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Preference of Using ICT over Extension Agents in Accessing Agricultural Information by Farmers in Developing Countries: A Case Study of Kitui West Sub-County, Kenya

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Information Communication and Technology (ICT), specifically Radio and Television are potential knowledge dissemination channels. This study investigated the usage of radio and Television compared to extension agents as sources of agricultural knowledge among farmers in Kitui West Sub County, Kenya. Specifically, the study identified that farmers potentially use radio and television as major sources of agricultural knowledge more than extension agents. The study employed a cross-sectional survey design. The target population was 19,970 smallholder maize farmers and the estimated sample size was 350. Proportionate clustered random sampling was used to select respondents in order to ensure reasonable representation of the population. Data was collected

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using two instruments namely; Researcher administered questionnaire for farmers and focus group discussion guide. The collected data was managed with computer program Statistical Package for Social Science (SPSS Version 21.0). Questionnaire instrument used provided quantitative data which was analysed using descriptive statistics namely; frequencies and percentages while focus group discussion guide instrument used to provide qualitative data was analysed using content analysis. Results were presented by use of a table. The study therefore concludes that farmers mostly use ICT mostly Radio in obtaining agricultural information. The study recommends to the County government to engage and fund the various information sources including public, private extension officers and local media especially radio and television to increase passing of information to the farmers.

Keywords: ICT; information source; private extensions agents; public extension agents.

1. INTRODUCTION

"Today, the demands on farmers have grown exponentially along with the size of farming operations and the sophistication of their tools. Despite incredible advances, their challenges are far more complex. Farmers today still need grit, foresight and good judgment" (Cargill, 2023). "Challenges facing agriculture range from shrinking land size as a result of population explosion, poor yields and food insecurity. The solution to these challenges lay in the adoption of modern farming trends" (Waititu, 2019). "But now they also need to adopt sustainable farming practices, embrace digital technologies and operate profitably to ensure their survival in the face of challenging economics, climate change and rising consumer demands for claims-based food, including traceability. Advanced technologies have dramatically increased yields with fewer resources and allowed farmers to plan and predict with far greater certainty than ever imagined" (Cargill, 2023).

"This information needs to be made available to the farmers. Apart from extension agents farmers also receive information from various other sources, especially mass media such as radio, TV, and newspapers" (Srivastava, 2018). Farmers have received agricultural information as inherited knowledge, from agriculture extension workers, radio/TV and from friends (Wanjiku et al., 2021). "Inherited knowledge in this case means practices or knowledge that are perpetuated within the household from one generation to the next. Knowledge sharing forums are convened to promote the exchange of local agricultural information among farmers, using participatory peer-to-peer education and learning" (Agim & Chioma, 2020).

"Information Communication and Technology (ICT) mean all devices, (including landline telephones, mobile phones, radio, internet and television broadcast) networking components, applications and systems that combined allow people and organizations to interact in the digital world" (Rouse, 2019). "Information communication technologies (ICT) are critical in the agriculture industry, much like in nearly every other industry in the world" (Ayim, et al., 2022). "These technologies, which include satellites, mobile networks, and internet, send and receive data, that if collected and interpreted appropriately yield valuable information" (Johri, et al., 2022).

"Private extension involves personnel in the private sector that delivers advisory services in the area of agriculture and is seen as alternate to the public extension" (Bloome, 1993). "It refers to the services provided in the areas of agriculture and allied fields by extension personnel working in the private agencies or organizations for which farmers are expecting to pay a fee and in computer and data managed with Statistical Package for Social Science (SPSS) computer program (SPSS Version 21.0). Instruments providing quantitative data were analysed using descriptive statistics namely; frequencies and percentages while instrument providing qualitative sometimes, services are provided without a fee" (Suraji et al., 2020). "Public extension services refer to the agricultural advisory services provided by government through its funding, mainly towards personnel emoluments, research, farmer trainings and transferring knowledge on agriculture to the farmers" (Matome & Antwi, 2022).

