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Effect of Information Materials Provision on Implementation of Bee-Keeping Projects in Baringo County, Kenya

Hezron Tirok^{1*}, Fredrick Ochieng Owuor, PhD¹ & Andrew Kimwolo, PhD¹

¹ Moi University, P. O. Box 3900– 30100 Eldoret, Kenya.

* Correspondence Email: hezrontirok@gmail.com

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This paper looks at how provision of information materials on apiculture affects the implementation of bee farming projects in Baringo County, Kenya. This is because the implementation of bee keeping projects in Baringo County has not been effective compared to other bee farming producing regions of Kitui and Makueni counties. The study was conducted among Baringo County bee farmers groups. The study was guided by explanatory research design which involved qualitative and quantitative techniques of data collection, analysis, and interpretation. The target population consisted of 1238 bee farmer groups. Sample size of 302 bee farmers was chosen using proportionate cluster and simple random sampling method. Collection of data was undertaken through use of questionnaire. Qualitative analysis of data has been done through thematic content analysis approach. Quantitative data analysis involves using descriptive and inferential statistics. It was found out that information materials provision resulted to improved implementation of bee keeping projects. It is recommended that technical support needs to be regularly provided to bee farmers to enable them to adopt modern and cost-effective bee farming activities.

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INTRODUCTION

Bee keeping project implementation is an essential farming activity across the world as it contributes to sustainable rural development through supporting ecological activities and increasing household income through honey from bees (Novelli et al., 2021). When comparing with other farming projects implementation, time demands and input requirements for apiculture are not high, and profit gained from the venture is usually high (Schouten, 2020); therefore, there has been increased efforts of up-scaling bee keeping projects implementation (Berem, 2015). This situation has seen efforts being done by global, international, and government across the world promoting bee keeping projects as an economic activity. Therefore, the way bee keeping project is implemented by bee farmers was the focus of the investigation.

Research shows that implementation of bee farming projects varies across different countries even developing ones. Gross (2020) reported that the reduction in the population of honeybees in the last twenty years in United States of America was startling calling for the new initiatives to improve the industry. Deirdre (2014) observed that even though a lot of money has been invested in those projects, the number of bee-keepers in South Africa was found to be low. Previous projects on bee keeping appeared to attract very few farmers into the sector. Some of the world leading honey exporters include the European Union, Mexico, India, Germany, Argentina, Ukraine, Turkey, USA, and China (FAO, 2015). In the year 2019, China exported honey worth 284 million US Dollars. High production of honey per hive has been documented in the following countries 64kg per hive in Canada, 55kg per hive in Australia, 40kg per hive in

Argentina and 33kg per hive in China (FAO, 2015). These countries appear to have adopted innovative bee keeping practices widely resulting to higher honey production. Apparently, bee keeping projects in other areas of the world is undertaken using conventional techniques with very few of those farmers in developing countries found to have adopted modern bee keeping practices (Kiiti, 2019).

In Kenya, innovative bee farming is still new like in many other countries in Sub Saharan Africa resulting to low production. Attempts by international organisations, Non-Governmental Organisations (NGOs), and government to enhance the adoption of modern bee keeping practices have received little success as many bee farmers continue to utilise traditional log hive resulting to low quantity and quality of honey being produced (Kiiti, 2019). This has necessitated the need for stakeholder participation in bee keeping projects toward the adoption of new methods of bee keeping. One of the areas where stakeholders participate in the implementation of bee keeping projects is in the area of materials provision. It is a strategy of ensuring that project information resource is available to all parties and if it is communication, all can understand it. Information disclosure is one aspect of promoting transparency in implementation of projects (Malachira, 2017). Mujuni, Natukunda and Kugonza (2012) suggested that enhancing bee-keepers’ access to daily market information and helping them in finding suitable place for selling their products and efficient demands would assist them in effectively undertaking the bee keeping project in Uganda. This study examined how provision of information facilitates implementation of bee keeping projects in Kenya with focus on Baringo County.

Baringo County is characterised by inadequate infrastructure, high vulnerability to hunger and diseases, high poverty levels, poor market access, lack of security, and recurrent droughts (Mwaka, 2014). Mwaka report continues indicated that county ranked as one of the counties with poverty index of 60.0% of households living below Kshs. 150 a day more than 62.0% considered to be facing starvation. In this county, poverty level is high, there weather patterns are extremely worse, and insecurity is the order of the day. Poverty levels during droughts and insecurity periods always rise above 67.0% in Tiaty and Baringo South (Marigat) Sub Counties (Kenya National Demographic Health Survey, 2022). However, because of changing environmental patterns recently, many areas that livestock production was undertaken have embraced apiculture as an alternative source of livelihood. The trend of bee keeping has been growing in the county due to drought situation which has led to reduction in the numbers of livestock and climate change. The bee keeping which was once confined to those considered to be poor is now being adopted by people across the county as way of adapting to changing environmental conditions in Baringo.

