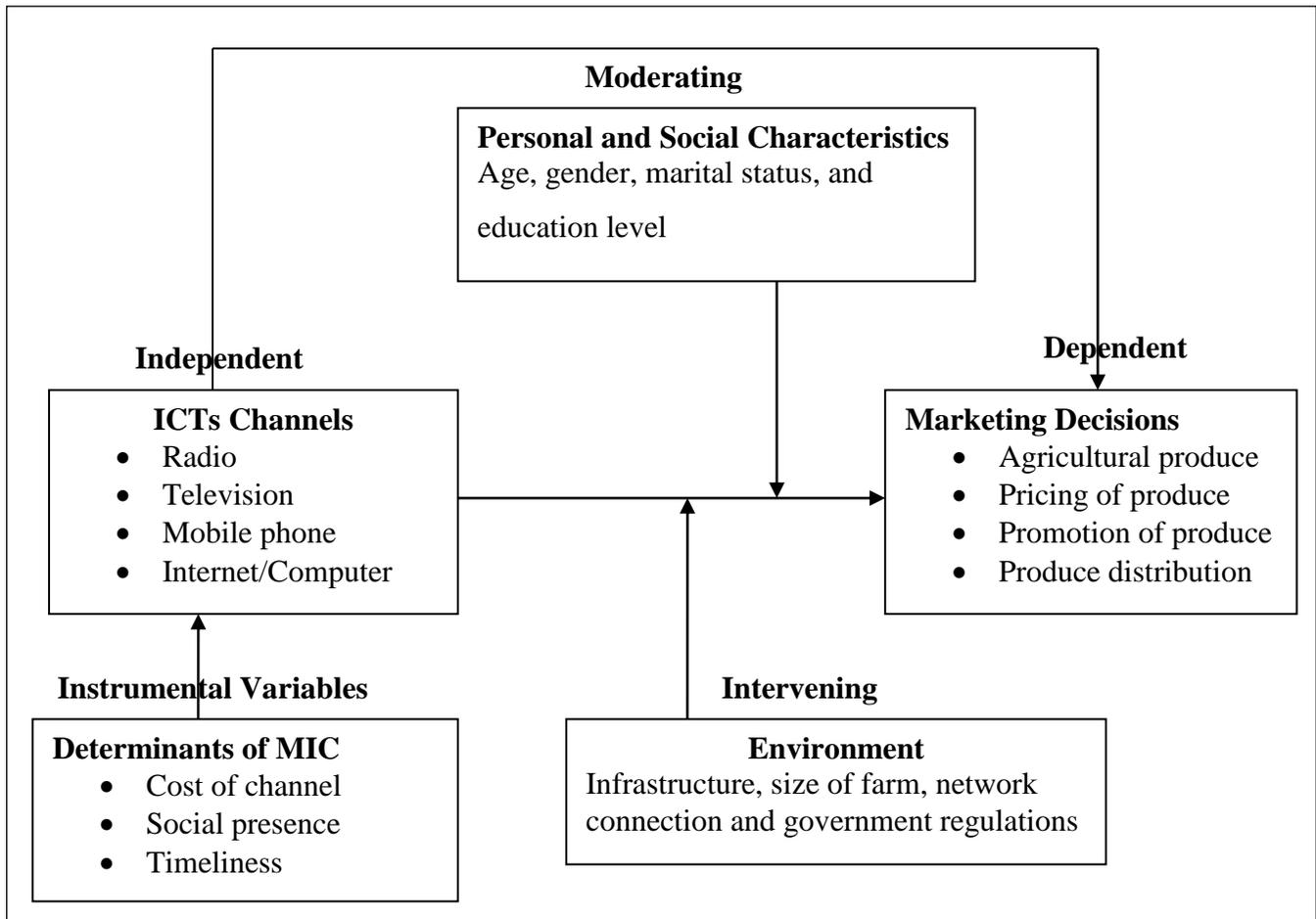
Conceptual framework

The conceptual framework is informed by the literature that ICT is a factor of marketing decision making among the small scale farmers. The cost of obtaining ICT channel by the farmers determines which market decision a farmer is to make. Assuming that the farmer is rational, he/she will use the less costly ICT channel. The decision of farmers to sell their produce to a certain market or the decision to sale their agricultural produce at a certain price and how to create awareness of the produce will depend on the availability of ICT channel(s).

The framework illustrated in Figure 1 indicates that market decision is dependent on infrastructure, farm & farmer characteristics. Water & electricity supply, road network, size of farm, number of employees, education level, age or gender of a farmer influences the making of decision on marketing. Furthermore, ICT channels could also be viewed as a function of marketing decision making. For example when a small scale farmer uses ICT instrument to source for market information, his/her marketing decision making is expected to change based on the information received. Farmer can make specific marketing decisions on produce/crop,

price, advertisement, and distribution of farm produce. These decisions are based on the 4Ps of marketing decision model. ICT channels refers to radio, television, mobile phone, and internet/computer.

Figure 1: Conceptual framework



DISCUSSION

ICTs are used to speed up the circulation of information among the small scale farmers. They are instruments which help farmers to optimize their production potential on their limited land by planting for market demand. Use of ICTs by farmers promotes the expansion of local markets and direct access to international markets and productive resources. It is a powerful tool in production and marketing system as it affords inexpensive access to vast amount of information and networks, access to market information and the ability to directly access lucrative markets. ICTs are widely used all over in the rural areas and therefore farmers are able to access resources and information on agriculture.

