RULES AND NOTES TO GUIDE AUTHORS

Papers submitted for publication should be sent to The Editor, Journal of AICM, agecon@uonbi.ac.ke.

The papers should contain the following:

1. Topic
2. Editors (Supervisors)
3. 2 brief paragraphs of summary of entire work
4. 2 paragraphs of important literature review
5. 1 to 2 paragraphs on methods used
6. 1 page on results and discussion of the study
7. 3 points on recommendation from study
8. References

In total this should form about two and a half pages
Principal’s Comment

I am pleased to note that MSc. AICM graduate students are carrying forward the spirit of the Regional Agricultural Information Network (RAIN) and the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) whose goals and objectives were to promote the provision and sustainable management of client-oriented agricultural information and strengthening regional capacities to access, generate, exchange, package, disseminate and use this information for agricultural research and development.

The results of the students work in this document show how they have incorporated Information Communication Technologies and Information Communication Management (ICT/ICM) content to enable access, understanding and utilization of agricultural knowledge. It is my hope that these researches will go out there and promote economic growth, fight poverty, reduce hunger and enhance resources through collective action in agricultural activities for development, extension and agricultural education and training.

Prof. Agnes Mwang’ombe
Principal, CAVS
AICM Graduates Bridge the Gap between Researchers and Farmers through Information and Communication

Education, training, information and communication for agricultural research and development in combination with Information and Communication Technologies (ICT) are becoming increasingly urgent in Africa and Kenya in particular.

The research findings in this Journal of AICM by MSc. AICM 2013 graduates, show that Kenya depends highly on agriculture, yet agriculture is still a weak sector of economy. The findings of the graduates identify the importance of agricultural education and training national development. As such agricultural programmes should move away from the conventional agricultural education and training systems of delivery (the blueprint approach) to learning process approach (participatory styles) that embrace ICT in delivery. This approach bridges communication gap between academics and practitioners in the agricultural sector.

The emphasis therefore is on information and communication to assist in getting developed technologies, research findings and modern methods of farming from the shelves in agriculture and related institutions to producers.

The AICM young scientists have gathered data from important sources of information for farmers (agricultural research and extension, Agricultural Training Centres-ATCs, agribusiness firms, agrochemical firms, electronic and print media) through formal/informal interviews and discussions to evaluate access to agricultural knowledge and information by various agricultural products.

In addition to concluding that a lot of technologies and research findings are on shelves and have not yet reached farmers unless better ways of information flow to farmers are introduced, the scientists have also recommended: providing agricultural education at technical level; re-educating trainers in response to market demand; involving farmers in response to market demands; involving farmers in planning of their training; innovation and practical orientation for agriculture and the need to review and rationalize agricultural curricula across board.

Dr. Fred I. Mugivane  
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Summary
The purpose of this study was to establish the factors that affect the use of agricultural knowledge and information systems (AKIS) tools in adoption of grain amaranth by smallholder grain amaranth farmers in Lugari, Kakamega County, Kenya. The AKIS tools in this study included radio, mobile, extension agents, researchers and farmer to farmer. The access to agricultural information by smallholders for improved agricultural production has increased the application of agricultural knowledge and information systems (AKIS).

The findings suggest that farmer-farmer (interpersonal) communication, FM Radio stations and cellular phones are important AKIS tools in improving small scale agriculture in rural areas. Socio-economic factors have significant effect in the adoption of grain amaranth production by smallholder grain amaranth farmers.

Literature Review
Theoretical perspective and conceptual framework:

1. Transfer of technology concept: This is a two-way flow of information with farmers at the centre as shown in the figure below. Farmers can get information from extension agents, researchers or gain education from other information sources (FAO, 2000).

2. Innovation-Diffusion Theory: Rogers and Shoemaker, (2005) define an innovation as an idea, practice or object perceived as new by an individual. It is the perceived or subjective newness of the idea for the individual that determines his/her reaction to it. If the idea seems new to the individual, it is an innovation. This theory relates well with adoption of grain amaranth using AKIS. The Adopter categories classify farmers according to the rate of adoption of a new technology or practice. The first adopters are called innovators. They are followed by early adopters, early majority, late majority and laggards. This is illustrated in the figure below.
Methodology

Design Approach
A multi-stage purposive sampling and proportionate allocation technique was used to select 131 respondents. A pre-tested questionnaire was used to collect data. Descriptive analysis was done by SPSS software while quantitative analysis was done by STATA software.

