

Effectiveness of Nakuru Farmers' Call Centre Communication Media in Delivery of Agricultural Extension Services to Farmers in Nakuru County, Kenya

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ABSTRACT

Access to timely, accurate and relevant agricultural information, skills and technologies is among the limiting factors contributing towards low productivity and profitability in agricultural value chains in Nakuru County. Nakuru County Government introduced Nakuru Farmers Call Centre (NFCC), which is an alternative and innovative extension model for delivering quality agricultural extension services to farmers. The success of this initiative in promoting delivery of agricultural extension services and productivity has not been determined, especially on the ineffectiveness of NFCC's communication media. The purpose of this paper was to determine the effectiveness of communication media used by NFCC in delivery of agricultural extension services to farmers in Nakuru County. The study employed the descriptive survey research design. A target population of 3,473 farmers who are registered and have obtained agricultural extension services from NFCC and four experts who answer farmer's questions on a daily basis were used. Purposive, stratified, proportionate and simple random sampling procedures were used to select four sub-counties, 110 farmers and 4 experts who took part in the survey. A semi-structured farmers' questionnaire and experts' interview guide were used to collect data. The results indicated that phone calls, Short Message Service (SMS) and WhatsApp were the preferred communication media. Utilization of Twitter and Facebook were low due to limited farmers' skills in using social platforms, lack of smart phones and cost of data bundles. The farmers rated the success of NFCC communication media in delivery of extension services at $M = 3.24$ ($SD = 0.90$) on a 5 points scale. It was concluded that the communication media used by NFCC in delivery of extension services was effective. The paper recommends that NFCC should train farmers on e-extension, assist in reducing costs of using communication media by making farmers aware of discounts rates offered by mobile phone services providers and offering toll free services.

Key words: Nakuru Farmers Call Centre, communication media, effectiveness, agricultural extension services

INTRODUCTION

The agriculture sector plays a critical role in Kenya's economy as it accounts for 20 per cent of Gross Domestic Product (GDP) and employs over 40 percent of the total population and more than 70 percent of the rural populace (Central Bank of Kenya, 2022). It is important to ensure that the agriculture sector is vibrant given the critical role it plays in the Kenya's economy. This can be achieved through effective agricultural extension services since it has a significant impact on performance of agriculture (Cormarck, 2018). Danso-Abbeam *et al.* (2018) argues that the efficiency of a country's agriculture extension services determines the success of its agriculture sector, because through it, farmers are provided with information, technology and innovation which if well utilized leads to increased agricultural productivity.

Agricultural extension are systems designed to build and strengthen the capacity of rural farmers and other stakeholders through provision of access to information and technology as well as enhancing agricultural skills and practices, capacity to innovate and address varied rural development challenges (Barber *et al.*, 2018). Agricultural extension plays a key role in sharing knowledge, technologies, agricultural information and linking farmers to other actors in the agriculture sector (Anang *et al.*, 2020). Provision of quality extension services to farmers is important since it enhances agricultural productivity and their socio-economic well being (Cheplogoi, 2021). Despite its importance, provision of agricultural extension services to farmers has been facing various challenges in most African countries. These challenges include inadequate funding, poorly trained personnel, ineffective agriculture research

extension linkages, inappropriate agricultural technologies, low extension agents to farmer ratio and lack of clientele participation in program development (Krell *et al.* 2021; Munthali *et al.*, 2018). Studies conducted in Kenya show that low extension agents to farmer ratio, irregular evaluation of extension programmes and policies, institutional and programme instabilities of national agriculture extension systems as some of the challenges facing delivery of extension services (Chimoita, 2014; Kyambo *et al.*, 2021).

The challenges in provision of extension services previously noted at the national level are also experienced in Nakuru County. According to County Government of Nakuru (2021), the challenges encountered in the provision of extension services in the County include inadequate funding, short falls in extension staff, inadequate investment in research and development and inability to keep pace with the ever changing agricultural technologies. A promising solution for the shortcoming in delivery of agricultural extension services may be found in the increasing prevalence of ICT in developing and emerging economies (Lajoie-O'Malley *et al.*, 2020).

