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Access to and Use of Information on Environmental Issues by Farmers in Kiambu County

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Abstract **Original Research Article**

Research in Kiambu County reveals farmers' information needs on environmental information issues, information accessibility and use on the same, which impact agricultural production. Farmers in this county produce dairy products, cash crops like tea, coffee and pyrethrum and a mixture of food crops. The paper focuses on climate change, global warming, weather and seasonal changes, their effects on land use and hence implications on agricultural productivity, yields, cropping practices, crop diseases, etc. The study investigates specific environmental information issues: specificity of needs; information sources; information usage; variety of channels of access; and challenges to access. The study sampled 150 farmers, 18 to 55 years, selected randomly: population 897, in 28 cooperatives. A descriptive research design was applied with Stratified Random Sampling technique. Face-to-face interviews and semi-structured questionnaires were used. On specificity of needs, findings show information on seasonal variation was by far the most sought after. On sources, Government was the principal source. Other key suppliers by rank were: Cooperatives, Audio media, NGOs and Churches. On usage, important drivers were: when to plant, which crops, and managing soil erosion, and proper food storage. Usage information access (as collateral effect) helps farmers in tree planting. By channels of information delivery, Barazas are most important by far, followed by Audio/media (radio and television). The study recommends increased information; that the government develops a national strategic framework for information access to promote agricultural production, income generation, and for improved livelihoods.

Keywords: environment information need and access, information use, agricultural information, information communication channels.

INTRODUCTION

According to the Kenya's Ministry of Agriculture [1], Kenya Climate Smart Agriculture Implementation Framework, 98% of Kenya's agricultural activities are rain-fed and highly susceptible to climate change and climate variability. Access to and use of information on environmental issues is therefore important to farmers in Kiambu, a County in Kenya, featuring smallholders whose main activity is growing foodstuffs like maize and beans and the cash crops, tea, coffee and pyrethrum, and keeping dairy cattle for milk and manure. Information on environmental issues is important for farmers to understand vulnerability of the agricultural sector to climate change, its effects on their livelihood and to sector's contribution to food security at county and national levels.

Information on environmental issues like climate change, global warming, weather and seasonal changes affects land use and hence agricultural productivity, agricultural yields, cropping practices, crop diseases, etc. According to World Bank, FAO and IFAD [2] "dairy cows have difficulties coping with extreme heat and increased temperatures which results to lower milk production and susceptibility to diseases." In Kiambu County extreme weather has become more frequent leading to flooding and droughts. These extremes result in problems of providing enough feed and food for dairy cows. "It has impact on quantity and quality of fodder production that has also implications on climate and Green House Gases (GHG emissions)". Thornton, P.K., Jones, P. G, Alagarswamy, G. and Andersen, J. [3] Talks of effects of crop yield response to climate change within East Africa. Besides, owing to extreme weather changes, various diseases emerge that impact dairy and crop production. While the county and

the country needs to produce more food while conserving available land, farmers need information and knowledge on environmental issues.

Lack of information and hence knowledge on environmental issues including climate changes, weather, increased fragmentation of landholdings, and hence overuse of farm land and other environmental land related issues threatens farmers' livelihood. Farmers information needs and information seeking behavior is affected sometimes by their land size and their education level and to some extent their gender. Ditta R. (2009) [4], examines the characteristics of information seeking behavior in developing countries and notes that people living in the rural areas, mostly farmers, have difficulties locating and accessing needed information. Some are unaware of their information needs. Information on environmental issues is not easily accessible because it is poorly understood by the rural farmers.

In Kiambu County and in other parts of the country, climate change is associated with unpredictability of the timing and amount of rainfall received. There is need for a comprehensive study to adopt effective strategies to address the problem, since lack of information and or documented evidence on the impact of the climate change in the county will continue to affect negatively on agricultural production. The results could be reduction in capacity to generate food yields and hence sustainable income leading to poor livelihood. Access to information on environmental issues helps understand the effects on climate change, global warming, weather and seasonal changes including cropping practices, crop and animal diseases spread and disease resistance and control, aspects that affect agricultural yields and production. Information on environment issues is related to several other issues that affect farming practices for example, flooding and soil erosion, drought, that affect not only food crops but landscape and loss of life, environmental conservation, natural resources and mining, water, public utilities and leisure, land and soil composition and natural disasters. In Kiambu County, several people have lost their lives in quarries, in attempts to make livelihoods from mining stone or clay. Information enables farmers to take part in decision-making processes on environmental issues and make informed decisions on several issues including their farming and dairy production, and their living conditions.

