Research Application Summary

Information and Communication Technologies and agricultural knowledge management: Comparative assessment of peri-urban and rural settings in Kenya

Odongo, D. A.[1], Mugivane, F.[1] & Olubayo, F.[1]
Department of Agriculture Economics, University of Nairobi, P. O. Box 30197, Nairobi, Kenya
Corresponding author: Odongo.dorine@gmail.com

Abstract

The purpose of this study was to investigate the use of ICTs among smallholder farmers and extension agent for knowledge management, and compare the situation in peri-urban and rural settings. The study was carried out in two districts of Kenya, one representing the rural setting and the other representing the peri-urban setting. Data were collected using semi-structured questionnaires and key informant interviews in both districts. A total of 200 questionnaires were administered to smallholder farmers in both districts; the government extension agents from the Ministry of Agriculture were interviewed in both districts, as well as the non-government extension agents who included NGOs, and private companies. An independent samples t-test analysis was conducted to compare the use of ICT for farmers in peri-urban and rural settings. There was no significant difference in use of ICTs among smallholder farmers in peri-urban and rural settings. It emerged that most of the famers use mobile phones for communication and sharing but not for acquiring information and knowledge, despite the development of recent technologies enabling the access of agricultural knowledge through mobile phones. There was a significant difference in access to internet and television programmes between the two settings, and it was also established that although radio programmes are the widely used form of ICT, they are still a challenge when it comes to ease of access due to inconsistency and poor timing of the programmes. The widely used form of knowledge dissemination by the extension agents is face to face, and group meetings. There is very limited use of ICTs to disseminate in extension information. There is therefore need to create more awareness about the new ICT based technologies developed for the famers, as well as capacity building and training on how to use these technologies.

Key words: Information and Communication Technologies, Knowledge, knowledge management

Résumé

Le but de cette étude était d'étudier l'utilisation des TIC chez les petits agriculteurs et les agents de vulgarisation pour la gestion des connaissances, et de comparer la situation dans les milieux péri-urbains et les milieux ruraux. L'étude a été menée dans deux districts du Kenya, l'un représentant le milieu rural et l'autre représentant le milieu péri-urbain. Les données ont été recueillies au moyen de questionnaires semi-structurés et des entrevues auprès d'informateurs clés dans les deux districts. Un total de 200 questionnaires ont été administrés aux petits agriculteurs dans les deux districts ; les agents gouvernementaux de vulgarisation du ministère de l'Agriculture ont été interrogés dans les deux districts, ainsi que les agents de vulgarisation non-gouvernementaux qui comprenaient les ONG et les entreprises privées. Un test- t pour échantillons indépendants a été exécuté pour comparer l'utilisation des TIC pour les agriculteurs en milieu péri-urbain et en milieu rural. Il n'y avait pas de différence significative dans l'utilisation des TIC parmi les petits agriculteurs dans le milieu péri-urbain et le milieu rural. Il est apparu que la plupart d'agriculteurs utilisent les téléphones mobiles pour la communication et le partage, mais non pas pour acquérir des informations et des connaissances, malgré le développement des technologies récentes permettant l'accès aux connaissances agricoles via les téléphones mobiles. Il n'y avait pas de différence significative dans l'accès à l'internet et aux programmes de télévision entre les deux milieux, et il a été établi aussi que, bien que les programmes de la radio sont la forme très répandue de TIC, ils sont encore un défi quand il s'agit de la facilité d'accès suite à l'incohérence et à la mauvaise coordination dans le temps des programmes. La forme très répandue de la diffusion des connaissances par les agents de vulgarisation est le face à face et des rencontres de groupe. Il y a une utilisation très limitée des TIC pour diffuser les connaissances séparément. Il est nécessaire de créer une plus grande sensibilisation sur les nouvelles technologies basées sur les TIC, développées pour les agriculteurs, ainsi que le renforcement des capacités et la formation sur la façon d'utiliser ces technologies.