Statement of the Problem

Bee keeping projects implementation is aimed at supporting rural community livelihoods to reduce poverty in Baringo which is classified as one of the poorest counties in the country (Kenya National Demographic Health Survey, 2022). Research shows that most of bee keeping projects being implemented in Sub Saharan African countries do not meet objectives of stakeholders due to variations in project specifications, cost, and time overruns (Ofosu & Ntiamoah, 2016; Heckle et al., 2018). It has been identified that one factor to consider when implementing community projects is information provision through relevant public and private agencies involved in apiculture value chain. Miriti (2019) found out that the apiculture industry remains mostly underdeveloped because in most parts of Kenya, it is conducted using conventional

means. Baringo County is one of the regions where bee keeping has potential to generate household income, but this has not yet been fully exploited resulting to increased poverty levels amongst households (KDHS, 2022). Research examining how provision of information materials to apiculture farmers influences implementation of bee keeping projects in Kenya remains an area that has received less attention. It is against this backdrop that the study investigates the influence of resource materials provision and implementation of bee keeping projects in Baringo County, Kenya.

Literature Review

Conceptual Literature

Information materials provision is an act of ensuring that information accessible to all project stakeholders and conveying that kind of information in a way that can be understood by stakeholders is an important phase of engagement of stakeholders (Malachira, 2017). In community-based projects, it becomes essential that there is openness in whatever information is being disclosed or relayed to all members. With respect to important projects like bee keeping that have detailed guidelines on how to conduct it, transparency is a fundamental feature of community participation as it assists in knowing the specific needs of the project hence resulting to meeting the interests of all people involved in the project.

Bee farmers expects to receive information from government officers on regular basis. In Ethiopia, extension officers provide information relating to technological advancements in apiculture which has been found to improve bee keeping projects implementation level (Tadesse et al., 2021). As the bee-keeper becomes more knowledgeable in bee keeping, the farmer would have adequate knowledge to identify issues of bee keeping and the methods to mitigate the challenges. This will help them focus on the bee keeping activity as they understand the whole processes due to the information materials and knowledge that they

received. Hence, information materials provision through extension officers is critical to effectively implementation of bee keeping projects. This study looked at how information of bee keeping projects is provided to rural bee farmers in Baringo County, Kenya.

Empirical Literature

Research in Fiji by Hinton et al. (2019) found out that one crucial barrier to small-scale bee farmers was poor technical knowledge and skills due to inadequate access to quality educational programmes and apiculture training materials. It was suggested through focus group discussion interviews that adoption of training programme offered by Fiji Beekeepers Association would offer lasting support for small scale apiculture farmers to enhance their knowledge and skills on improvement of their farming practices. Further,

Shimelis (2017) cross sectional study was to assess the honey farming system, discover bee farming challenges and ascertain the relationship of key risks variables with outbreak of honeybee diseases, pests, and predators. Result showed that the key challenge influence bee farming was shortage of bee forage, honeybee colony, absconding of duties by farmers, poor management, honeybee diseases, agro-chemical application, high cost of modern hives and accessories, predators, and pests. Additionally, the challenges that majority of beekeepers faced stemmed from the fact that there was no adequate provision of information on bee keeping projects which was critical to their success.

In Ethiopia Southwest Amhara State, Abro et al. (2021) assessed the bee farming impact on rural family's income per capita income. Findings showed that bee farming would enhance rural families' per capita income to replace crop production that was undertaken by many families. But the per capital income difference between bee farmers and families that were doing crop production showed significant difference due to extension services information provided on bee

keeping by the officers. In another study, Tadesse et al. (2021) sought to find out variables that influenced bee farming and marketing challenges. Results showed that most farmers said that lack of market information was a challenge while others said that lack of market access information was a challenge that influenced honey-selling in their areas. The above studies from Ethiopia shows that for effective implementation of bee keeping, supply of market information is critical an issue that this study investigated in Baringo County.