Data analysis
Regression model was used in the study - Y= α + β1X1 + β2X2+………..βnXn + ε

The study therefore used both descriptive and quantitative analysis

Results and Discussion

Over 53% respondents attained primary education. This has a negative impact since education is key in innovation adoption. Respondents’ information access and use through AKIS was as follows:

Farmer to farmer (interpersonal) communication is used more by respondents (93.9) in adoption for grain amaranth. This is a big challenge bearing in mind of the education level, 53% of respondents have primary level education. The technical content of information exchanged is low.

Y= α + β1X1 + β2X2+………..βnXn + ε…equation 1

Y (adoption) = 1.72 + 0.92X1 + 0.08X2 + 0.01X3 + 0.062X4 + 0.01X5 + 0.15….equation 2

Adoption=1.72 + 0.92Fellow farmer + 0.08Radio + 0.01Mobile + 0.06Researcher + 0.01Others+ 0.15………..equation 3

Adoption is positively related to AKIS tools. Farmer to farmer (inter-personal) communication brings positive change of 92% to adoption followed by radio at 8%.

F distribution at α=0.05, shows that use of AKIS tools has significance in the adoption of grain amaranth production by smallholder farmers in Lugari, Kakamega County.
Recommendations

1. The study recommends that the government strengthens the use of AKIS tools by restructuring research-extension-farmer linkages and making it affordable for farmers to buy mobiles and airtime for information sourcing. Deployment of technical extension staff should be based on their professional training and prevailing enterprises within the localities.

2. Further research should be carried on other factors such as market prices, farmers' tastes, infrastructure and input prices that affect adoption which could not be covered in this study.

References


Kari J, (2010). University of Tampere, Department of Information Studies and Interactive Media, 33014 University of Tampere, Finland

AN EVALUATION OF ACCESS TO INFORMATION ON PASSION FRUIT PRODUCTION BY FARMERS IN KEIYO NORTH DISTRICT, KENYA

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Summary
Passion fruit farming in Kenya is viewed as a viable enterprise and as an income generating activity. Its farming is gaining popularity in the country as trends for 2002-2010 show its production increasing yearly in Keiyo North district amid various production challenges. A study was conducted to evaluate the access to information on production of passion fruit by farmers in the district. Data was collected through key informant interviews, focus group discussion and administration of a questionnaire. The data collected was on social and economic characteristics, passion fruit management practices, access to initial/current information and dissemination channels.

The major findings of the study showed that majority (62.7%) of farmers, rely on fellow farmers for initial information on production and on extension agents for subsequent information. Baraza/field days were ranked as the most common method of information dissemination. The group approach was found to be popular with 80% of the farmers. This study concludes that there is need to equip farmers with more information which is well structured to suit the needs of the passion fruit farming community.

Literature Review
Challenges of low passion fruit production could be attributed to inadequate access and utilization of information on passion fruit production among farmers (Ogboma, 2010). Provision of agricultural information remains a domain of agricultural extension workers/agents. There are many different channels of communication used by extension agents to transmit agricultural information to farmers. The use of radio and newspapers are more common and accessible while fax, email and internet have low coverage due to their dependence on landline infrastructure (Aker, 2010).

The sources of information and media that farmers have had access to range from interpersonal sources such as friends and elders to new ICTs like mobile phones. However, mobile phones have rarely been used to access agricultural information (Kameswari & Gupta, 2011). According to Gauntam (2000), some of the earlier recognized channels for disseminating technical knowledge in extension were field days, bulletins and publications, barazas and public meetings called by the chief, the location administrative officer, or local extension staff. Most of these are still in use.

Methodology
The study was conducted in Keiyo North district of Rift Valley province. It is one of the 18 districts in Rift Valley province. The area was found suitable for the study because the farmers in this district grow passion fruits and interact with extension agents.

A key informant interview was conducted on extension agents to establish what extension messages and channels they used to deliver passion fruit production technologies to farmers. The main data collection tool used was the questionnaire. It was used to gather information on the channels used by extension personnel to disseminate information on passion fruit technologies to farmers. Data on farmers’ personal characteristics such as age, gender, level of education, size of farm, number of enterprises and number of children was collected. 51 farmers were sampled.

