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EFFECTIVENESS OF THE NAKURU FARMERS' CALL CENTRE IN LINKING FARMERS TO AGRICULTURAL EXTENSION STAKEHOLDERS IN NAKURU COUNTY, KENYA

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ABSTRACT

This paper examined the effectiveness of Nakuru Farmers Call Centre (NFCC) in linking farmers to agricultural extension stakeholders in Nakuru County following reports of delays in responding to farmers' queries and requests by NFCC, provision of low-quality services, and lack of follow-ups. The descriptive survey research design was adopted during the study. The target population was all the 3,473 farmers in Nakuru County who were registered with NFCC and the 4 center experts. A sample of 4 center experts and 110 farmers selected using census, stratified, proportionate and simple random sampling techniques were involved in the survey. Data were collected using the farmers' questionnaire and experts' interview guide. Data were summarized and described using frequencies, percentages, means and standard deviations. The findings showed NFCC had linked majority (80.9%) of the farmers to extension stakeholders. The farmers rated linkages with Government/Public extension service providers ($M = 4.15$, $SD = 1.21$), agro-dealers ($M = 4.02$, $SD = 1.25$) and agriculture marketing services providers ($M = 3.54$, $SD = 1.50$) highly while those to agriculture university scientist ($M = 2.62$, $SD = 1.67$), agricultural NGO's ($M = 2.80$, $SD = 1.50$), and research institutes ($M = 2.98$, $SD = 1.46$), were low. The overall success of NFCC in linking farmers to stakeholders was rated at $M = 3.40$ ($SD = 0.50$). NFCC was successful in linking farmers with government/public extension services providers agro-dealers and agriculture marketing services providers. However, it was not successful in linking farmers to agriculture university scientist. Number of farmers call centres (FCC) should be increased and the centres be given adequate facilities and staff. These resources will enable FCCs to provide quality services to a wider section of farmers, link them to stakeholder promptly and make follow-ups as a way of ensuring that farmers have been assisted, thus enhancing their effectiveness.

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INTRODUCTION

Agricultural extension is a system designed to build and strengthen the capacity of rural farmers and other stakeholders through provision of information and new technologies. It enhances farmers' agricultural skills and practices and their capacity to innovate and address varied rural development challenges (Barber *et al.*,

2018). Agricultural extension also plays a crucial role in improving farmers access to finances and markets (Kwapong *et al.*, 2020). Agricultural extension further plays a key role in linking farmers to other stakeholders in the agriculture sector (Anang *et al.*, 2020).

Stakeholders are groups of people, organizations, institutions or individuals that are influenced by and

have abilities to significantly impact directly or indirectly on an area of interest (Mozumder *et al.*, 2018). In the context of agricultural extension, stakeholders refer to farmers, research institutions, agriculture university scientists, private and government entities engaged in delivery of extension services, provision of inputs, processing and marketing agricultural produce (Sutherland and Labarthe, 2022).

Linkages to agricultural extension stakeholders are initiated because farmers are not able to singly solve the multi-faced problems, they encounter in their farming activities (Ladele and Akinwale, 2016). Connecting farmers to stakeholders enhance their access to extension services, technology, inputs and markets (Nalumu *et al.*, 2021). Rose *et al.* (2021) contend that farmers should be connected to multiple stakeholders because farming requires information from diverse sources. They aver that linkages connect farmers to those who can provide information needed in diverse areas such as pests, parasites and diseases control, animal husbandry, post-harvest management, markets among others. Farmers Calls centers (FCC) have been found to be among the most effective means of connecting farmers to extension stakeholders (van Dijk *et al.*, 2022).

The advent of the mobile telephone technology has provided the agriculture sector with an alternative platform for providing timely agricultural information and advisory services to farmers (Mapiye *et al.*, 2021). The technology has enabled the setting up of FCC which support large numbers of farmers across wider geographical locations. The key role of FCC is to disseminate agricultural information on all aspects of crop, livestock and fish production, processing, and marketing (Rajasri *et al.*, 2013). The advisory services from call centers are accessed by farmers through their mobile phones. It has been found to be an effective agricultural extension model for information and technology transfer to smallholder farmers (CoLab, 2018). In its endeavor to enhance delivery of extension services, Nakuru County government set up Nakuru Farmers Call Centre (NFCC) in 2018.