In Western Tanzania, Kuboja (2017) evaluated adoption, efficiency and profitability of modern bee farming and its impact on bee farmers household income. Result showed that modern beehives produced more honey than the conventional ones resulting to increased profitability in the latter. The profitability was because the agricultural extension officers made frequent visits to farmers and organised regular training programmes to educate farmers on apiculture management. When this knowledge was shared to farmers, it influenced their household economic level. This shows the importance of information materials provision towards improving profitability of bee farming ventures. This implied that access to extension services and capacity building programmes perform important role in the implementation of modern bee keeping activities resulting to reduction in poverty level at household level among small scale bee farmers.

In Baringo County, Kenya, Heckle et al. (2018) assessed factors influencing adoption of bee keeping farming by small scale farmers. They established that some of the factors influencing farmers adoption of bee keeping practices were access to information on bee keeping, inadequate land to set up beehives, existence of alternative income generating activities, societal views on bee farming production outcomes, lack of information on markets, fear of keeping bees and negative cultural practices against bee keeping. This implied that the low intake of bee keeping was due to low level of

knowledge and awareness on bee farming practices, farmers reluctant to utilise modern honey harvesting methods, inadequate local group social networks for bee farming and less interest by women and young people to be involved in bee keeping. The study by Heckle et al. failed to establish how information materials provision affected the implementation of bee keeping projects by groups in Baringo county, a focus of this investigation.

Materials and Methods

The study was conducted in Baringo County, Kenya. The study was guided by explanatory research design. According to Rovai et al. (2014) this design aim is to describe why a particular phenomenon occurs and to predict future occurrences. The target population for this study involved 1238 beekeepers (farmers) in Baringo County. To select the sample, the researcher adopted a statistical formula provided by Yarmane (1973) for sample size determination shown below.

$$n = \frac{N}{1 + (Ne^2)}$$

Where:

N = Population (1238)

e = Desired margin of error

n = desired sample size.

This can be computed as:

$$n = \frac{1238}{1 + 1238 (0.05^2)} = 302 \text{ bee farmers groups.}$$

The study used multi-stage sampling to divide the target population into various groups (clusters). This is a sampling method which involves two or more

stages of random sampling based on hierarchical structure of the natural clusters in a target population (Creswell, 2014). In this study, considering that bee farmers groups came from various Sub Counties in Baringo, they were classified into four clusters. In each group, there were four officials; chair, deputy chair, treasurer, and secretary, and during the selection of a group to form the sample size, only one of the four officials was picked to represent the group with the chair being given the priority. In situation where the chair was unavailable, one of the other three officials were picked to answer the research questionnaires. The clusters were four; Baringo Central, Baringo North, Mogotio, and Baringo South. After clustering, the selection of bee farmers groups was done randomly using simple random method for each sub county proportionate to their study population. Primary data was collected through questionnaires administered to bee farmers. Due to the nature of data to be collected, quantitative and qualitative methods of analysis was used. Qualitative data from open-ended questions and interview guide were analysed using thematic content analysis. For quantitative data, coding and entry of data was done through use of Statistical Product and Service Solution Computer programme (SPSS Version 24.0). Analysis of data was performed using descriptive (frequencies, percentages, means and standard deviations) and inferential (Karl Pearson, assumption of regression tests and regression) analysis.

Results and Discussions

Information materials provision

Group leaders were asked to indicate the source of information for beekeeping. Their responses are presented in Table 1.

Table 1 Source of information of bee keeping by groups

Source	Frequency	Percent
Bee farmers	191	75.5
Group members	183	72.3
Extension officers	117	46.2
NGOs	46	18.2
Radio	26	10.3

Source: Field Data (2023)

The main sources of information for bee keeping are the farmers themselves (75.5%) and group members (72.3%). The statistics shows that less than 50.0% of information concerning bee keeping comes from the county government, non-governmental organisation, or radio. The result coincides with Mujuni et al. (2012) who found out that despite extension workers being recognised as a major source of information on farming, they rarely visited farmers to share information on bee keeping in Uganda. This implies that for bee keeping projects to thrive, information mainly comes when farmers gather together to share knowledge on the best methods of bee keeping projects.

With respect to the frequency to which they received information, 45.1% reported that they sometimes

received, 32.0% always received, 19.0% often received and 4.0% rarely received information on bee keeping. The sources of information for bee keeping are critical since they inform members on the best approaches with respect to hives, hive management, honey harvesting, honey processing, and marketing. When bee farmers do not have the right information on bee keeping, their venture becomes less profitable resulting in an increased household poverty crisis.

The researcher asked the respondents to indicate their level of agreement/disagreement on the extent to which their group were provided with information from relevant actors on bee keeping. The results are provided in Table 2.