Results and Discussion
The findings in this research revealed that 3.9 % of the respondents had not attained any education, 62.7 % had primary level education, 25.5 % had obtained secondary education and 7.8 % had obtained tertiary education. There were more farmers who had attained primary level education than those with tertiary education. There were more farmers who had attained primary level education than those with tertiary education. Approximately 46 % of the sampled respondents had between 4 and 6 children while 2 % did not have any children. All the respondents were growing passion fruit and also engaging in other farm enterprises including maize, beans, wheat and dairy production. The next most common enterprise after passion fruit is maize followed by beans. Dairy farming accounted for only 26 % showing that crop farming is generally preferred to livestock keeping. There
are different practices performed by farmers on passion fruit. All the farmers were found to practice disease control. The activities practiced by the least number of farmers are nursery establishment (8%), irrigation (4.5%) and mulching (3%). 32 of all the respondents establish their own nurseries. This is a big number considering that one of the major messages by extension agents is that farmers should obtain clean planting materials from recommended nurseries. Many farmers practice disease and pest control but the methods they use are not very effective since they end up abandoning their crop after a while, precisely when it gets diseased. Most farmers practice pruning, staking (trellising) and pest control which are important aspects of passion fruit farming.

Majority of the passion fruit farmers relied on other farmers to provide initial information on passion fruit production. This accounts for 62.7%. This implies that extension agents did not participate much in the introduction of growing passion fruits and it was more of the farmers initiative. Based on the earlier observation on their levels of education, very few farmers went out of their way to source information from books.

Other farmers accounted for 20% as a source of current information, while a combination of government extension agents and local NGO agents accounted for 64.9%. This could be attributed to extension agents taking an interest in passion fruit production after farmers had through their own initiative started growing passion fruit and hence the reason for their being the most relied upon source of information. Frequency of passion fruit farmers receiving information from extension agents was 40.8% weekly and 38.8% monthly. 44% of the respondents reported that they visited or sought extension agents for information monthly. 28% said they never visited extension agents for information. 8% of the respondents said they never consulted fellow farmers. 64% consulted fellow farmers weekly. Farmers greatly rely on fellow farmers for information and do not take long before consulting one other. Extension agents use different channels to communicate passion fruit production messages to farmers. Some of the channels available to them are booklets/leaflets, radio/television, farm visits, baraza/field days and use of mobile telephone. Majority identified the most used channels as farm visits and baraza/field days. The farmers prefer personal contact with extension agents thus the choice picked. The respondents who have access to a mobile phone account for 92% while only 8% do not have access to a mobile phone. If extension agents were to choose communicating through mobile phones, majority of the farmers would be reached as reported (Aker, 2010) that the use of mobile phones can improve access to information about agricultural technologies by reducing the cost of obtaining this information through other means like paying visits to extension offices.

**Recommendations**

1. Both extension agents and farmers should aim at equipping farmers with more structured information since farmers rely on one another for information.
2. The group approach to information dissemination should be emphasised as it was found to be popular with most farmers. It will also be useful in reaching many passion fruit farmers at once.
3. Use of modern communication especially mobile phones should be encouraged to inform on planned training sessions and in future, could be used to access information directly from extension agents through platforms such as Short Message Services (SMS).

**References**

Aker, J. C (2011). Dial “A” for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries. Tufts University, Economics Department and Fletcher School, Medford, MA 02155.


Summary
Post harvest management of cereal crops is a major concern for smallholder farmers in Kenya. The country loses between 30 and 40 per cent of cereals harvest due to inefficiencies in handling and is faced with threat of Aflatoxin due lack of timely and relevant information and knowledge on post harvest management of cereal crops.

Decision-making by smallholder farmers is complicated by inappropriate and inefficient information transfer from research and extension services and low literacy levels among these smallholder farmers usually prevent farmers from using agricultural information effectively. New developments in ICTs offer possible solutions to these problems and thus the need for carrying out this study.

Literature Review
Past studies by several authors including Roling (1988), have defined Agricultural Information System as a “system in which agricultural information is generated, transformed, consolidated, received and fed back, to enable knowledge utilization by agricultural producers”. Generally, an Agricultural Information System consists of components (sub-systems), information related processes, system mechanisms and system operations. Research, extension and farmer can be seen as the major components of an agricultural information system. However, various actors and organizations can be found in a system. System approach can be applied to any specific farming systems in order to analyze how the information system works.