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 (DOALF, 2020). It is an extension delivery mechanism that borrowed heavily from the extension methodology of Kisan Call Centre based in Hyderabad in

Telangana State, India. The concept was customized to fit the Kenya's situation and specifically farmers in Nakuru County. NFCC is located at the Nakuru Agricultural Training Centre (ATC) in Soilo farm at the Njoro interchange.

Setting up NFCC was a strategy aimed at upscaling agricultural extension service delivery to farmers, boosting agricultural productivity and reducing the effects of low Farmer to Extension Officers' ratio in Nakuru County that currently stands at 1:1400. It was also a strategy aimed at enhancing linkage between farmers and various agricultural extension stakeholders such as other farmers, agriculture institutes, public and private extension providers, agricultural NGOs, research organizations, agriculture university scientists, agro-dealers and agriculture marketing services.

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. There is a Coordinator who ensures the smooth running of the Farmers' 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, 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. The technical team is expected to respond to the farmers queries on real-time or within twenty-four hours (NFCC, 2020). Subject matter specialists answer farmer queries on best agronomic practices, pest outbreaks or other queries using telephones. These queries are analyzed and if there is any endemic problem, timely advice can be emitted by the state agencies through the television, radios among other channels (Das, 2016). The NFCC concept is now scaled up to other Counties in Kenya like Laikipia, Nyeri and Nandi.

The County Government of Nakuru established the NFCC with the aim of delivering quality extension services, among which was enhanced linkage between farmers and agricultural extension stakeholders. However, farmers have raised a number of complains such as delay in responding to their queries and requests and lack of follow-ups by NFCC and provision of low-quality services by stakeholders (NFCC, 2021). This is an indication that the performance of NFCC in linking farmers to stakeholders has been unsatisfactory. The

aim of this paper was to establish the effectiveness of NFCC in linking farmers to agricultural extension stakeholders in Nakuru County. The paper attempted to answer the question; how effective is NFCC in linking farmers to agricultural extension stakeholders?

METHODOLOGY

The descriptive survey research design was adopted during this study. According to Mahali *et al.* (2019) descriptive surveys are primarily concerned with determining “what is” and the state of affairs as they exist, without manipulation of variables. The design was deemed appropriate because the aim of this paper was to determine the effectiveness of NFCC in linking farmers to agricultural extension stakeholders. It entailed collecting data from a sample at one point in time without manipulation of variables.

The survey was conducted in Nakuru County, Kenya. Nakuru County borders Laikipia to the North East, Nyandarua to the East, Kajiado to the South, Baringo to the North, Narok to the South West, with Bomet and Kericho to the West (County Government of Nakuru, 2018). The County covers an area of 8376.7 square kilometers. It comprises of eleven Sub-Counties namely Naivasha, Gilgil, Nakuru East, Nakuru West, Bahati, Subukia, Njoro, Molo, Rongai, Kuresoi North and Kuresoi South. The total population of the county is 2.1 million people (Kenya National Bureau of Statistics, 2019). The main economic activity of residents of the County is agriculture, mainly crop farming and livestock production (County Government of Nakuru, 2021). The inhabitants of the County also engage in business, tourism, manufacturing and mining. The County was selected because it has a farmers’ call center, which have not recorded significant success in linking farmers to extension stakeholders.

The survey targeted all the 3,473 farmers in Nakuru who had interacted with NFCC to obtain agricultural extension services and 4 NFCC experts who answer farmers’ questions on a daily basis. The accessible population comprised of 1993 farmers from Subukia, Njoro, Molo and Rongai Sub-Counties who had interacted with NFCC and 4 experts from the centre. The 4 Sub-Counties were selected because they had the highest numbers of farmers who had sought services from NFCC.

All the four NFCC experts (census) took part in the survey while the sample size of the farmers was

determined using Kathuri. N.J. and Pals (1993) recommendation. They recommended that the minimum sample size of a social science study with a population that does not have major subgroups is 100. This sample size (100) was increased by 10 percent to 110 during the survey to cater for dropouts and non-responsive subjects. Proportionate sampling techniques were used to determine the number of farmers from each of the 4 (Subukia, Njoro, Molo and Rongai) Sub-Counties, from which the accessible population was drawn. At the Sub-County level, simple random sampling techniques were used to select those who participated in the study.