Table 2 Information materials provision

Information materials provision	Mean Statistic	Std. Deviation Statistic
Information on modern bee farming is regularly provided to the group for the benefit of all.	3.8893	.95722
We regularly receive technical support on bee farming activity from extension officers	2.8024	1.28192
We have benefited from mobile / technological access to information of apiculture in our group	3.8103	.87035
Communication channels for all members of the value chain in the bee keeping projects is established and utilized by group and its members	4.0316	.78616
The group regularly engages all its members with information on the best practices in apiculture	4.3004	.52391
the group has developed an apiculture manual to be used by all group members	2.7075	1.46433
Valid N (Listwise)	3.5903	0.9806

Source: Field Data (2023)

Statistics indicate that most respondents agreed (mean=3.88, standard deviation=0.95) that information on modern methods of bee keeping is

frequently provided to the group members. Considering that conventional practices of bee keeping are labour intensive and with low yield

returns, it is recommended that bee farmers adopt modern bee keeping practices which is fully dependent on whether information is provided or not. Secondly, respondents were undecided (mean=2.80, standard deviation=1.28) on the statement that they regularly received technical support on bee keeping practices from agricultural extension officers. The result suggests that county government extension officers rarely provide technical advice to bee farmers or through their groups on the way to improve their bee keeping projects farming practices. This is despite bee farming being one of the main economic activities of a majority of residents of the county. The findings coincide with Tadesse et al. (2021) who found out that only 27.7% of respondents reported that they had access to extension service in bee keeping. If proper technical advice is provided, the production and profitability of bee keeping will be high resulting to improved standard of living for the households.

Results indicated that most groups agreed to have benefited from technological access to information on bee keeping projects (mean=3.81, standard deviation=0.87). This means that the inability to receive technical support from agricultural extension officers has opened for the opportunity for group leadership to refer their members on digital applications that have information content on bee keeping projects farming. Considering that a number of beekeepers have smartphones, accessing of information relating to bee keeping projects becomes easier. Additionally, information on digital devices regarding to bee keeping is also used to train group members on modern bee farming.

Findings also illustrate that the group leadership have ensured that communication channels for all members of the bee keeping value chain have been established and utilised by groups and its individual members (mean=4.03, standard deviation=0.78). Considering the members of the bee keeping value chain are critical, the communication channels have to be maintained so that if there is any update or

information needed to reach the lower level is easily reached. Findings also reveal that most respondents agreed (mean=4.30, standard deviation=0.52) that their group frequently engages all its members with information on bee keeping projects best practices. Considering that respondents had earlier indicated the source of information on bee keeping projects to be their groups, it is confirmed here to be the platform where they get the right information or assistance with respect to modern methods of bee keeping.

However, research results showed that not all groups had developed bee keeping manual (mean=2.70, standard deviation=1.46) to be used by all group members. Considering that most groups have not been in operation for more than five years (as farmers used to practice bee keeping as individuals before), very few number of them have not developed manual to be used in bee keeping projects. Considering also there is low input of support from the county government and non-governmental organisations to support bee farmers, this explains why very few groups have developed manuals to be used. Average statistics shows that participatory information materials provision was high (mean=3.59, standard deviation=0.98). This means that efforts have been made to ensure that bee farmers have the right information to enable them undertake bee farming activities effectively.

Through the information resource provision, group members get more knowledge, it helps members to distinguish the usability of various materials for bee keeping and assist group members to adopt new modern methods of bee keeping. At the group level, research findings from open ended questions revealed that information provision helped the group achieved its targets as right knowledge and skills are applied by members in running their bee farming projects. Additionally, when information is provided, mistakes are significantly avoided as information is dispensed early to all group members.

Conclusions and Recommendations

The research established that there was significant effect of information materials supply to groups and individuals on the effective implementation of bee keeping projects. This is because group members became more aware of what they needed to do in order to reap maximum benefit from their ventures. Supply of information also increased group members' knowledge, skills, and capacity in order to effectively undertake sustainable and profitable bee keeping ventures. The implication of this observation is that for effective implementation of bee keeping projects, group members should be supplied with the appropriate knowledge materials. To address information materials provision, there is need for the county governments' extension department to develop manuals to assist farmers or groups understand the dynamics and successful strategies of bee keeping projects farming. Technical support needs to be strengthened considering emerging issues in climate change and how it affects bee keeping projects. This information also needs to be in print form (manuals), and in digital form to enable reach a wide audience and have impact. Partnering organisations also need to continue providing up to date information to bee farmers groups on modern trends of bee keeping (including cost efficient hives with maximum productivity), cost effective honey harvesting and process, and market dynamics information.

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