"Information sources are various means by which information is passed to create awareness, increase the knowledge of the user, to reduce his level of uncertainty or reduce the varieties of choices available to the users of information. For information to be effective, it must be accurate,

timely and relevant. Sources of information about agriculture activities are: radio, television, extension workers, cooperative societies, friends and colleagues, newspapers and magazines, books/leaflets, phones, libraries and institutes" (Adio et al., 2016). For this study information source will refer to the various ways farmers access information, these sources include public extension agents, private extension agents, and ICT (Radio/TV/Mobile phones/internet).

This study tries to compare the sources which rural farmers use and rely in order to get agricultural information and apply it in there production activities.

2. METHODOLOGY

A cross-sectional survey design was used for the study. This design involves looking people at one specific point in time (Lauren, 2023). The data is collected at the same time from people who are similar in other characteristics but different in a key factor of interest such as age, income levels, or geographic location (Deakin, 2021). Data is often obtained using self-report surveys and researchers are then able to collect a lot of information from a large pool of participants (Cherry, 2019). This design is selected since its quick, inexpensive, and can be used to determine what a community prefers as well as a fact that the participants are not normally treated or deliberately exposed (Wang & Cheng, 2020).

The study was carried out within 4 wards in Kitui West Sub- County, Kenya**.** This area has a population of 141,334 people while the number of farm households is 19,970 (KNBS, 2019). The target population for this study were the farmers in the 19,970 farm households in Kitui West Sub County (Kitui West SCAO, 2019). Proportionate clustered random sampling was used. The Sampling frame was established using information from the Sub County Agricultural Office in collaboration with the ward administrator. Proportionate clustered random sampling was the most appropriate method to select respondents from every ward in order to ensure reasonable representation of population. For every ward, a random sampling was done to obtain the farmers for the researcher to administer questionnaire. Data was obtained by use of two instruments. These are; a researcher administered questionnaire for smallholder farmers and focus group discussion guide. A focus discussion guide was used to collect data from at least 50 farmers from 4 community-based groups to collect information on various sources of agricultural information. This instrument required a content analysis table with themes and sub themes to analyse the opinions of the farmers.

For this study, validity was established by seeking opinion from peers and experts. To ensure reliability, pilot testing was done in Machakos County. To ensure research ethics were met the researcher obtained all the necessary approvals from the relevant bodies. He was guided by the data collection tools and assured the farmers that confidentiality was guaranteed. Data obtained was coded analysed using Statistical Package for Social Science (SPSS) Version 21.0. Instruments providing quantitative data were analysed using descriptive statistics namely; frequencies and percentages. Data collected using focus group discussion was analysed using content analysis. Results are presented by a table" (Munyao, D. K., 2021).

3. RESULTS AND DISCUSSION

Farmers were asked to indicate their main sources agricultural information. Table 1 shows responses from farmers.

The percentages indicate the proportions of respondents using various information source. Respondents who obtain agriculture information from ICT (Radio, TV, mobile phones, Internet) accounted for 46.6% while from Public extension officers accounted for 27.5% while those who receive information from private extension agents were 26%.

Table 1. Sources of Information

Information source	Frequency	Percentage
Public Extension Officers	96	27.5
Private Extension Agents	91	26
ICT (Internet, Radio, mobile phones and TV)	163	46.5
Total	350	100

This reliance on ICT could be due the government policy that the supply of extension services be demand driven (Ugochukwu & Chinyelu, 2020). This policy requiring that farmers must request the services they want from the government officers, keeps off most farmers from the extension officers and therefore needs to be reviewed (Muyanga & Jayne, 2006). Possibly people rely on radio, Tv or phone calls (46.6%) because it is the main tool of information dissemination which reaches larger proportion of the people irrespective of their position. It promotes the level of awareness of the people and also enables people to be adequately informed (Malekani & Mubofu, 2020). Kaaya (1999) echoed that agricultural education intervention programmes will be more fruitful if they are conveyed through the radio. The study findings are in agreement with those of Ozowa (1995) and Belay (2008) who found that radio was a major source of information farmers used in accessing agricultural information. Indeed, radio can reach many people much more quickly than other media and does not require reading ability on the part of semi-illiterate or illiterate farmers to obtain necessary information (Mwaniki, 2019). Radio is a very popular source of information since the local radio stations have programs sponsored by firms selling agricultural inputs. In these programs, farmers are allowed to call in and ask questions on the challenges they face on farming. Some private firms have started to use radio to pass information about agriculture (Ogola, 2015).