Data was collected using the farmers’ questionnaire and NFCC experts’ interview guide. The selection of the questionnaire was based on the fact that it is ideal for gathering data from a sample that is dispersed over a wide geographical area (Sadan, 2017). In addition, it is easy to administer, score and analyse. The interview guide was selected because it takes a short time to conduct, allows the interviewer to control topics and format of the interview, thus making it easier to code and analyse data (Doody and Noonan, 2013).

The farmers’ questionnaire had items for gathering the respondents’ bio-data, who they have been linked to, the extension area the linkages were based on and effectiveness of NFCC in facilitating linkages. The effectiveness of the NFCC in linking farmers to stakeholders was determined using a set of 10 close ended items on stakeholders: farmer to farmer, public/government and private agricultural extension services providers, agro-dealers, agricultural institutes, agricultural Non-Governmental Organizations (NGOs), marketing services and credit providers. These stakeholders were selected based on their interaction with farmers with regard to provision of extension services, inputs, credit, processing and marketing of farm produce and technical expertise (Table 1).

Effectiveness was operationalized as level of success in connecting farmers to these stakeholders based on a 5 points scale (1= Not successful, 2=Somehow successful, 3=Moderately Successful, 4=Successful, 5=Very Successful). The expert’s interview guide also had items on their bio-data, who they had linked farmers to, the extension area the linkages were based on and the effectiveness of NFCC in linking farmers to the stakeholders. Experts from Department of Agricultural Education and Extension, Egerton University assessed the face and content validity of the farmers’

questionnaire and experts' interview guide. Their recommendations were used to improve the two instruments before they were used to gather data in the field. The Cronbach Alpha method was used to estimate the reliability of the farmers' questionnaire. It yielded a

reliability coefficient of 0.78 which was above 0.70 thresholds recommended ensuring the reliability of the instrument (Taherdoost, 2016).

Table 1. Agricultural extension Stakeholders and Linkage with Farmers.

Stakeholder	Linkage to farmers
Farmer to farmer	Agricultural information, technology and innovation sharing
Government/Public extension service providers	Provision of agricultural extension services, farm visits, training, demonstrations, field days/ exhibitions
Private extension providers	Selling technologies and innovations to farmers
Agro-dealer	Supply of inputs (certified seeds, fertilizers, chemicals) livestock drugs
Agriculture institutes	Sharing knowledge, technology and innovations, offering training, conducting demonstrations
Research institute scientists	Providing expertise knowledge based on research, knowledge banks on crops, livestock and fisheries, bulking materials, soil testing, breeding
Agriculture university scientist	Sharing scientific knowledge, technology and innovations, providing specialized training, conducting demonstrations.
Agricultural NGO's	Soil testing, providing funds for agricultural technologies development and agricultural activities.
Agriculture marketing services providers	Connecting farmers to markets (contract, on-line, physical)
Credit providers	Provision of services for financing farming activities and agricultural transactions such as loans, bills of exchange, bankers' acceptance

Prior to conducting the survey, a permit to conduct the research was sought from the National Commission for Science, Technology and Innovation (NACOSTI). After obtaining the permit, the respondents were formally contacted; the purpose of the research explained to them and consents to participate in the study sought as guided by the Egerton University Ethics Committee. Thereafter, the dates for administering the questionnaires and conducting interviews set. On the diverse days, the farmers were taken through the steps of filling the questionnaire before they were administered. They were then given ample time to fill them. Similarly, the 4 NFCC were taken through the interview steps before they were conducted. The interviews were conducted in their offices and were recorded electronically and on paper.

This paper established the effectiveness of NFCC in linking farmers to agricultural extension stakeholders in Nakuru County. This objective was achieved by ascertaining whether the sampled farmers had been linked to extension stakeholders by NFCC, the extension

The collected data was screened for errors, coded and keyed in a data file and analysed with the aid of the Statistical Package for Social Science (SPSS) version 25.0. Data collected using open ended items and the experts' interview guide were organized in themes pertinent to the study objective and summarized using frequencies and percentages. The farmers' responses to the 10 close ended items on stakeholder categories that were used to measure effectiveness were scored on a 5-point scale, their means calculated and then transformed into an overall means (index). NFCC was considered effective in linking farmers to stakeholders if the overall mean rating was $M = 3.00$ and above.