The proliferation of mobile telephony is providing new opportunities for delivering timely and relevant agricultural information and advisory services to farmers (Mapiye *et al.* 2021). In this space, agricultural call centres are emerging as a major channel for supporting large number of farmers across wider geographical locations and with fewer technical resources. Through their phones, farmers are able to access timely and relevant technical support at reasonable costs. Most small holder farmers live in rural areas and rely on public extension services for information on modern production practices and technologies. This calls for an effective agricultural extension model for information and technology transfer to small holder farmers to ensure increased productivity and farm incomes. To this end, in March 2018, Nakuru County government through the Department of Agriculture, Livestock and Fisheries (DOALF) came up with the Nakuru Farmers Call Centre (NFCC) as

an innovative ICT extension model of delivering agricultural extension services to farmers.

Setting up NFCC was a strategy aimed at upscaling agricultural extension service delivery to farmers in Nakuru County and boosting productivity. Nakuru Farmers Call Centre is an ICT platform that is supported by the County Government of Nakuru through the Department of Agriculture, Livestock and Fisheries (County Government of Nakuru, 2021). It's an extension model for delivery of agricultural extension services to farmers using ICT. NFCC concept borrowed heavily the extension methodology from the Indian Kisan Call Centre (KCC) based in Hyderabad in Telangana State. The concept was customized to fit the Kenya's situation specifically the Nakuru County farmers. It was established in March 2018 at the Nakuru Agricultural Training Centre (ATC) located in Soilo farm at the Njoro interchange. Its aim is to enhance delivery of agricultural extension services to farmers and reduce the effects of high farmer to extension officer's ratio in the county.

NFCC is operated by four technical officers; Crops officer, Livestock production officer, Fisheries Officer and a technical officer in-charge who on daily basis answers farmer's queries. NFCC also links farmers to various stakeholders such as other farmers, agriculture institutes, private extension providers, agricultural NGOs, research institute scientists, agriculture university scientists, agro-dealers and agriculture marketing services. There is a Coordinator who ensures smooth running of the Call Centre.

The NFCC operates for five days a week, from Monday to Friday between 8.00 A.M and 5.00 P.M (DOALF Nakuru County Extension report, 2020). The NFCC uses mobile telephony in form of calls, SMSs and social media platforms (WhatsApp, Twitter and Facebook) as the communication media to reach farmers with extension advisory services. The farmers use the same communication media to reach NFCC. For quality service, the farmers queries should be answered on real-time or within twenty-four hours (NFCC, 2020). Subject matter specialists

answer farmer queries on best agronomic practices and pest outbreaks using telephones. These queries are analyzed and if there is any endemic, timely advice can be emitted by the state agencies through television, radio's among other channels (Das, 2016). The NFCC concept has also been borrowed by other Counties in Kenya like Laikipia, Nyeri and Nandi.

Nakuru County government through the Department of Agriculture, Livestock and Fisheries (DOALF) launched NFCC in March 2018 with the aim of providing farmers with adequate and timely extension services leading to improved productivity. However, this has not been the case, as evidenced by unsatisfactory quality, relevancy and timeliness of information and insignificant improvement on productivity in farmers' agriculture value chains (Lee, 2018). This implies that NFCC has not been effective in delivery of extension services. Anang *et al.* (2020) and Kiptot and Franzel (2015) contend that, extension models are deemed effective when they are readily available, accessible and able to improve production and productivity. The failure by NFCC to enhance provision of extension services could perhaps be due to its communication media. The objective of this paper was to determine the effectiveness of the communication media used by NFCC in the delivery of agricultural extension services to farmers in Nakuru County. It sought to answer the research question; How effective is the communication media used by the Nakuru Farmers Call Centre in delivering agricultural extension services to farmers in Nakuru County?

METHODOLOGY

This paper adopted the descriptive survey research design. This design uses a survey to gather data which is used to describe a population, situation or a phenomena and focuses in answering, how, what, when and where, rather than why (Pawa, 2020). It involves conducting an investigation the way things are without manipulation of variables (Akhtar, 2016). The design was selected because this paper sought to establish how effective communication media used

by NFCC are in delivery of agricultural extension services. It involved data collection from a sample at one point in time without manipulation of variables.

