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Socio-economic factors affecting sisal cultivation and adoption in Kiomo Division, Kitui County

Aaron M. Mwaniki*[1], Daniel P. Kisangau[2], Nashon K. R. Musimba[3]

[1]*Department of Dryland Agriculture, South Eastern Kenya University, Kenya*

[2]*Department of Biology, South Eastern Kenya University, Kenya*

[3]*Department of Range and Wildlife Sciences, South Eastern Kenya University, Kenya*

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Abstract

Sisal cultivation has the potential of contributing immensely towards the economic development of a given country resulting to the improved standards of living. However, despite its potential, farmers are yet to embrace sisal production as one of their economic mainstay. This study examined the factors contributing to the low sisal cultivation and adoption in Kiomo division, Kitui County. During the study, 184 farmers were randomly sampled. Secondary and primary data were used and statistical package for social scientist (SPSS) software was used for data analysis. The study revealed that 57% of the interviewed farmers were aware of sisal cultivation as a commercial activity. The study showed that there was a relationship between gender and awareness of sisal cultivation as a commercial activity (P-Value=0.215>P=0.05). It was also revealed that there was a relationship between the gender and awareness of sisal cultivation as a commercial activity (P value=0.000>0.05). Further, 30.65% of factors identified to be contributing to the low sisal propagation related to lack of knowledge and 0.77% related to financial constraints. This shows that there was association between the awareness of sisal cultivation as a commercial activity and highest level of education (P value=0.332>P=0.05). This study contributes to existing literature on sisal production in the world and Kenya in particular. The analysis of the various restraining factors and driving factors will not only create a good foundation for future research on sisal, but also provide guidance in policy formulation.

* **Corresponding** Aaron M. Mwaniki ✉ a2mwaniki2003@yahoo.com

Introduction

Sisal is a drought resistant crop, whose cultivation can lead to effective use of the greater arid and semi-arid land in the Sub-Saharan Africa. On the other hand, sisal is environmentally friendly (F.A.O, 2016). Sisal is a renewable resource and can form part of overall solution to climatic change. Measured over its life-cycle, sisal absorbs more carbon dioxide than it produces (Dlamini *et al.,* 2014). During processing, it generates bio-energy, produce animal feed, fertilizer and ecological housing materials, and at the end of its life cycle, it is 100% biodegradable. Moreover, sisal plant reduces soil erosion through its extensive root system and contributes positively to watershed management. Sisal plant used as hedges act as effective vegetative barrier or fences to protect the crops land and forest from predatory animals and intruders (Katani, 2016).

However, despite the benefits that would accrue to a country as a result of sisal cultivation, the global sisal cultivation has been declining. In East Africa, sisal production declined in the early 1960s. Consequently the foreign income derived from the exportation of sisal product dropped resulting to foreign earning from other crops surpassing those of sisal (Dellaert, 2014). In Kenya, for instance, sisal production has been on a decline since 1961. According to statistics from the food and agriculture organization of the United Nations, Kenya exported 71,300 tons of sisal in 1963, compared to 27,560 tons produced in 2011, indicating a major decline of Sisal production in the country (Dellaert, 2014).

Between 1970 and 1990, world production of sisal and henequen dropped by about 50 percent, reflecting the severe reduction in global demand. Production of these fibres is concentrated in low-income countries of Africa, Latin America and Asia, and hence the depression of the market had profound adverse impacts on the livelihoods and food security conditions of the rural populations concerned (Franco *et al.,* 2016).

The sisal plantations are being replaced by other crops, with the fibre industries turning to synthetic fibres which have been proven to be environmentally unfriendly. Moreover, the vast majority of land in arid and semi-arid areas which are not fertile go to waste.

Depsite the potential of sisal cultivation in mproving the livelihoods of the local communities in Kenya, majority of the farmers have not yet embraced sisal production as one of their main economic crops. A study was carried out to determine factors affecting sisal cultivation and adoption in Kiomo Division in Kitui County, Kenya. A survey conducted by ADRA Kenya in 2013 showed that 16% of the households in the Kiomo division are not cultivating sisal for economic purpose even after sensitization (ADRA, 2014). The aim of the present study was therefore to invetigate on the factors contributing to low cultivation and adoption of sisal in the study area.

