

CTA
Working Paper
15/06

Market in Their Palms? Exploring Smallholder Farmers' Use of Existing Mobile Phone Farming Applications: A Study in Selected Counties in Kenya

Fredrick Odhiambo

Series: ICTs for agriculture



Market in Their Palms? Exploring Smallholder Farmers' Use of Existing Mobile Phone Farming Applications: A Study in Selected Counties in Kenya

Fredrick Odhiambo

Massey University, New Zealand



About CTA

The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

CTA operates under the framework of the Cotonou Agreement and is funded by the EU.

For more information on CTA, visit www.cta.int

About the author

Fredrick Odhiambo completed his Master of Philosophy degree in development studies at Massey University, New Zealand, where he explored the use of mobile phone applications in smallholder farming and their effect on farming, marketing and well-being in Kenya. He is currently a PhD candidate at the Department of Engineering and Innovation; Open University, Milton Keynes, United Kingdom.

About CTA Working Papers

CTA's Working Papers present work in progress and preliminary findings and have not been formally peer reviewed. They are published to elicit comments and stimulate discussion. Any opinions expressed are those of the author(s) and do not necessarily reflect the opinions or policies of CTA, donor agencies or partners. All images remain the sole property of their source and may not be used for any purpose without written permission of the source.



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Licence. This license applies only to the text portion of this publication.

Please address comments on this Working Paper to Benjamin K. Addom (addom@cta.int), Programme Coordinator, ICT, at CTA.

Contents

Executive summary	v
Introduction	1
Results	1
The mobile phone farming applications in Kenya	2
The costs of using the mobile phone farming applications	3
The effect of using the mobile phone farming applications on the smallholder farmer's access to information and markets	3
The effect of the use of the mobile phone farming applications to smallholder farmers' production	6
Conclusion	7
References	7

Executive summary

This study aimed to explore the use of mobile phone farming applications by smallholder farmers in accessing markets and information and the effects of these on their farming and marketing experience. The result indicates that the mobile phone farming applications have facilitated the smallholder farmers to access markets and marketing information. They have been effective in reducing the information search costs and marketing transaction costs for smallholder farmers. As a result of the reduced transaction costs, farmers (especially rural farmers) had increased their participation in markets. Similarly, there was evidence that these mobile phone applications had enabled smallholder farmers to access reliable markets with better prices and had provided incentives for the smallholder farmers to increase their production. However, these applications had limited effects on the smallholder farmers' access to agriculture extension and production information. This was because the applications service providers had not developed a comprehensive content of production information. Finally, mobile phone farming applications can facilitate the smallholder farmers to access information and markets in Kenya. There need to be increased dissemination of information about these services to the farmers. Similarly, the mobile phone farming service providers needs to increase the agriculture extension content in their network to enable the farmers' to access such information easily.

Introduction

The role of agriculture in poverty reduction and development has been acknowledged and emphasised by The World Bank (2008). The World Bank report estimated that growth within the agricultural sector is two times effective in reducing poverty in developing countries compared to growth in other sectors. Agriculture in developing countries can help in poverty reduction and development by increasing farm incomes and food security among the smallholder farmers who most often are the poorest and most vulnerable. The focus for poverty reduction through agriculture in developing countries is with the smallholder farmers. Silva and Ratnadiwakara (2008) have proposed that commercialisation of smallholder farmers' production through technological adoption and increased market participation is the best way for facilitating agriculture for the development agenda. However, emerging consensus has highlighted that attaining such growth and commercialisation within the smallholder farmers production can be daunting because of the structural constraints associated with geographical and historical factors in sub-Saharan Africa (Delgado, 1999:165).

In the Kenyan context, the contribution of the agriculture sector to the economy has been discussed widely in the literature (Nyoro *et al.*, 1999; Nyoro, 2002; Gitau *et al.*, 2009; Government of Kenya, 2009). It is evident that agriculture is the mainstay of Kenya's economy, contributing 24% of the GDP directly and another 27% indirectly through linkages with the service, manufacturing and distribution sectors (Government of Kenya, 2009: 2). The sector is also an important tool for employment creation and poverty reduction, accounting for 65% of Kenya's total exports earnings and providing 18% of formal employment and a further 80% of informal employment in the rural areas (Gitau *et al.*, 2009: 3). Within the rural areas, agriculture accounts for over two-thirds of the rural economy generating over two-thirds of rural-based GDP and employing over 80% of the rural population (Thurlow *et al.*, 2012: 88). Therefore, agriculture is the single most important sector for Kenya's general economic and rural development.