This study was conducted in Nakuru County which is located in Rift Valley region, Kenya. The County borders Baringo to the North, Laikipia to the North East, Nyandarua to the East, and Kajiado to the South, Narok to the South West with Bomet and Kericho to the West (Nakuru County First Integrated Development Plan, 2013). Nakuru County covers an area of 7,495.10 square kilometers most of which is arable land. 202 square kilometers of water mass (Naivasha, Elementaita and Nakuru) while 679.60 square kilometers is gazetted forest. It comprises of eleven Sub-Counties namely Naivasha, Gilgil, Nakuru East, Nakuru West, Bahati, Subukia, Njoro, Molo, Rongai, Kuresoi North and Kuresoi South. Agriculture is the main economic activity of the inhabitants of the County with majority of farmers engaged in crop farming and livestock production (Kenya Information Guide, 2015). Other economic activities in the area are business, tourism, manufacturing and mining. The location was selected because it is among the few counties in Kenya that has a farmers' call centre. However, despite the presence of NFCC there has not been improvement in delivery of agricultural extension services to farmers and productivity.

The target population of the survey was all the 3,473 farmers in Nakuru County who had interacted with the NFCC to obtain agricultural extension services (NFCC, 2020). The four (4) NFCC experts (key informants) who answer farmers' questions on a daily basis were also part of the target population. The accessible population was all the 1993 farmers from Subukia, Njoro, Molo and Rongai sub-counties who had interacted with the Nakuru Farmers Call Centre to obtain agricultural extension services. The four (4) NFCC experts (key informants) who answer farmers' questions on a daily basis were also part of the accessible population. The 4 sub counties were chosen because they host the highest numbers of farmers who had interacted with the Nakuru Farmers Call Centre.

The farmers' sample size was determined using Kathuri and Pals' (1993) recommendation that the minimum sample size for a social science study is 100 for a population with out major subgroups. An extra 10 households were added to cater for dropouts and non-responsive subjects during the study. The sample size of the farmers was thus 110. All the four experts who answer farmers' questions on a daily basis were also selected. Proportionate sampling procedure was used to determine the number of farmers from each sub county. At the sub county level, simple random sampling techniques were then used to choose those who participated in the study.

The farmers' questionnaire and NFCC experts' interview guide were used to gather data. The questionnaire was selected because it is an efficient tool for collecting data from a large sample that is dispersed over a wide geographical area, is easy to administer, score and analyse (Sadan, 2017). The interview guide was chosen because it takes a short time to conduct and minimizes bias and subjectivity (Doody and Noonan, 2017). It also enables a researcher to control the topics and format of the interview, making it easier to code, compare and analyse data.

The farmers' questionnaire had sections with items for collecting bio-data, communication media used to deliver extension services and their effectiveness. The effectiveness of the communication media was operationalized as the level of success of phone calls, SMS, WhatsApp, Twitter and Face book in delivery of extension services to farmers in crop, livestock and fisheries farming areas. The farmers rated the success of the 5 communication media on a 1 to 5 scale (1= Not successful 2=Somehow successful, 3=Moderately Successful, 4=Successful, 5=Very Successful). The experts' interview guide had items for gathering respondents' bio-data, communication media used to interact with farmers and their effectiveness. The face and content validity of the farmers' questionnaire and experts' interview guide were checked by experts from Agricultural Extension Department, Egerton University. The reliability of the farmer's questionnaire was also estimated using

the Cronbach Alpha method. It yielded a reliability coefficient of 0.879 and was deemed reliable since the coefficient was above 0.70 threshold recommended for social science and education research (Institute of Digital Research and Education, 2016).

A permit to conduct the research was sought from the National Commission for Science, Technology and Innovation (NACOSTI). The respondents were formally contacted and the purpose of the research explained to them. Their consent to participate in the study was sought and the dates for administering the questionnaires and conducting interviews set in consultation with them. The farmers were taken through the modalities of filling the questionnaire before they were administered. The farmers were given adequate time and support whenever necessary to fill the questionnaires. The procedures for the interview were also explained to the experts before they were conducted. The interviews took a round 40 minutes and were recorded in paper and electronically.