As cited by Chartman (1983); Aboyado (19870 and Ozowa (1995) a wide range of Agricultural information sources are available to farmers. Due to this wide sources of available agricultural information, there is therefore need to identify sources of Agricultural information that farmers prefer (Opara, 2008). This identification may help Agricultural information providers to re-examine the current media of information presentation to farmers.

Methodology
A descriptive research design was used for the study. A multi-stage sampling and simple random sampling methods were used to randomly select a total of 140 smallholder cereal farmers for the survey. Five Agricultural information service providers were purposively selected. The study used open and close ended questionnaires, semi-structured interviews and direct observations to collect primary data.

Results and Discussion
Results revealed that 61% of smallholder farmers reported extension agents as source of agricultural information, 48% from mass media and 1% from public research institutions and Universities thus showing lack of information support from the institutional sources for agricultural production. The results further showed that 15.4% of smallholder farmers have no access to agricultural information on Post harvest management, 61% access agricultural information once/year which is inadequate for effective agricultural information dissemination since there are two cropping seasons per year. Main findings of Pearson’s coefficient of correlation when age, formal education agricultural income and experience were correlated with the Total information score showed that $r$ was 0.02081. Thus, as a strategy to constraints in the existing agricultural information systems the focus should be addressing the low levels of formal education, low agricultural income and less agricultural experience.
Recommendations
1. The policy makers in the government should ensure that programmes on Agriculture by all service providers should focus more on capacity building of the extension agents with the emphasis on skill development on post harvest management ICTs.

2. Extension agents should be retrained by Ministry of Agriculture on promoting post harvest management activities bearing in mind the changing ICT environment.

3. All the leading agents in Agriculture sector spearheaded by Ministry of Agriculture need to develop a small holder farmers’ friendly Agricultural Information system which can address problems of post harvest management using ICTs.

References


THE EFFECT OF SPONSORS ON CONTENT IN VERNACULAR AGRICULTURAL RADIO PROGRAMS: THE CASE OF KASS FM KENYA

Author: Meshack Kipkemboi Ronoh
Editor: Prof. Levi, S.M. Akundabweni

Summary
This study was conducted on agricultural programmes aired on Kass FM radio, a vernacular radio station broadcasting in the Kalenjin language in Kenya. A content analysis was performed on agricultural programmes aired in the months of June, July and August 2012. The study sought to find out the effect sponsors had on the content of the agricultural programmes they sponsored.

Literature Review
Research has identified non-provision of necessary agricultural information as a key factor limiting agricultural development in developing countries. This is attributed to the absence of a functional agricultural information delivery system and the lack of access to relevant agricultural information by farmers (Aina, 1999).

Radio is the most popular and accessible medium in Kenya. 95% of all Kenyans listen regularly to the radio (Media council of Kenya, 2012). The status of the radio industry in Kenya today represents a rapid departure from a state-controlled monopoly that existed until the early 1990s. As a result, there is little research on the current state of Kenya’s radio industry. Since the entry of private broadcasters, the radio industry in Kenya has developed tremendously and this has affected how the medium delivers information and, ultimately, its effects on audiences.

Research design
Content analysis was applied in this study. The first step involved the determination of the universe of the study; all the agricultural programmes aired on Kass FM. The second step was the determination of the study sample size from the universe. The agricultural programmes selected were then recorded and transcribed. Content categories were used to define the classes into which the data collected would be coded. A coding schedule was then prepared using the content categories and this was used to conduct data collection. Collected data was thereafter analyzed using SPSS.

Frequency of occurrence of a theme was used as a method of quantifying the data. The first objective was measured by identifying the name of the sponsor and the business activity which they engage in. The second objective was measured by identifying the themes and topics that were discussed in each sampled programme. The third objective was measured by identifying various characteristics of the programme that can be considered as “sponsor influenced”.

Results and Discussion
This study found out that sponsors with a bias to agricultural programmes in Kass FM, were those who produce goods that are consumed by farmers. Agrochemical manufacturers/processors were the largest group of sponsors with a bias to agricultural programmes sponsorship in Kass FM. Others were milk processing companies, animal food processing companies, wholesalers and retailers of agrochemicals and insurance companies that offer agro-insurance.

The study also found out that dairy farming was the most discussed topical issue in agriculture followed by maize farming and wheat farming. These three topics accounted for 40% of the total agricultural topical issues discussed on Kass FM. This is so because a majority of Kass FM’s listenership practice these three forms of agriculture and sponsors take advantage of this reach to push for the consumption of their products. The study also found out that topics on livestock production were biased towards dairy production at the expense of other forms of livestock production like chicken, sheep, goat and fish.