Materials and methods

Description of the Study area

The study was conducted in Kiomo Division in Mwingi Central Sub-County of Kitui County, Kenya. The Division is located about 170km East of Nairobi. Temperatures range from a minimum of 14°C to a maximum of 34°C (GoK, 2014) (Fig. 1).

The area receives bi-modal rainfall, and has historically received 574mm of precipitation annually. Long rains occur between March to May and Short rains from October to November. The vegetation of Kiomo in Mwingi central sub county is tree-shrub-land dominated by *Acacia spp,* shrubs and grass lands. The region lies at ecological zone IV with savannah characteristics. The communities of Kiomo division depend mostly on agro pastoralism. The study area has a population of 16,267, of which 8% is urban according to the 2009 National population census with 2.1 percent growth rate (GoK, 2009).

Study Design

Descriptive research design was used in the study (Kothari, 2004). Data was collected from all the sub locations of each of the two locations selected. The sub locations are Kiomo and Mbondoni of Kiomo location, and Kairungu and Kakongo of Kairungu location (GoK, 2009).

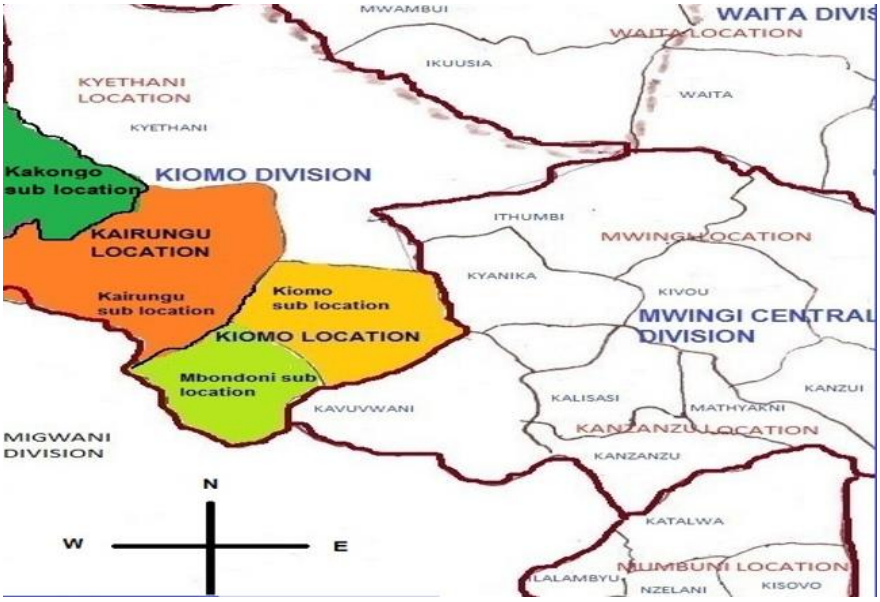

Fig 1. Map showing the administrative boundaries in Mwingi Central sub-county.

Primary and Secondary Data Collection

Survey method was used for collection of data used in the study (Orodho, 2003; Kothari, 2004). 184 questionnaires were distributed during the study (75 males and 109 females). Primary data was obtained from sisal farmers and relevant stakeholders working in the Division. These stakeholders included ADRA Kenya, Tahidi Community Based Organisation, National Drought Management Authority (NDMA), Action Aid Kenya and ministry of agriculture. Secondary data was obtained from monthly, quarterly and annual reports of these stakeholders. The data was collected using semi-structured open-ended interviews, key informants questionnaire and Focus group discussions.

Sample Size

The total number of households was 2,783 (GoK, 2009). The formula below was applied to determine the sample size to be used in the study (Mugenda and Mugenda, 2003).

$$n = \frac{Z2\ pq}{d2} \quad \frac{(1.96)2\ (0.4)\ (0.6)}{(0.05)2}$$

Where:

n = the desired sample size (if the target population is greater than 10,000)

z = the standard normal deviate at the required confidence level (1.96).

p= the proportion in the target population estimated to have characteristic being measured.

q= 1-P.

d= the level of statistical significance which was set at 0.05.