Mots clés: Technologies de l'Information et de la Communication, Connaissance, gestion des connaissances

Background

Knowledge is fast gaining popularity across many disciplines as a very important asset and key resource in organisations. Uriarte (2008) recognises that knowledge is now the new strategic imperative of organisations, and states that "knowledge is an essential asset that has become more important than land,

labour or capital in today's economy". Review of existing literature reveals that there exist multiple definitions of knowledge. This study borrowed the definition of knowledge from the works of Tiwana (2000), where knowledge was said to be "information, skills and expertise gained through experience or learning when applied for the right action in the right format, at the right time and place, for decision making". This definition is based on decisions made and actions taken as a result of knowledge, and emphasizing on the context in terms of time and appropriateness. As Davenport and Prusak (1998) argue, decisions and actions form the basis of evaluating knowledge.

Similarly, multiple definitions of knowledge management (KM) exist as put forward by various scholars. For the purposes of this study, knowledge management is considered to be a concept which includes elements of knowledge creation and acquisition, knowledge storage and retrieval, knowledge transfer and sharing; done at the right time and context. Knowledge acquisition, sharing, storage and retrieval are elements in a broader theme which is knowledge management (KM). Farmers need to continuously acquire and gather new knowledge to keep up with new emerging trends or technologies in the sector, in order to realise increased outputs. They also need to store this knowledge for future reference, and as they interact with fellow farmers thus sharing and transferring knowledge in the process.

This study therefore assumes that famers are already engaged in knowledge management in their daily activities. The study seeks to investigate what role Information and Communication Technologies (ICTs) plays in the knowledge management processes, and the extent to which they have been applied in KM within the smallholder famer context. With the widespread use of mobile phones especially in Kenya, voice and short messaging services have gained more popularity and they offer easy accessibility. Technologies involving use of short messaging services with the mobile phones have been developed in Kenya for example kuzadoctor/mkuza (see www.backpackfarm.com). The Government of Kenya (through its National Farmers Information Service –NAFIS) has also developed an internet based technology whereby farmers can log into a website and access any information and knowledge they require, as well as ask questions (see www.nafis.go.ke). According to Nyirenda-Jere (2010), traditional forms of ICT such as radio and

televisions have become more prevalent in advisory service provision, with more radio and television stations giving airtime for agricultural programmes or information. With this consideration, the study considered ICTs to include radios, televisions, mobile phones, as well as computers and use of internet. The importance of ICTs and communication in KM is also emphasized by Alavi and Leidner (1999) who argue that "knowledge is personalised and in order for one person's knowledge to be useful to another individual, it must be communicated in such a manner as to be interpretable and accessible to the other individual."

Study Description

The study was conducted in two districts in Kenya with Mbooni West district used as the rural site while Dagoretti district was used as the peri-urban site. Mbooni West is situated in rural Eastern Kenya about 160 km from Nairobi City. Its geographical coordinates are 1° 62' 0" South, 37° 47' 0" East. Dagoretti district is on the outskirts of Nairobi County about 11.9 km from Nairobi City, and it covers an area of 38.5 km^2. Its geographical co-ordinates are 1° 18' 0" South, 36° 46' 0" East. Dagoretti district is one of the major towns in the outskirts of Nairobi City in which horticultural production is a major economic activity. In the district, the average farm size is 0.2 ha, and the produce from this district supplies the major markets of Kawangware and Kangemi. There are farmers who engage in production using the green house technology. Mbooni on the other hand is a district located in the semi-arid parts of the country.

The study was conducted using qualitative and quantitative research design. Collection of primary data involved use of structured questionnaires and focus group discussions with the famers. A total of 200 farmers were reached in both districts (103 in Dagoretti, 97 in Mbooni). Two focused group discussions were held with an average of 30 farmers in each group, from both districts. Key informant interviews were used to target the extension officers both government and non-government agents in the districts. Secondary data were obtained from the review of literature. Quantitative data were subjected to both descriptive and inferential statistics, using the statistical package for social sciences (SPSS) software. Comparison of information between the two districts was done using correlation and the t-test.

Research Application

There was no significant difference ($p=0.56$) between the two settings as far as ICT use was concerned. In the peri-urban

setting, 71.8% of the respondents used ICTs to acquire agricultural information, while in the rural setting, 67.9% of the respondents used ICT.

Use of radio to acquire information and knowledge through the FM stations was found to be the most popular and widely used form of ICT with a majority of the farmers using ICTs identifying it as the mostly used form of ICT compared with 22.4% for television, followed by mobile phones and internet at 17.4% and 9.1%, respectively.