The findings of this study show that, sponsors have a major influence on the content of agricultural programmes aired in Kass FM. This therefore means that sponsor influenced radio agro-programming inertia (SIRAPI) takes precedence over agricultural subject matter listenership (ASML) programming and hence, ASML programming is greatly affected by SIRAPI. Topical issues discussed in sponsored agricultural programmes were limited to the business activity of the sponsors. This greatly narrowed down the pool of agricultural information transmitted to farmers through these programmes.
**Recommendations**

1. Kass FM should also introduce programming policy that will increase the amount of topical issues on agriculture discussed in the programmes.

2. Kass FM should also introduce caveats during the programme to duly inform listeners of sponsored agricultural programmes that the information offered in the programmes might be biased towards the sponsoring company.

3. Kass FM should introduce programming policies that will lead to increased temporal reach of ASML programmes from the current 18% without reducing the number of SIRAPI programmes aired.

**References**


This study investigated these processes in the smallholder farmer set up and extent of ICT usage for these processes and compared the peri-urban and rural settings in Kenya. There are different sources of knowledge with a significant difference in percentage of farmers using each of the sources, as influenced by the specific information needs. ICT usage for knowledge management differs significantly in Dagoretti and Mbooni for specific ICT types including radio, mobile phones, television and internet. Radio is the ICT type used by most farmers in both settings to acquire agricultural knowledge, while Television and internet use are more popular in the peri-urban setting than in the rural setting. Setting, based on types of crops grown, information needs and infra-structure are important factors which influence use of ICT for knowledge management among the smallholder farmers. Despite the increased use of mobile phones across Kenya, the results reveal that farmers in Mbooni and Dagoretti districts mostly use their mobile phones just for sharing purposes as opposed to acquisition of advisory services. There is need to create more awareness and training in ICT use, to enable successful adoption and use of the technologies.

Agricultural knowledge management in the smallholder set-up.
Knowledge management is a broad term covering the social and technical processes that support communication and information management in organizations. According to Long and Villareal, (1994) knowledge dissemination and creation should be considered or placed in a social context involving specific actors and interacting individuals who become inter-related through networks of interest and through the sharing of certain knowledge frames.

The national development blue-print (the Kenya Vision 2030) envisions Kenya as a knowledge-led economy wherein, the creation, adaptation and use of knowledge will be among the most critical factors for rapid economic growth (GoK, 2005). This can only be achieved if knowledge management is embrace in both the formal and informal sectors. As stipulated in the World Bank report 2011, the creation and passing of information between the various actors along the agricultural value chain can be described as knowledge brokering, a concept which is argued to be critical to innovation and increased productivity. The ASDS lists various opportunities and advantages which can be exploited to build a robust and dynamic agricultural sector including human resources (GoK, 2010). Knowledge as is discussed in this study is embedded in systems and is also embodied in persons. This is evidence that there is availability of knowledge in the Kenyan agricultural sector. A report by the World Bank on ‘enhancing agricultural innovation’ further recognises that agricultural development depends to a great extent on how successfully knowledge is generated and applied (World Bank 2007).

It is against this backdrop that the study sought to establish the status of knowledge management among smallholders’ farmers with respect to their sources of knowledge, as well as how they reach these sources or obtain the knowledge

Methodology
A semi-structured questionnaire was administered to a sample of 200 smallholder farmers obtained using the simple random technique in Dagoretti and Mbooni districts. Two focus group discussions were held in each district comprising between 10 to 20 farmers each. 16 extension agents were interviewed in both settings. Data was subjected to analysis using the IBM-SPSS software version 20 to obtain descriptive and inferential statistics, statistical significance set at 5%.

Results and Discussion
There are eight main sources of knowledge for farmers in both peri-urban and rural setting, with the percentage of farmers using each source varying significantly between the two settings, as influenced by information needs and accessibility of the sources. These include government extension agents, NGO extension agents, Farmer associations, input suppliers, Neighbours, Farmer maga-
zines. Private Companies, and self (tacit) knowledge.