Access to and use of information as observed by Lwoga ET, Stilwell C, Ngulube P. [5], and Odini C. [6], is important as it instills knowledge useful to the user. Information on environment ensures that we equip farmers with at least basic facts and knowledge that can help them identify any anomalies like for example changes in weather and if they do not have that information the impact will negatively affect their production.

The channels used for information communication include Barazas, radio and television. Barazas are organized meetings, a way of passing information (that government administration uses, especially the chiefs, to pass information to the community). For environmental issues, this mode is useful in passing warning messages on impending floods, draughts, and can be used to pass more substantial information on climate changes, weather etc. Radio was popular among women farmers because they listened to the radio often during the day while doing their household chores. The radio has been in existence for a very long time. It is cheaper for the rural people to own and maintain. Farmers only needed to listen, and not to read and trying to comprehend. More programs and information on environmental issues should be aired more often. The study revealed that the radio programs on environment were not regularly aired and farmers did not know when they were aired. The study revealed that the T. Vs were less appealing to the farming community because the television was an expensive item most farmers could not afford to have and, due to poor infrastructure, electricity was an impediment. Like radio communication, farmers who owned televisions were not aware when environmental related issues were aired.

Granted that there are many factors responsible for the poor agricultural production, leading to poor livelihood, the study postulates that lack of adequate, relevant, accurate and timely information on environmental issues is a major contributing factor and a considerable setback to agricultural yields and dairy production and hence fostered poor livelihood. This means there is a gap between farmers need for information on environment issues and information sources and content. Lead information specialist and researchers including Odini S, and Omuke A. [7] agree in relation to health information that information seekers and users are forced to spend more time trying to locate the information they need, hence rarely get the information they need in time.

Considering the target audience, based on literacy levels, unique needs, specific land needs, the County and the National government together with the cooperatives and other stakeholders should use the best and if possible the most up-to-date communication channels in disseminating environmental related information to farmers. This would include enhancing vernacular communication to reach out to those with low literary level.

This study examined information needs, accessibility and use of information on environmental issues by farmers in Kiambu County, the challenges they encountered in accessing the information, with a view of proposing strategies for improvement, for the benefit of the farmers' agricultural and economic growth for improved livelihood.

LITERATURE REVIEW

The literature that examines access to and use of information on land, agriculture and environmental aspects in Kiambu County and in Kenya is scanty. Related studies focused on agricultural activities, on dairy farming, coffee and tea Mitei Z. [8], on access to credit for farmers in which information was sought and used, for example, Muriuki HG [9]: Wambwoba MS, and Wakhungu [10]; Wachekeh [11]: A few studies have investigated effects of environment on small scale farming beyond Kenya, like Altieri MA and Koohafkan P. [12]. Andresen, Jeff. *et al*. [13], are of the view that climate change is happening in Kenya and that it is caused by human activities. They go further to say that temperatures in Kenya have been increasing since the 1950s, "in a trend similar to the global average". This implies that the effects of unmitigated climate change in Kenya are likely to have a significant impact on human livelihoods, health, water resources, agricultural production, therefore food security and even tourism.

Wabwoba and Wakhungu have established that the sustainability of community food security is affected by rainfall patterns, among other factors such as leadership, management and funding of food security projects, and goes further to recommend that farmers need to be empowered with knowledge on irrigation and the off-season intensive farming of high-value crops. Seasonal changes is a major concern by farmers in this study.

A study done by Maina, Newsham and Okoti [14] on Agriculture and climate change in Kenya: climate chaos, policy dilemmas, observe that the agriculture sector features many economic activities all impacted upon by climate change in different ways. The study observes that Kenya has many and varied Agro-ecological zones, which make the agricultural sector very complex, as it attracts many players and actors with differing interests, roles, responsibilities and spheres of influence.

Maina *et al*. further reveal that the country lacks localized data and (possibly) the critical technical manpower to implement projects that deal effectively with the impacts of climate change, and to plan for the varied regions and compounds in the whole sector. These are underlying challenges that include top poverty levels, low capacities to adapt and dynamic cultural practices.

Otsuka and Pace [15] state that land-use policy is concerned with the way land and natural resources are used and managed. Chiuri and Nzioki [16], Khasiani [17], Slayter and Rocheleau [18], have recognized the role of women. They point out that women operate economic activity along with environmental information and its consequences during drought, when they have to provide food for their families, and that they are the main savers of seeds for the planting season. Odini SMC. [19], also observes that provision of information can empower rural women to ease poverty. Further, women's groups in Kenya form a major plank of environmental management initiatives at the grassroots level. The Greenbelt initiated by the late Professor Wangari Maathai was a major source of information and knowledge on environment by rural women in Kenya. Government policy should aim to support them by providing them with relevant information.