The collected data was screened for errors and coded. The coded data was keyed in a data file and then analysed with the aid of the Statistical Package for Social Science (SPSS). The farmers' responses to the 15 close ended items that were used to measure effectiveness were scored on a 5 point scale; their means calculated and then transformed into an overall means (index). The overall mean was used as an indicator of success of communication media in delivering extension services to farmers. The communication media was deemed effective if it recorded an overall mean of 3.00 and above. Qualitative data gathered using open ended items and interviews were analysed thematically and summarized using frequencies and percentages.

RESULTS AND DISCUSSION

The communication media used by NFCC to deliver extension services and those used by the farmers to interact with the call centre were analysed. The modes of communication that NFCC uses to deliver extension services according to the farmers are presented in Table 1.

Table 1
Communication Media used by NFCC to deliver extension services to farmers

(n = 110)

Sl. No.	Communication media	Frequency	Percentage
1	Phone call	82	74.5
2	SMS	60	54.5
3	WhatsApp	22	20.0
4	Twitter	2	1.8
5	Facebook	8	7.3
6	Others (oral during visit to farm)	11	10.0

Multiple responses

The results in Table 1 reveal that majority of the farmers received extensions services through phone calls (74.5%) and SMS (54.50%). The rest received the services through WhatsApp (20.0%), Facebook (7.3%), Twitter (1.8%) and others (10.0%). Phone calls and SMS were thus the most commonly used mode of communication by NFCC. This was confirmed by information provided by the NFCC experts. The experts reported that their preferred media of communication were phone calls, SMS and WhatsApp. These findings are consistent with those of a study by (Aker, 2011) who noted that mobile phones were the most used channel of communication in the e-extension sector. This was attributed to the fact that mobile phones have both audio and video features which meet most of the basic needs of the poor and allow for a two-way communication between farmers and service providers.

With regard to preferred mode of communication when engaging with NFCC, the results indicated that farmers preferred phone calls (85.5%) and SMS (50.0%). Social media based platforms such as WhatsApp (6.4%), Facebook (5.5%) and Twitter (2.7%) were rarely used. These results are evidence that majority of farmers in Nakuru County access NFCC extensions services through phones and SMS. The results support those of study in Kilosa District in Tanzania by Mlozi *et al.* (2016) also observed that mobile phones and SMS were the most popular communication media among farmers. The popularity of mobile phones was attributed to the fact that they are affordable and allows direct communication with extension workers, and information can be shared using SMS

technology. The results show low uptake of social media based communication media such as Twitter and Facebook. Similar observations were made by Khan *et al.* (2017) in a study conducted in Bangladesh. The low uptake of these media was attributed to farmer's lack of knowledge and skills and awareness of role of social media in e-extension.

When asked to indicate the languages used by NFCC to deliver agricultural extension services, the farmers reported that Kiswahili (83.6%) and English (58.2%) were the most frequently utilized ones while local languages (12.7%) were the least used. The frequent use of Kiswahili could be due to the fact that it is the national language and the population of Nakuru County comprises of multi-ethnic groups. It should be noted that it is important to transmit agricultural information to farmers in a language that they understand best. This at times calls for use of local languages. A study conducted in Nigeria by Abdullahi *et al.* (2016) revealed that translation of agricultural extension services into local languages ensured it was understood and effective in assisting farmers in solving the problems they encountered in their farms.

The farmers rated the success of the 5 communication media (Phone calls, SMS, WhatsApp, Twitter and Facebook) NFCC uses in delivery extension services in crops, livestock and fish farming areas using a set of 15 closed-ended items. The responses to the items were scored; their means calculated then transformed into mean score of each of the 5 communication media. Table 2 presents the items and each communication media mean and their standard deviations.