Majority of farmers in Dagoretti (88.3%) use government extension agents as their knowledge source, that same source is used by 54.6% of farmers in Mbooni. Private companies are used by only 1% of farmers in Dagoretti in contrast to 35.1% of those in Mbooni who rely on private companies as a source of knowledge. Farmers in the peri-urban setting have easier access to Government extension agents than those in the rural setting; farmers in the latter setting have easier access to private companies. The study established that this difference is influenced by the context and the information needs. Private companies are more prominent in the rural setting due to the export oriented nature of farming in Mbooni west district. Majority of farmers grow French-beans with a high demand in the export market, compared to Dagoretti district where the main vegetables cultivated are for consumption in the local market.

Use of ICT is influenced by the setting based on nature of business with respect to types of crops grown, information needs and infra-structure. 71.8% and 68% of farmers in Dagoretti and Mbooni respectively use ICTs to acquire knowledge. There is a significant difference in the use of specific different ICT types by farmers in the two settings. Radio is the type of ICT used to acquire agricultural knowledge that is mostly used by farmers in peri-urban and rural settings in this study. Television and internet use are more popular in the peri-urban setting than in the rural setting. Poor infra-structure is one of the major reasons behind this significant difference in use of television and internet; while radios can use the lowest form of technology and energy like the battery cells, the latter requires a higher form of technology and energy like electricity or stronger cells of higher voltage. These are expensive, thus out of reach for most farmers.

**Conclusion and Recommendations**

1. The entry of non-government stakeholders in the extension and advisory services sector has increased the farmers' sources of knowledge because they have several options to consult when in need of information.
2. The Government needs to ensure harmonization or put in place structures for collaboration among different stakeholders in extension service provision in order to facilitate the success of the extension policy.
3. Adoption levels of the ICT-based innovations are still very low and this calls for awareness campaigns, as well as train farmers and the extension workers on ICT usage to promote the adoption of these technologies.
4. There is need to create more awareness about the ICT-based innovations that enable access of knowledge among the farmers, so as to enhance their adoption and use.

**References**


The spread of mobile phones into rural areas represents one of the most profound changes in rural Kenya and many other developing countries in the past decade (Global Satellite Messaging, 2008). Farmers, agricultural processors, and marketers have transitioned from a culture in which there was virtually no telephone service of any kind to one in which mobile phones are now widely utilized among farmers and at rural markets.

As pointed out by Dean, Faculty of Agriculture, Prof. S Shibairo in Volume 1, Issue 1 of AICM Newsletter; ‘The bridge between the research side of technology and adoption side is the information and communication technologies’. Mobile phone communication provides one of such technologies.

Many digital platforms have been hosted that try to communicate to farmers agricultural information ranging from input advertisements, input-output price fluctuations, extension messages etc., however, there is little documented information on the efficiency and effectiveness of the digital paradigm shift.

**Literature Review**

Reduced communication costs could not only increase farmers’ access to information, but also to public information such as those provided via agricultural extension services. The marginal cost of providing market information via Short Message Services (SMS) is cheaper than providing the same information via an additional extension visit, and is equivalent to providing the same information via radio. Reducing the costs of disseminating information could increase the extension system’s geographic scope and scale, as well as facilitate more frequent and timely communications between extension agents and farmers. This could, in turn, improve the quality (or value) of the information services provided. Yet the impact of these reduced costs on farmers’ adoption decisions will depend upon the ability of such information to serve as substitute for in-person mechanisms (Aker, 2010).

In Nigeria it was observed that farmers using cell phone made greater number of contact than those made by farmers who had physical contact with extension agents. It could be inferred from this finding that farmers using cell phone are more informed than farmers making contact with extension agents. Experts have also found out that cell phone, could be used as a tool to reduce extension farmers ratio of 1:2000 per farm families in Nigeria. (Bolarinwa et al, 2011).

In Kenya today platforms like iCow, M-Kilimo and Angaza Mkulima have employed mobile phone technology to pass extension messages to the Kenyan farmers. There is urgent need for our digital government to go full blast in providing e-extension to make available extension messages to the farmers without physical contact. In any case the number of extension agents has been going down since 1990 and the number of farmers has been going up.

**Methodology**

In the study, I investigated how dairy goat farmers used mobile phones in dairy goat rearing. The dairy goat farmers targeted were widows, caregivers and orphans in a World Vision project. The study was justified by the fact that dairy goat rearing has reduced the perennial inflow of relief food into the area. Household survey collected information from 100 dairy goat farmers on heterogeneous variables around ownership and use of mobile phones in keeping of dairy goats. The household survey was enriched by two Focus group discussions and four Key informant interviews.