METHOD

The study sampled 150 farmers ranging from 18 to 55 years, randomly selected from a population of 897 farmers from the largest and the smallest segments in a register of 28 cooperatives. The target population comprised farmers growing food and cash crop in a rural area of Kiambu County. We applied a descriptive research design while Stratified random sampling technique was then used to achieve representativeness. We collected data from the farmers using face to face interview and semi-structured questionnaires.

The method used for the research was interpretive since the study was qualitative and was used to answer questions with the aim of understanding farmers' information needs, their sources of information and how they get and use it. Interpretive paradigm allowed the researcher to view the world through the perceptions and experiences of the farmers in Kiambu county. To understand farmers' information seeking behavior and understand their problem from their situation. The researcher used quantitative descriptive technique to supplement qualitative technique mainly to explain the phenomenon through data analysis, to summarize the findings in terms of frequencies, percentages and intensities. Creswell JW [20], and Onwuegbuzie AJ, Leech NL [21], acknowledges the strength of use of the two approaches together. Niedzwiedzka B. [22] "New Model of Information Behavior." informed the method, and theoretical framework. The model was chosen because it incorporates aspects of information needs, information seeking and information use that were the subject of the investigation.

Data presentation, Analysis and Interpretation

The study found that information on land ownership and size was an important factor in advancing the need for information on environmental issues.

Land ownership, size and farming: Table 1 shows land ownership and size as reported by the respondents. 16 (10.6%) of the farmers owned between 0.1-0.9 acres, and 16 (10.6%) owned between 1.0 -1.9 acres.

Table-1: Land ownership and size

Size of land acres	Count	Percentage
0.1-0.9	16	10.6
1.0-1.9	16	10.6
2.0-2.9	43	28.6
3.0-3.9	33	22.0
4.0-4.9	14	9.3
5+	28	18.6
Total	150	100

However, land ownership seemed unequal and uneven. The highest number of farmers 43 (28.6%) owned between 2.0 and 2.9 acres, while the smallest number of farmers 14 (9.3%) owned between 4.0 and 4.9 acres. The 28 (18.6%) farmers who owned 5 plus acres were mostly cash crop farmers.

Most farmers owned less than three acres of land and which they used wholly and intensively, mainly for mixed farming of non-cash crops like maize and legumes. Other farmers used the land for cash crops like tea, coffee and pyrethrum and dairy farming. Owing to the small size of farms, farmers focused information opportunities to improve their land, their production and hence their livelihood.

Principal farming activities

The study found that the main farming activities of the area surveyed are in dairy farming, followed by coffee and tea, respectively. Table 2 shows the main farming activities reported by the respondents and the percentage each segment represented in the sample.

Table-2: Main farming activities

Main farming activities	Frequency	Percent response rate
Dairy	80	53.3
Coffee	43	28.6
Tea	25	16.6
Pyrethrum	1	0.7
Others	1	0.7
Total	150	100

Over 50% farmers are engaged in dairy farming followed distantly by coffee farming 43(28.6%) and Tea 25 (16.6%) pyrethrum 1(0.7%) other 1 (0.7). Other than the three main farming categories, 'Food crop' farming, horticulture, chicken rearing and livestock dominated 'Other farming'. The sampled area is intensive in dairy farming. Most farmers kept at least a cow for milk for livelihood.

Information needs on environmental aspects

The key information needs related to environmental aspects were identified as information on seasonal variations, climate changes, water catchment, tree planting and global warming. Information needs on environmental aspects are shown in figure 1.