In the peri-urban setting, 54.4% of the farmers had very easy access to radio programmes, with 27.2% finding it moderately easy. The case was not significantly different in the rural setting with 52.6% of the farmers reporting very easy access to radio programmes and 19.6% of them reporting moderately easy access. In addition, 10.7% and 18.6% of the farmers found it not easy to access the radio programmes in peri-urban and rural settings, respectively. However, it emerged that while radio was a widely used form of ICT for dissemination of information and knowledge to farmers, a significant percentage (more than 45%) in both rural and peri-urban settings did not find it easy to access these radio programmes. From the focused group discussions held with the farmers, it emerged that most of the programmes were aired during inconvenient timings when the farmers were busy in the farms and were therefore not able to tune in, or they had inconsistent timings where they were not aired at the same time and thus left the famer unaware of when next they would be aired.

There was a significant difference between the two settings with respect to internet and television programmes. In the rural setting, only 3.1% of the respondents had easy access to internet services, with 89.7% of the respondents found it impossible to access internet services. On the other hand, 19.4% of farmers in the peri-urban setting could afford easy access to the internet services, while 68% found it impossible. These statistics reveal that as far as internet use is concerned, use and access is still very limited among smallholder farmers. The reasons cited by the farmers for this scenario were varied across the two sites; among the farmers with easy access to internet in the peri-urban areas, 3.9% of them accessed these services from their mobile phones; 38.5% of the famers in these areas did not know about internet services, with another 26.2% were aware of the technology, but with no knowledge on how to use it. In

the rural setting, 58.8% of the farmers did not know about internet services, but only 19.6% were aware of the technology but with no knowledge to use it.

These results reveal the level of awareness of these technologies, and calls for greater awareness campaigns and capacity building among the small-holder farmers. The Government of Kenya through its National Agricultural and Livestock Programme (NALEP) has developed a web based technology aimed at disseminating information and knowledge to farmers as a way of embracing technology in offering advisory and extension services to farmers (www.nafis.go.ke). However, from the study, it was established that a very insignificant percentage of farmers knew about internet and its use, with a much less percentage being able to access the technology.

An interview with the project's implementing team revealed that the content uploaded on the website was developed in collaboration with farmers and other stakeholders and was based on farmers' demand. However, farmers can only demand what they know or have information about. NALEP which is the implementing body of this technology use various forums to initiate demand from the farmers including exhibitions, farmer field days, and through the extension workers in the districts and divisional level. Although they used these channels through which they prompted farmers to demand, more needs to be done concerning capacity building and training on use of the technology.

Even with the increasing use of mobile phones across Kenya and the increasing development of mobile based technologies, it appears that most of the famers only use it as a form of communication and sharing information as well as sending and receiving money, but not as a means of acquiring new knowledge or information. Of the farmers in the peri-urban setting, 46.7% did not know about the mobile phone technologies which could allow them to access agricultural information. Similarly 42.6% of those in the rural settings equally did not have this information. This reveals that although mobile phones are widely used in Kenya, they are mainly for communication purposes as opposed to knowledge acquisition through the newly developed technologies.

As far as knowledge dissemination is concerned, the extension agents apply very limited use of ICTs. The government extension agents use face to face approach, group approach and exhibitions /field days as methods of disseminating knowledge to farmers. The only instance when ICT was used was when making announcements or advertisements about events like exhibitions; this of course occurs vey infrequently and is depended on fund availability. In such cases, they use radio programmes and vernacular FM stations to reach out to the famers. This approach was seen to be different from the private companies like the input suppliers. A private company (Syngenta) operating in the rural settings indicated that they mostly used radio programmes to reach out to their farmers and they had seen a good response with most of the famers contacting them for more information.

Conclusion

This study has been established that the extent to which ICTs are used for knowledge management in both districts is mostly for knowledge sharing, with the other elements of knowledge management which include knowledge acquisition, storage and dissemination being done with very limited or no use of ICT. Yet there are numerous technologies developed that involve use of ICT to acquire information and agricultural knowledge as well as being used for storing the same. There is need to create more awareness on these and train the end users on how to use them in order to achieve a positive transformation in the agricultural sector in Kenya,

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