**Results and Discussion**

From the study it was clear that use of mobile phone reduces the length of channel of communication to a minimum. 99% of farmers interviewed own or have access to mobile phones with a key significant fact that 95% of these farmers use mobile phone money transfer services at least once in a month.
Through the use of mobile phone communication dairy goat farmers of Mutonguni division are able to access market information on prices of goat milk, breeding stock, salt lick and livestock drugs and make comparison of the same before making a decision on where to buy or sell.

On management of the animals farmers use mobile phone to contact Livestock officers and the veterinary doctor to attend to their sick animals. This has greatly reduced response time and has saved lives of animals that could have otherwise died.

As a group the chairman of Kitui West Dairy Goat Breeders Association observes that ‘Mpesa has made debt collection very easy. The people we sell goats to just transfer the required amount to the treasurer’s mobile phone once they are satisfied with the goods’. A confession from one of the farmers is and I quote; ‘Ni kukwataa athooi aingi ma mbui, mbaikana nthenge, nanituthing’isyaa kuivwa na nziaya simu mbee wa muthooi ata nesiambui. Loosely translated as; ‘We receive a lot of orders for goats, whether does or bucks, and we insist on payment through mobile money transfer before the customer collects his goat’. Other team members added that mobile phone communication has also reduced the cost of following up on debts of milk sales.

Farmers of the group pay their monthly dues through mobile money transfer and this has greatly reduced defaulting and strengthened group collection. Mobilization for farmers to come for a meeting has never been easier as all the secretary does is to circulate an invitation all the members most of whom own or have access to mobile phones.

The enormous success of the dairy goat project could not have been captured better than in the Progressive Agribusiness magazine Edition 005 of May/June 2011 where the editor observes that ‘The introduction of commercial goat keeping in Mutonguni as a scalable poverty reduction strategy has turned out to be a best practice with the potential to stimulate this rural economy and offer lessons to other community based projects’.

Achievements of the project include; increased family income of those households who are keeping dairy goats. One widow confessed that from sale of milk and offsprings she has educated her daughter from Form one to Form four. Nutrition has also improved from consumption of goat milk. Goat milk is reputed to be more nutritious than cow milk and one needs just half the volume to prepare as much tea. Other benefits are increased crop yields from use of manure and collective action when farmers agreed to castrate local breed of bucks as soon as they mature to avoid breeding with the improved breeds and allow upgrading of local does with Toggenburg group bucks.

Truth be told, no innovation comes without challenges. Many farmers (99%) were able to cite one or a combination of challenges that they face as they use mobile phone in carrying out their business of keeping of dairy goats. Ranking highest at 32% is high cost of airtime. This is followed closely 27% by inadequate knowledge on use of mobile phones, which limits the number of features that a farmer can use on his/her mobile phone. Those who cite high cost of airtime, inadequate knowledge on use of mobile phone or both form 79% of the farmers, confirming that there is a burning desire among the farmers to exploit the technology for increased dairy goat production.

**Recommendations**

1. Most farmers (99%) own or have access to mobile phones and yet no farmer communicates over mobile phones on a daily basis. The constraint cited is high cost of airtime (32%). Development agencies coming up with community-based projects should include allocation of airtime especially for leaders of the groups to ease communication to various members of the groups. This will shorten the chain of communication, reduce message distortion and facilitate response from the receiver of the message.

2. Unlike Ugandan farmers who are capable of using mobile phones to take photos of agricultural demonstrations, using the loudspeaker function to permit a group of farmers to consult with an expert, recording group members pledging when they will repay loans, and storing data such as the date hens should start laying eggs, Kenyan farmers only use voice calls and send SMS as the only means of communication through mobile phone. There is need to build capacity of Kenyan farmers in their respective farmers groups on how to use the other mobile phone applications to reduce the digital divide.
3. The government should support those firms that offer e-extension platforms by reducing taxes on their equipment and levies on their activities. This will enable such firms to diversify their products and also be able to carry out publicity on their products. This will help them to expand their audience and be able to benefit more farmers to boost agricultural production.

4. Some research should be done among farmers in different parts of the country to bring out their views on the improvements that they think can enhance their use of mobile phones to improve agricultural productivity in their farms. This participation will spur adoption of mobile phone based innovations intended to improve agricultural production.

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