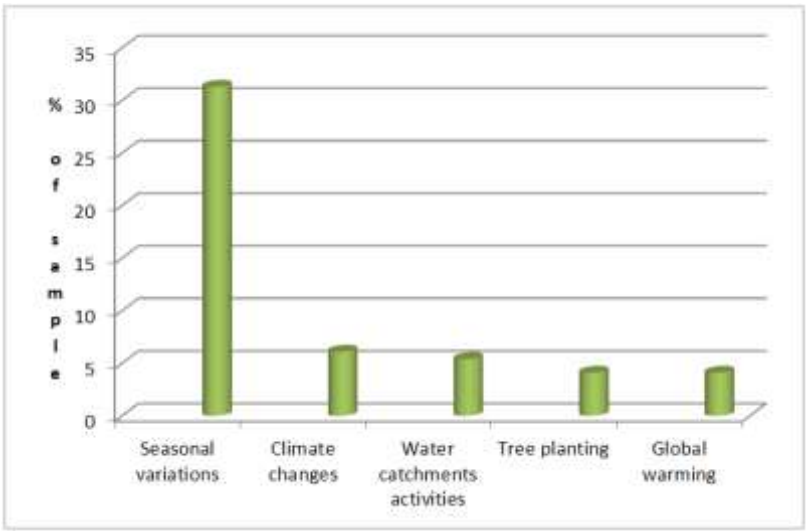

Fig-1: Main Information Needs on Environment

The most important information need is on seasonal climate changes 46 (31.3 %) and the effect of climate change on farming 9 (5.8%). The farmers were convinced that late planting was the main reason for low farm production. This was because they lacked information on the expected weather and seasonal changes. Farmers needed to know about water catchment 8 (5.2%); tree planting 6 (3.9%) including which trees are better suited to which area; proper planting methods 5 (3.2%); manure preparation 5 (3.2%); and Global warming 6 (3.9%). When asked about global warming the farmers said they have heard of it and did not know how it would affect them but was interested in getting informed on this aspect of environment. Despite environmental information being useful by some farmers, 52 (33.5%) were not keen on seeking information in this category especially the subsistence farmers who still largely depended on traditional ways of monitoring the weather patterns. This exposes a paradox. Global warming already affects farmers' activities, though they are unaware of the subject; thus they show little in related information-seeking activity. Information on seasonal changes emerges as the most important information need understood by the farmers. This is not surprising owing to deforestation that has taken place in the County, especially during the last twenty years and which has impacted the weather pattern in the area. The need for information on water catchment is also because of dry weather, which has affected farming and food production in particular, leading to poverty and hunger in the County.

Information sources on environment

The study sought to find out the sources of information on environment. The findings are as shown in Table 3.

Table-3: Sources of information on environmental issues

Sources	Count	Percentage response rate
Government	43	28.7
No information access	41	27.3
Various cooperatives	25	16.6
Radio and the television	13	8.6
NGO	9	6.0
Churches	8	5.3
Banks	1	0.7
From other people	2	1.3
By experience	2	1.3
Recurrent seasons	2	1.3
Printed media	1	0.7
Salesmen	2	1.3
Own personal research	1	0.7
Total	150	100

The national government is the principal source of information on environment issues sought by farmers, on issues like climate change, seasonal changes, global warming and tree planting. Cooperatives societies and audio media as sources of information were second and third followed by the NGOs and the Churches. The farmers however expressed their views that sources on environmental issues were not easily available within the County.

The analysis of table 3 shows, most of the information on environment came from the government 43 (28.9%), from various cooperatives 21 (14.1%), the audio media especially the radio and the television 14 (9.4%) the NGO 10 (6.7%) and churches 8 (5.4). However, from the analysis the indications at 42 (28.2%) respondents show that information sources on environment were not easily identified and hence not available.

The results show that most sources of information are those whose agents take information to farmers rather than farmers going to the sources. The farmers indicated that the extension workers brought the information to them concerning agricultural activities but hardly any information on environmental issues, except when there is a lot of rain and farmers are advised to move away from slopes and near rivers in case of floods.

Channels used for information presentation

The study present channels used in information presentation. Figure 2 shows the main information channels.