However, despite the acknowledged importance of agriculture to Kenya's economy, the sector has been facing many problems, especially when it comes to smallholder production and marketing. Among the many problems the smallholder farmers in Kenya faces is the problem of access to information and markets. This has been highlighted by Okello *et al.* (2011) who have argued that the problems of accessing information by the smallholder farmers has been a barrier to commercialisation of agriculture in Kenya. However, despite these problems, in recent years there have been attempts to tackle these challenges with the use of information and communication technology (ICT) especially the mobile phone (Aker, 2011). These have involved the use of mobile phones, the internet and mobile phone applications. This paper presents the results from a Kenyan study that explored the use of mobile phone farming applications by smallholder farmers to access information and markets.

Results

This section presents the results of the study. The section discusses the four research questions which were used to explore the smallholder farmers' use of these mobile phone farming applications.

The mobile phone farming applications in Kenya

The first research question was:

How are the different smallholder farmers using the mobile phone farming applications to access marketing and production information?

A total of 13 smallholder farmers who uses these applications were interviewed from the various counties. The mobile phone farming applications explored included Mfarm, Mfarmer and NAFIS. Mfarm and Mfarmer are Nairobi-based, privately run agribusiness companies which began their operations a few years ago. These two mobile phone applications provides a platform for farmers to access markets, information and inputs through their mobile phones (Mfarm, 2013; Mfarmer, 2013). NAFIS service is run by the Ministry of Agriculture and has integrated mobile phone application service and internet, allowing farmers to have a broader access to information. The farmers access information on these services by mostly sending a text message to the application or sometimes by calling it.

The smallholder farmers used and interacted with these applications differently. In accessing markets through the Mfarm application, the concept of contract buying was important. The farmers using this application narrated that they contacted a buyer through the application by sending a text message with information about the produce being sold, the price offered and the quality. Thereafter a buyer was contacted by Mfarm. The farmer and the buyer then agrees on the quality, quantity and price of produce and then both parties signs a contract stipulating all the details. One of the respondents indicated that:

Respondent A: "First I had to send a text to Mfarm with all the information about my produce, the quantity I have, the quality and the price I would prefer. Thereafter, I was linked up with a buyer. The buyer and I agreed on the price, the quality and quantity. I then signed a contract with Mfarm and the buyer also signed a contract with Mfarm with all the information we had agreed on." (Source: Fieldwork notes 2013)

For Mfarmer and NAFIS, the process of contacting a potential buyer involved sending a text message with the information containing the produce on offer, the price, the quantity and quality and the area the farmer was based. This information goes to the application system where the same information is sent to other buyers in the system. Interested buyers then contact the farmer directly and thereafter the farmer and the buyer agrees on the price, quality and quantity and the mode of produce delivery and payment. It was common for the farmers using these two services (Mfarmer and NAFIS) to transact sales without meeting each other since the payment was often done via mobile money payment system such as Mpesa. One of the respondents using Mfarmer said that:

Respondent L: "At the beginning, when my produce was ready I would send a text to the number 8988 indicating the number of bags of Irish potatoes I had and the price I was offering per bag. The message was then relayed to interested buyers by Mfarmer and an interested buyer would then relay his interest to Mfarmer. Mfarmer would then send me the buyers' details and from there I would contact him/her." (Source: Fieldwork notes 2013)

In terms of accessing price information, the farmers simply sent a text message containing the name of the produce and the city of interest to the service provider. The service would

then reply to the text with the price of the produce at the particular city of interest. Mfarm had developed a permanent mobile phone app for Android phones which the farmers with such phones could download and install in their phones. Through the app the farmers could easily access price information updates as long as the phones had internet access. Access to production information via these applications was limited as production information is very bulky and accessing them through text messaging was complex.

The costs of using the mobile phone farming applications

The second research question was:

What are the costs of using the mobile phone farming applications and are they affordable to the smallholder farmers?