According to findings by Masangano et al. (2016) "farmers at times do not understand the agricultural extension policy especially the principle of demand driven services. Most farmers do not demand such services because they did not know that they are supposed to do when in need of extension services. This is further compounded by the lack of county government structures at the village levels through which farmers could express their demands". The extension officers also cover wide area and most farmers were not able to access their services (Masangano et al., 2016). In Kenya each extension officers is expected to attend to 6,000 farmers, a task that says is impossible to perform (Aineah, 2018). According to Aineah, "the extension officers are not enough to attend efficiently to all the farmers. He says the fact that extension officers are also not fully facilitated makes efficient engagement with farmers difficult (Varshney, 2011). He says agriculture is hurting because the role of extension officers in the field has been relegated". According to another research, farmers in South Africa and Pakistan indicated that public extension services were not effective in the dissemination of information through print material (Al-Sharafat, et al., 2012), agricultural campaigns, farmer's days, and signboards (Talib et al, 2018). Moreover, in Pakistan it was also discovered that agricultural extension services provided insufficient information to most farmers (Al-Zahrani, et al, 2019).

Private extension are not mostly used in developing countries. They have limited influence on practices which do not directly benefit farmers but benefit their interests since their dealings are commercial in nature. The farmers get advice provided by agrovets and firms which sell inputs to them as well as stockists who buy dry maize grains from them. According to Berthe (2015) private advisory services are essential and provide essential services for their clients, however poor farmers are not likely to access the services from the private sector who, if they are not subsidized with significant levels from public funds, will only serve better off farmers (Berthe, 2015). In Kenya, for instance, the agricultural extension service which used to be offered by the government for free has broken down in recent years. Private sector alternatives are sometimes too expensive for smallholder farmers who have learned to farm without any professional help (Langat, 2020).

3.1 Findings on Source of Information from Focus Group Discussions

Content analysis was used to analyse responses by focus group discussion from community-based groups. The main objective of focus discussion groups is to develop an in-depth understanding of a problem by examining details of participants' attitudes and behaviour which may have been otherwise difficult to characterize through quantitative survey research (Mwaijambe et al., 2009). Participants were required to do a discussion on the various source of agricultural information including Pubic extension officers, Private extension officers (NGOs, CBOs, FBOs, agrovet) and from ICT (Internet, Radio, mobile phones and TV). The following responses were given: First, most of the participants said the that they mostly obtained information from from radio, since there exists vernacular programes from where the semi-illiterate group of farmers can receive formation without struggling to understand the language. The radio programs

invite expert who can speak local language and help them breakdown the language on their behalf. Secondly, farmer said that they also obtained information from government equipped extension officers who could move to the farmers and enhance the agricultural information. Private extension officers are not mostly involved except some farmers could say about an NGO which organized the farmers in groups called Farmer Field Schools (FFS).

4. CONCLUSION

Information Communication and Technology (ICTs), especially (Internet, Radio, mobile phones and TV) were the most preferred sources of agricultural information more than public and private extension agents. It is therefore recommended that the County government and private firms should use the local media especially radio and television to increase passing of information to the farmers which seems to be the preferred source in deciding activities they do in their farms.

ETHICAL APPROVAL

The researcher obtained a letter of approval from the National Commission for Science Technology and Innovation (NACOSTI) to conduct research in the study area.

DICLAIMER (ARTIFICIAL INTELIGENCE)

Daniel Kiangi Munyao do hereby declaire that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this Manuscript).

COMPETING INTERESTS

Author has declared that no competing interests exist.

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