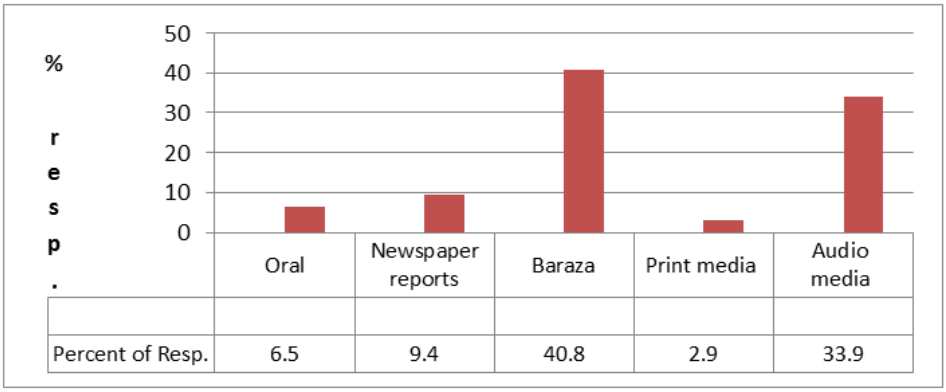

Fig-2: Channels used for information gathering and distribution

Among these channels, by far the most important channel is the *baraza* 113 (40.8%) followed by audio media, specifically communication by the radio 94 (33.9% and Newspaper reports 26 (9.4%). However, information passed to farmers at Baraza was mainly on warning from the government agencies on floods, and dry spells in general. Information on managing soil erosion, understanding forest conservation and importance of water catchment areas and the impact it has on the environment. However, through radio and television the farmers especially the more educated learned much more on changes in climate, expected rain and vulnerable areas and crops at risk, including kinds of diseases that can affect crops and dairy cattle, etc.

FINDINGS

The study established that the main information needs, that is, the important information gap that needed to be filled on environmental related aspects were identified as information on seasonal variations, climate changes, water catchment and global warming and tree planting. The farmers were of the view that low farm production was at least partly due to lack of information on weather and the effects of seasonal variations. Farmers need to know the proper planting methods and time conducive to their respective environments as agreed by Maina, Newsham, and Okoti in their study on Agriculture and Climate Change in Kenya. Their impression is that climate changes impact the agriculture sector which impact many economic activities.

The study also revealed that farmers' sources of environmental related information were not easily available within the county and that the government was the principal source of information on the environmental issues followed by cooperatives societies, audio media radio and television and sometimes NGOs and the Churches.

The study also found out that the farmers accessed very little information on environment and were concerned that the information they got was inadequate. The little information they obtained however has guided the farmers on when to plant and which crops to plant, managing soil erosion, and proper food storage and in tree planting especially on which trees to plant on which area and when. Some farmers learned of organizations like the Greenbelt Movement, national government's concern and policies related to forest conservation and how water catchment area impacts the environment.

Challenges of accessing information on environmental aspects

The study established that most farmers could not articulate their environmental information needs and some of them could not comprehend the benefits of environment related information. Some were not sure of the particular information they needed, although they were keen on being informed of seasonal changes. Another challenge was that environmental issues were not easily identified, and hence not readily accessible, particularly to the illiterate and semi illiterate indicating that educational levels of farmers was of great importance on understanding environmental issues. Shortage of information sources was a challenge. In some cases, the information they were able to get was neither timely nor reliable, so that farmers were not sure when to plant which crop. Cash crop farmers, mainly tea and coffee growers, cited lacking information on changes in weather patterns, information useful in deciding on when to prune crops. Absence of this information affected crop production resulting in low quantity of produce leading to losses. The language used on environmental issues was a challenge to those rural farmers of modest education, not to mention the illiterate farmers in the county. Lack of infrastructures such as communication infrastructure that would facilitate access to information, especially via television, and cost in time and money of accessing information sources in urban areas from the rural areas in Kiambu County was a concern. Cultural practices hindered especially women from going to search for information. The study also noted indifference by farmers caused by lack of understanding, for example, farmers could not forego activities they considered paramount, such as planting or digging in order to go searching for information.

CONCLUSIONS

The study established that information on seasonal changes stood out clearly as the most important information required by farmers, followed by information on climate change, water catchment, tree planting and global warming. On environment information sources the study established that the government was the main source, followed by cooperatives, radio and television and very little contribution from the NGOs and churches. Farmers' use of acquired information, mainly on seasonal changes, was very useful in predicting weather so that farmers could decide when to plant and what crops to plant. Information on managing soil erosion, understanding forest conservation and importance of water catchment areas and the impact it has on the environment. The farmers also acquired knowledge on food storage

The way forward is that farmers and especially smallholders need information on environmental issues that contribute to their agricultural development. The national government and the County government should invest in modern environmental information system that can help disseminate up-to-date information on environment to farmers. This was predicted early on by Munyua [23] on the need to use rural radios and other mobile telecommunication methods and these to be adapted to local needs and to build on farmers' knowledge. Famers must be informed on the changing weather patterns and hence climate changes worldwide, regionally and locally and its impact on agricultural productivity, deepening their understanding of the impacts of climate change on agricultural yields, crop disease spread, disease resistance, soil erosion and even disaster management.

OBJECTIVES

This article sought to investigate farmers' information needs on environmental issues in Kiambu County, their information sources and use, and the challenges they faced in accessing the information and how to overcome these challenges.

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