From the literature reviewed on ICTs and marketing decisions of small scale farmers, it is evident that more has to be done to improve the livelihood of these farmers and especially in the area of market access and this is where effective market information channels become a vital element to provide timely information for decision making. Information becomes available to the decision-maker through different ICT channels, such as mobile phones, internet, radio, and television. Information empowers small farmers to participate in decision-making, exchange ideas with others in developed and developing countries, and improve the quality of life of the people. The ICT tools empower the farmers by enabling them make appropriate decisions on what to produce, where to sell, how much to sell, and to create awareness of their produce.

The paper therefore, highlights significant potential of ICTs to facilitate the marketing decision making among the small-scale farmers in Kenya. Service providers and ICT developers are increasingly recognizing this potential, including the business opportunities of marketing ICT services to a large number of smallholder farmers. Initially ICT services focused mainly on the provision of farming and market information, today services are becoming more comprehensive, offering more diverse and multiple ICT services that support farmers at different stages of agricultural production. This trend needs to continue in order to increase the effectiveness of ICT services in agriculture. It is important to employ ICT services in complementary support programmes and infrastructure developments to address other production and market limitations.

Incorporating ICT in daily farming activities is the key problem of most small scale farmers. The major setback is limited knowledge in ICT and therefore access to information for their agricultural opportunities is limited. For the small scale farmers to get economic stability, they require minimum basic education which can make possible for them to read and write. The bottom-line will be based on the years spent in school and not the educational achievement to increase the probability of awareness. An emphasis can be put on education as key to achieving a sustained increase in farm output through easy and cheap information exchange, from the platform provided by ICT channels. For farmers to make proper decision on market of their produce they need education and training to be intensified to let the small farmers know the benefit derivable by the exercise. The small farmers will require awareness on how to improve seed selection, and their cultivation, irrigation and fallowing techniques and how to use appropriate techniques to harvest and conserve food crops as well as ability to access the markets to sell their farm produce. Suitable help in successful usage of ICT can empower them as individuals, and it will improve their chances of acting commercially which can be done through value addition. Hence, education will equip small farmers with knowledge and skills to deal and use the information they receive from the channels for decision making.

Farm size tends to be a factor of increasing the probability of ICT usage for market decision awareness. The expectation is that as farmers convert more portions of their unused lands into farm lands, then they will increase income which can lead to increase in their purchasing power. A larger size of the farm in terms of area and crop or herd size can increase the necessity of farmers to increase the amount of information required to make decisions. Information without a relative context carries no value whatsoever. The only reason that statement becomes valuable is if it changes behavior or decisions somehow. The amount of time invested in gathering information should be worth the cost spent gathering it. The searching of market information may include the monetary costs, and the opportunity cost of the time taken up in searching. The monetary costs are not under the farmer's control, and all he or she can do is choose whether or not to incur them. For instance, it is costly to pay for telephone airtime to make a phone call or to access the internet to get market information. However, time taken and mental effort given over to undertaking the search, sorting the incoming information, and integrating it with what the farmer already knows can be determined by the farmer's ability to undertake the search, and this in turn depends on intelligence, prior knowledge, education and training. The farmer will most likely choose the ICT channels that would incur the lowest cost and at the same time maximize returns since he/she is rational and wants to increase profitability of the farm produce. Poor service providers' network may lead to lack of connectivity to most ICT channels like mobile phones, televisions, and radios. This could pose a challenge to the options of communication channels available to the small scale farmers in Kenya. Most of these channels will require use of electricity or alternative source of energy which may not be available in some areas. The farmers are left with limited options on making market decision through these channels. Language of communication in each particular channel could prove a barrier to most small scale farmers. They have to rely on literate relatives or friends for translation or disregard the information altogether. Precision of information may be lost in the interpretation depending on the competence of the interpreter.

CONCLUSION AND RECOMMENDATIONS

ICTs are essential for facilitating small scale farmers in making marketing decisions which can bring about social and economic change in their livelihoods. ICT facilities exchange among farmers from diverse social groups; allow rapid access to information needed for exchanging, buying, producing, and selling products and lead to increased productivity gains. Through accessing, possessing, and using ICTs, farmers play a crucial role in the distribution of resources and wealth, and globalization is expected to bring about improved market operations and economic effectiveness within and between countries. ICT channels should therefore, be

geared to strengthening the small farmers, with special emphasis on rural poor, and be developed in rural areas with limited access to information. This may be achieved by setting up functional, integrated information systems in rural and urban-poor communities, which would bring in new and diverse resources to enable small-scale farmers to access information. By doing this, the small farmers will be empowered thereby reducing the gap between the large-scale and small scale farmers.

Further analysis is required to focus on how ICTs could best be used to address multiple constraints, either by providing several complementary services or by integrating ICT services with other support activities. In addition, suitability and effectiveness of ICT services will be shaped by the context in which they are offered. These dynamics remain seriously under-researched. Further studies are essential so as to be able to adjust the ICT services to the particular needs of small-scale farmers in the rural communities and develop business models that lead to the establishment of ICTs for small farmers. Such research will need to be based on an interdisciplinary approach that takes into account the economic, social-cultural and political dimensions of the small scale farmers. Since this study was based on existing literature, it is recommended that an empirical study is done in specific areas or counties in Kenya.

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