Table 2
Communication media Items mean scores and their standard deviations

Sl. No.	Communication media	Farming area	n	Mean	SD
1	Phone calls	Crops	93	4.39	1.03
		Livestock	66	4.14	1.15
		Fish production	23	4.09	1.31
		Mean	3	4.21	0.16
2	SMS	Crops	81	4.14	1.10
		Livestock	55	4.02	1.23
		Fish production	22	4.05	1.25
		Mean for SMS	3	4.07	0.06
3	WhatsApp	Crops	79	3.20	1.44
		Livestock	50	3.18	1.47
		Fish production	18	3.33	1.41
		Mean	3	3.24	0.08
4	Twitter	Crops	55	2.15	1.30
		Livestock	44	2.25	1.40
		Fish production	12	2.58	1.68
		Mean	3	2.33	0.23
5	Facebook	Crops	67	2.46	1.47
		Livestock	44	2.50	1.41
		Fish production	12	2.08	1.31
		Means	3	2.35	0.23

The results in Table 2 show wide variations in the mean scores of the five communication media. Phone call mean scores (M = 4.21, SD = 0.16) and was followed by those of SMS (M = 4.07, SD = 0.23) and WhatsApp (M = 3.24, SD = 0.08). However, the means scores of Twitter (M = 2.33, SD = 0.16) and Facebook (M = 2.351, SD = 0.23) were relatively low. These high mean scores suggest that the farmers were of the view that phone calls, SMS and WhatsApp were effective in delivery of extension

services in crop, livestock and fish farming. The low mean scores of the other media is an indicator that they were perceived by the farmers to be ineffective.

The mean scores of the 5 media (mobile phones, SMS, WhatsApp, twitter and Facebook) that NFCC uses to deliver extension services to farmers were used to calculate the overall communication media mean score (index). The overall mean score was used as the measure of effectiveness.

Table 3
Effectiveness of Communication Media overall mean score and Standard deviation

Sl. No.	Communication media	Mean	SD
1	Phone Calls	4.21	0.16
2	SMS	4.07	0.06
3	WhatsApp	3.24	0.08
4	Twitter	2.33	0.23
5	Facebook	2.35	0.23
	Communication media overall mean	3.24	0.90

Table 3 reveals that the overall communication mean score was 3.24 (SD = 0.90) based on a 5 points rating scale. This means is above the mid-point (3.00 points), an indication that the farmers' perceived NFCC communication media effective.

Analysis of data from the experts on NFCC communication media also indicated that phone calls, SMS and WhatsApp were the most effective modes of delivering extension services to farmers. Phone calls were rated effective because they enabled services providers to articulate issues and give further explanations. The high rating of WhatsApp was attributed to its ability to relay photographs and Facebook because of its wide audience. However, the experts noted that the effectiveness of some of the media was constrained by limitations in ability of farmers to use ICT, social media platforms and type of phones (not smart) owned.

These findings indicate that the communication media used by NFCC were effective in delivery of agricultural extension services. The findings support those of Langat *et al.* (2018) which showed that ICT based platforms enables experts to package information using simple words that can be understood by most farmers. As a result, farmers find agricultural information relayed relevant and can copy or modify them to suit their farming needs. The results are also in concurrence with those of Ogola (2015) who noted that farmers rated mobile phones and SMS usage in delivery of extension services effective because they received prompt information on a wide range of areas such as market prices, financial management and methods of irrigation, use of insecticides and soil improvement.

The results, however, are not in harmony with those of a study conducted in Bangladesh by

Khan *et al.* (2017) who established that a high proportion of the farmers considered e-extension as either low or moderately effective in disseminating agricultural information. The low rating was mainly due to farmers' lack of ICT skills, poor networks and low internet speeds. It means that for a communication media to be effective it must be reliable and farmers must be conversant with it and possess the skill to operate it.

CONCLUSION

The communication media, especially phones, SMS and WhatsApp, used by NFCC are effective in delivery of agricultural extension services. Phone calls and WhatsApp enable farmers to discuss, ask questions and even exchange photograph with NFCC experts thus enhancing chances of using the extension services to solve the problems they encounter in their farms. However, there are challenges that impend effective use of these communication media. They include poor phone network, cost of using the media and limited ICT skills which limit the uptake and effectiveness of the media in delivery of extension services.

RECOMMENDATIONS

Even though the findings indicate that communication media used by NFCC were effective in delivery of agricultural extension services, there were areas that require improvements. In this regard, the paper recommends that NFCC should train farmers on e-extension (phones, computers, internet, use of social media) to enhance their abilities to use its services. NFCC should also assist farmers reduce costs (airtime, bundles, smart phones) of using communication media by making them aware of discounted rates offered by mobile phone services providers and offering toll free services where possible.

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