RESULTS AND DISCUSSION

area the linkages were based on and the effectiveness of the call centre in facilitating linkages. The sampled farmers were asked whether they had been linked to extension stakeholders by NFCC. Majority (80.9%) indicated that they had been linked to stakeholders.

Those who had been linked to stakeholders provided additional information on extension areas the linkage

was based on. Table 2 presents the crop farming areas the linkage to stakeholder was based on.

Table 2. Crop farming extension areas the linkage to stakeholder was based on (n =110).

Agriculture extension area	Frequency	Percentage
Soil testing	56	50.9
Inputs (seed, fertilizers, agro-chemicals)	46	41.8
Crop husbandry (planting, weeding)	26	23.6
Pests and diseases control	47	42.7
Preservation and storage	14	12.7
Crop marketing and value addition	26	23.6

Table 2 shows that with regard to crop farming, the linkages were based on soil testing (50.9%), pests and diseases control (42.7%), provision of inputs (41.8%), marketing and value addition (23.6%), crop husbandry (23.6%), preservation and storage (12.7%). Soil testing, pests and diseases control, and inputs were key extension areas the linkages were based on. These findings are in harmony with those of MEAS (2015) reporting that information on pests, weed control and

fertilization schedules were frequently sought by farmers besides those on weather and market prices. Saravanan and Bhattacharjee (2014) also listed information regarding disease/pests outbreaks, crop cultivation technologies, new crop varieties and soil tests as the most sought services from Kisan Call Centre. The farmers also gave information on livestock farming areas the linkage to agricultural extension stakeholders was based on. The areas are contained in Table 3.

Table 3. Livestock farming extension areas the linkage to stakeholder was based on (n =110).

Agriculture extension area	Frequency	Percentage
Livestock husbandry	27	24.5
Livestock diseases/pests	30	27.3
Vet-chemicals	14	12.7
Livestock breeds	25	22.7
Livestock marketing and value addition	12	10.9

Table 3 shows that the areas of linkages included parasites and diseases control (27.3%), livestock husbandry (24.5%), breeds (22.7%), provision of veterinary-chemicals (12.7%), marketing and value addition (10.9%). These results show that control of livestock parasites and diseases, husbandry and breeds were the main linkage areas. The results suggest that farmers seek information and inputs related to livestock farming from various stakeholders. This is consistent with the findings of a study conducted in Mali, Benin and

Burkina Faso by Pousga *et al.* (2022) reporting that farmers frequently interacted with various agricultural extension stakeholders, public, private, NGOs and external donors.

The interactions were mainly related to livestock health and feeding. The farmers also provided data on fish farming extension areas the linkage to stakeholder was based on. Most of the farmers were linked in this farming area were relatively low compared to the others as shown in Table 4.

Table 4. Fish farming extension areas the linkage to stakeholders was based on (n =110).

Agriculture extension area	Frequency	Percentage
Fish management	8	7.3
Fish breeds	5	4.5
Fish ponds designs	8	7.3
Fish marketing and value addition	5	4.5

Table 4 shows that with regard to fish farming, the percentage of those that had been linked to stakeholders by NFCC was relatively low compared to the other farming areas. The linkages to stakeholders were based on fish ponds design (7.3%), management (7.3%), breeds (4.5%), marketing and value addition (4.5%). The low percentage of those who responded is an indication that fish farming is not popular in Nakuru County. Despite this, those in fish farming still sought linkages to perhaps improve their knowledge and skills in this farming area. This is in line with Nakuru County Government strategic plan of 2022-2025 which has provisions for promoting the development and management of fisheries, besides other farming areas

(County Government of Nakuru, 2021). A set of 10 close ended items in the farmers' questionnaire was used to determine the effectiveness of NFCC in linking farmers to agricultural extension stakeholders. The respondents rated the extent of success of NFCC in linking farmers to various stakeholders using five points (1=Not Successful to 5=Very Successful) scale.