The study found that the cost of using these applications were affordable to the smallholder farmers. The costs of sending a text message or making a call through these applications were similar to the normal charges of sending a text or making a call in Kenya which was about KES 1 (US\$0.0095) for texting and KES 3 per minute (US\$0.0286) for calling. The farmers with the Mfarm app installed on their phones reported that the cost of accessing price information via the internet was affordable. All the farmers interviewed agreed that the cost of using these services were affordable to them. Some farmers mentioned that even if the costs were to be higher they would still use the mobile phone farming service because the benefits of having stable and reliable markets were higher. One of the farmers in the rural area said:

Respondent F: "For me the costs are not an issue, one shilling per text is affordable. But even if the costs would be a little higher I would not mind as long as I can access better markets." (Source: Fieldwork notes 2013)

The smallholder farmers using the applications used text messaging more than calling since the costs of texting were lower than the costs for calling. Calls were only made when it was necessary and the message to be sent was longer or the reply needed was also longer.

The effect of using the mobile phone farming applications on the smallholder farmer's access to information and markets

The third research question explored was:

What has been the effect of using the mobile phone farming applications to the smallholder farmers' access to information and markets?

This section explored the differences, if any, that the mobile phone farming applications have made to the farmers in terms of accessing information and the effect of this on their marketing and production experiences. From the interviews it was evident that the use of these applications had facilitated the farmers' access to information at affordable costs and faster rates. These applications had enabled the farmers to meet most of their information needs, ranging from price information, marketing, availability of inputs their prices and production information. Among the three mobile phone farming service providers, there were differences in effectiveness in the type of information accessed. All the three mobile phone farming applications were effective in providing price and market information to the farmers

as well as linking them to buyers. However, in terms of providing production information, the NAFIS service was more effective because of its integration of mobile phone application and the internet in providing such information. One farmer using NAFIS reported that:

Respondent M: “NAFIS provides detailed production information. Getting such information through my phone is difficult because of the content. So when I want detailed information on dairy farming or even greenhouse farming I just go to their webpage and access the information. I did this when I was establishing my tea farm and it was very relevant. I did not have to ask for information somewhere else.” (Source: Fieldwork notes 2013)

Smallholder farmers experienced several benefits in terms of their farming experience of using the mobile phone farming applications. They found accessing information had become easier, faster and cheaper. The cost of texting to inquire about the price of a commodity or link to a buyer was affordable. In addition, the relay of information from texting to receiving a reply was fast so farmers were able to make decisions promptly. The information was reliable and current therefore the farmers were able to make prompt marketing decisions depending on the market offering higher returns. Farmers were able to form linkages and networks that the farmers with other farmers and traders through the use of the applications. Interestingly as the linkages and networks expanded, these linkages and networks eventually became the farmers’ main source of production information. The farmers generally did this by calling other farmers to get the information they wanted. Therefore the mobile phone farming applications enabled the farmers to create linkages with other farmers who provided important sources of information.

Moreover, since the farmers were able to access price information easily and at a cheaper cost through the applications, they were able to negotiate better prices for their produce when selling their produce to the middlemen. This was particularly evident among the rural-based farmers who were often prone to exploitation from middlemen. Access to price information through the use of these mobile phone applications actually empowered the rural smallholder farmers. Similarly, some of the farmers stated that access to price information had enabled them to anticipate price changes in the market, thereby planning their production around the price changes in order to benefit from seasonal price changes. In addition, the farmers, especially the rural ones, were able to know which crops had higher returns and therefore some of them were adopting such crops. One of the respondents said that:

Respondent L: “One of the advantages is that I know the prices of my produce. Even if I was to sell to the middlemen, at least now I know what my produce costs therefore I can insist on a better price. If he does not agree on the price I am offering, I tell him to go away since I can access another market easily.” (Source: Fieldwork notes 2013)

These benefits had direct effects on the smallholder farmers marketing experience which included: reliable and stable markets, access to better paying markets, reduced marketing transaction costs, ability to access a wider range of buyers and faster access to markets. The first effect the farmers reported was that they were able to access stable and reliable markets. Market stability and reliability was achieved through a combination of contract buying by the traders and the farmers having the opportunity to access wider sections of markets in various urban centres. While the Mfarm application offered the farmers the

opportunity to link with buyers and sign contracts, the other applications offered the farmers the opportunity to contact buyers easily through the system. In the case of Mfarm, when a buyer wanted to opt out of the contract, the buyer was required to give the farmers a 2-week notice period in order for the farmer to look for an alternative buyer. Several of the farmers mentioned that it often took less than a week to link up with interested buyers through the application system. Furthermore, the networks and linkages formed through the use of the services extended the farmers market reach as well as information on markets. If a buyer failed to turn up, the farmers could easily look for an alternative buyer through the application system. One of the farmers said that:

Respondent D: “Now I have peace of mind since I know where I will sell my produce. Mfarm has made marketing easy for me. Even if I have excess produce I just send a text through Mfarm and I easily link up with a buyer.” (Source: Fieldwork notes 2013)

The second effect of the use of the mobile phone applications by the farmers was that they were able to get better prices for their produce i.e., access markets with better returns. This was especially evident among the rural farmers who were able to access markets beyond the rural boundaries. Most of the rural-based farmers were selling their produce directly to traders in the towns where the prices of the commodities were higher. The urban-based farmers were also able to access better paying markets as the farmers were involved in negotiating the prices of their produce, thereby they avoided being exploited by the traders. One of the rural farmers mentioned that:

Respondent F: “I sell all my passion fruits to traders in Eldoret town because of better prices. Because of this I have been able to increase my farming income. The good thing about marketing my produce in Eldoret is that I avoid the price fluctuations here in the village since sometimes the rural markets are flooded with passion fruits therefore the prices drops.” (Source: Fieldwork notes 2013)

The third effect the farmers mentioned was the reduced marketing transaction costs in terms of money and time. They said that they were able to access price information on their phone easily thereby saving them time spent searching for information. In addition, marketing transaction costs were reduced because the farmers were able to market their produce directly to the final trader without going through the middlemen. Moreover, information search costs was also reduced, thereby reducing the costs of searching for price information. Among some of the buyers, especially the ones using Mfarm, the buyers were responsible for transporting the produce from the farm to their premises thereby reducing transport costs among the farmers. One of the farmers mentioned that:

Respondent L: “The trader who buys my Irish potatoes and peas picks the produce right here in my farm at his own costs. That has saved me a lot of money that I previously used in transporting the produce to the market.” (Source: Fieldwork notes 2013)

The fourth effect that the farmers mentioned was increased marketing opportunities. This was because farmers could search for a buyer through the mobile phone farming system and through the linkages and networks they had formed through using the mobile phone farming applications. Instead of just relying on the middlemen and the greengrocers, the farmers were exposed to other buyers. In some cases, two or more buyers would be interested in the farmer’s produce and the farmer would choose the one who offered the best

price. This had the overall effect of making the farmers produce competitive; they got better prices for their produce. One of the farmers mentioned that:

Respondent M: “Can you imagine sometimes I would get more than two responses from different buyers interested in my produce! I then simply choose a buyer who would give me a better price and would accept to pick the Irish potatoes from my farm.” (Source: Fieldwork notes 2013)

The fifth effect the farmers mentioned was that they were able to access markets at a faster rate i.e. the time for searching for a buyer had reduced. This was particularly so for the rural-based farmers who had to contend with poor road infrastructure. The contracted farmers had to remind the buyer about the agreed sale date a few days before harvesting in order for the buyer to come and collect the produce in time. Most of these farmers did not have a storage facility for their produce since as some farmer mentioned, that were able to sell their produce the same day they were harvested. This was significant taking into consideration that these farmers had small pieces of land and every space in the farm that was free was used for farming. Therefore, by not being forced to own a store, more land was freed up for farming. Faster access to markets also had the overall effect of giving the farmers extra time which they either used working on their farm or spending time with their families.

The effect of the use of the mobile phone farming applications to smallholder farmers’ production

Although it was difficult to relate the effect of the use of the mobile phone farming applications to production, there were some indirect effects. The indirect effects were related to the farmers’ motivation to increase production due to: easier access to markets, availability of better paying markets, reduced price fluctuations and reduced marketing transaction costs. It was evident that the farmers were accessing production information through the mobile phone farming applications; their preference were markets and market information compared to production information.