The responses to the items were scored, their means calculated and transformed into linkage to stakeholders overall mean. NFCC was considered effective in linking farmers to stakeholders when its overall mean was above the 3 points mark. The items and linkage to stakeholders overall means and their standard deviations are in Table 4.

Table 5. Items and Linkage to Stakeholders overall means and their standard deviations.

Stakeholder	N	Mean	SD
Farmer to farmer	61	3.38	1.66
Government/Public extension service providers	73	4.15	1.21
Private extension providers	53	3.40	1.43
Agro-dealer	62	4.02	1.25
Agriculture institutes	43	2.98	1.46
Research institute scientists	46	3.04	1.61
Agriculture university scientist	45	2.62	1.67
Agricultural NGO's	41	2.80	1.50
Agriculture marketing services providers	50	3.54	1.50
Credit providers	45	3.47	1.52
Linkage of farmers to stakeholders overall mean score	10	3.40	0.50

An examination of the results in Table 5 reveals that farmers rated NFCC ability to link them to Government/Public extension service providers (M = 4.15, SD = 1.21), agro-dealers (M = 4.02, SD = 1.25) and agriculture marketing services providers (M = 3.54, SD = 1.50) highly. The high mean scores is an indication that NFCC was successful in linking farmers to these stakeholders.

The high rating could be due to the prompt response to the farmers' requests, high quality services or competitive prices for inputs and services offered during the interactions. However, linkages to agriculture university scientist (M =2.62, SD = 1.67), Agricultural NGO's (M =2.80, SD = 1.50), and research institutes (M = 2.98, SD = 1.46), posted relatively low mean scores. These low ratings imply that the farmers did not consider linkages to agriculture university scientist, Agricultural NGO's and research institutes a success. This probably could be due to delay in response to their requests, no follow-ups, lack of feedback, low quality

services or uncompetitive prices of inputs/services offered by stakeholders the farmers have been linked to. The overall mean score was high as it was well above the mid-point (3.00). The relatively high overall mean score, suggests that the farmers were of the view that NFCC was effective in linking them to stakeholders.

Analysis of data gathered from the 4 experts revealed that they were of the view that NFCC was very effective in linking farmers to agro-dealers, research institutions, spray and silage preparation and extension services providers. They attributed this to attempts by NFCC to ensure that all those who make inquiries and request for services were served. The views of the experts are in harmony with those of the farmers that NFCC was effective in linking farmers to agricultural extension stakeholders. These results support those of a study conducted in Uganda by Waiswa (2021) which found out that use of e-extension was effective in providing extension information and linking them to markets and suppliers of inputs. A study conducted in Central Kenya

by Krell *et al.* (2020) established that Call Centers do not only play a significant role in delivery of extension services but were more effective in recommending to farmers who to go to for information, inputs and technical support. They argued that call centers are manned by experts who by virtue of their training and experience are best placed to guide and link farmers to sources of information, inputs and services. Prakash and Kaur (2022)) contend that farmers should be connected to multiple stakeholders because farming requires information from diverse sources and areas such as pests, parasites and diseases control, animal husbandry, post-harvest management, markets among others. They argued that call centers were best placed to facilitate the linkage process because they interact with both farmers and agricultural extension stakeholders.

CONCLUSION AND RECOMMENDATION

On the basis of the findings, it was concluded that NFCC had linked farmers to various stakeholders. The linkages were based on soil testing, inputs, animal husbandry, breeding, pests, parasites and diseases control, ponds design and fish management. NFCC was successful in linking farmers with government/public extension services providers, agro-dealers and agriculture marketing services providers. However, it was not successful in linking farmers to agriculture university scientist, Agricultural NGO's and research institutes. Despite these shortcomings, it was an effective means of linking farmers to agricultural extension stakeholders. The paper recommends that the number of farmers call centers be increased and the centers be provided with adequate facilities and staff. This will have enabled FCCs to provide services to a wider section of farmers, link them to stakeholders promptly and make follow-ups as a way of ensuring that farmers have been assisted by stakeholders. This will go a long way in enhancing effectiveness of NFCC in connecting farmers to stakeholders.

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