The effects and benefits associated with marketing provided the impetus for farmers to increase their production capacity by either adding other enterprises onto their farm or increasing the area of land under production. Some farmers engaged in more than one enterprise such as growing crops for the local markets and high-value vegetables for export markets in order to benefit from both markets. In addition, the reduced information search costs and the existence of stable and reliable markets were a stimulus for the smallholder farmers to increase their production. However, assessing the direct effect of the use of the mobile phone farming services on the smallholder farmers was difficult because these applications were not effective in providing production information compared to marketing information. One farmer in Narok mentioned that he had learned about a better performing variety of Irish potato through Mfarmer and as a result he had started growing the variety on his farm. The farmer mentioned that:

Respondent J: “I just learned a few months ago about this better performing variety of Irish potatoes through the service and so I have decided to introduce it in my farm.” (Source: Fieldwork notes 2013)

The major source of production information to the smallholder farmers was the network and linkages and the internet. Through the networks and linkages the farmers were able to learn and exchange information through their peers.

Conclusion

The aim of this research was to explore smallholder farmers' use of the existing mobile phone farming applications and to assess the effect of these applications on the farmers farming and marketing experience in Kenya. The mobile phone farming applications that were explored were: Mfarm, Mfarmer and NAFIS. Two key conclusions can be deduced from the study. First, the study title had asked the question: market in their palms? From the study, it was evident that the mobile phone farming applications have been effective in connecting smallholder farmers to accessing marketing information and the markets. The smallholder farmers have markets in their palms through the use of the mobile phone farming applications to access markets. It was clear that these farmers use these services to mostly access markets and marketing information compared to agriculture extension information. The mobile phone farming applications were effective in meeting the smallholder farmers' market needs. The overall effect of the use of the mobile phone farming applications in marketing was the reduction in information search costs as well as marketing transaction costs which in turn had led to increased access to markets by the smallholder farmers.

The second finding was that these mobile phone farming were not effective in providing extension and production information to the smallholder farmers. The agriculture extension and production information provided by these services were limiting and as a result the smallholder farmers were using other means to access this type of information. However, it was evident that the ease of access to markets had a positive effect on production of smallholder farmers.

References

- Aker, J. 2011. 'Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries'. *Agricultural Economics* 42 (6): 631–47. doi: 10.1111/j.1574-0862.2011.00545.x
- Delgado, C. 1999. 'Sources of growth in smallholder agriculture in sub-Saharan Africa: The role of vertical integration of smallholders with processors and marketers of high value-added items'. *Agrekon* 38: 165–89.
- Gitau, R., Kimenju, S., Kibaara, B., Nyoro, J., Bruntrup, M. and Zimmermann, R. 2009. *Agricultural Policy-making in Sub-Saharan Africa: Kenya's Past Policies*: Egerton University. Tegemeo Institute of Agricultural Policy and Development.
- Government of Kenya. 2009. *Agricultural Sector Development Strategy*. Ministry of Agriculture, Nairobi, Kenya.
- M-Farm. 2013. www.mfarm.co.ke. Accessed 3 September 2013
- Mfarmer. 2013. *About Mfarmer Kenya*. Accessed 24 September 2013 <http://www.mfarmerkenya.org/>
- Nyoro, J. 2002. *Agriculture and Rural Growth in Kenya*. DFID Kenya commissioned study, Tegemeo Institute, Egerton University.

- Nyoro, J., Kiiru, M. and Jayne, T.S. 1999. *Evolution of Kenya's maize marketing systems in the post-liberalization era*. Tegemeo Working Paper 2A. Tegemeo Institute of Agricultural Policy and Development, Nairobi, Kenya.
- Okello, J., Oliver, K., Njiriani, G. and Gitonga, Z. 2011. *Drivers of Use of Information and Communication Technologies by Farm Households: The Case of Smallholder Farmers in Kenya* (Vol. 4).
- Silva, H.D. and Ratnadiwakara, D. 2008. *Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka*. Paper presented at the IDRC Conference, Ottawa, Canada.
- Thurlow, J., Kiringai, J. and Gautam, M. 2012. 'The Kenya case study.' In Diao, X, Thurlow, J. Benin S. and Fan S. (eds), *Strategies and Priorities for African Agriculture: Economywide Perspective from Country Studies*. IFPRI, Washington, DC. 77–106.
- World Bank. 2008. *World Development Report 2008: Agriculture for Development*. World Bank, Washington, DC.

The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

CTA operates under the framework of the Cotonou Agreement and is funded by the EU.

For more information on CTA visit, www.cta.int

Contact us

CTA
PO Box 380
6700AJ Wageningen
The Netherlands

Tel: +31 317 467100

Fax: +31 317 460067

Email: cta@cta.int

 www.facebook.com/CTApage

 [@CTAflash](https://twitter.com/CTAflash)