Using the formula, a total of 368 households was arrived at as the sample size, but due to homogeneity of the target population, half of the sample size (184) was interviewed. A random sampling procedure was used to select the respondents (Orodho 2003; Kothari, 2004).

Data Analysis

Analysis of data was done using Statistical Package for Social Scientists (SPSS) Test Editor. Frequencies, percentages, graphs and chi-square tests were used in data analysis and presentation. Chi square test was used to determine the relationship between sisal awareness for commercial purpose and age, sex, location and size of the farm. The level of confidence was set at 95%.

Results and discussion

Analysis of the data showed that majority of the respondents were females (90.67%) while 9.33% were males. 0.67% of the respondents were aged above 70 years, 28.67% between 61 to 70 years, 28% between 51 to 60 years, 22% between 41 and 50 years, 16% between 31 to 40 years, while 4.67% were below 30 years.

34% of the respondents never went to school, 53.33% had primary school education while 12.67% had secondary school education. Majority of the respondents (64%) had a monthly income of between Kshs. 20,000 and 40,000 followed by 32% who had a monthly income of upto Kshs. 20,000. Only 4% had a monthly income of between Kshs. 40,000 to Kshs. 60,000 (Table 1).

Most of the respondents (45.33%) were from Kiomo location, 32.67% were from Kairungu location, while 22% were from Mbondoni location. Majority of the respondents (72.67%) owned 5 acres of land and below, 21.33% owned between 6 acres to 10 acres and 6% owned over 11 acres. The data depicts that 44% of the respondents were highly dependent on agriculture as their major source of living, 54.67% were slightly depended while 1.33% were least dependent. Further, majority of those aged 50 years and above were highly dependent on agriculture compared to those aged below 30 years (Table 1).

The fact that women were the majority in sisal farming corroborates with previous studies which revealed that women account for 43% of the agricultural labour force and form over two-thirds of the poor livestock farmers (Harvey *et al.,* 2014). A research carried by World Bank in 2005 indicated that 21.57% of the female population were employed in the agricultural sector while only 23.44% of males were employed in the sector (Msuya, 2007). There was a relationship between gender and awareness of sisal cultivation as a commercial activity (P-Value=0.215>P=0.05). The Pearson correlation analysis was 0.102 indicating that we had a positive correlation between gender and awareness of sisal cultivation as a commercial activity (Table 2)

There was a relationship between the age and awareness of sisal cultivation as a commercial activity (P-Value=0.809>P=0.05). Pearson correlation analysis was 0.020 indicating that there was a positive relationship between the age and awareness of sisal cultivation as a commercial activity (Table 3). Agricultural activity as a source of livelihood was less popular among the youth aged 30 and below. Abdullah and Samah (2014) found that majority of farmers who mostly depend on agriculture were aged between 45 and 54 years. The study further noted that if this trend continued, there would be adverse effects on global food production as the old people edge out of farming. These findings agree with Anarfi *et al.* (2005) that demand for and high cost of land by multinationals and other local investors is a factor that limits most youth from participating in agric-based livelihood activities.

Table 1. Summary of respondents' demography.

Variable	Details	Frequency	Percentage	Cumulative
Gender	Female	136	90.67%	90.67%
	Male	14	9.33%	100.00%
Age	20-30 Yrs.	7	4.67%	4.67%
	31-40 Yrs.	24	16.00%	20.67%
	41-50 Yrs.	33	22.00%	42.67%
	51-60 Yrs.	42	28.00%	70.67%
	61-70 Yrs.	43	28.67%	99.33%
	Above 70 Yrs.	1	0.67%	100.00%
Education level	Never went to school	51	34.00%	34.00%
	Primary Level	80	53.33%	87.33%
	Secondary	19	12.67%	100.00%
Location	Kairungu	49	32.67%	32.67%
	Kiomo	68	45.33%	78.00%
	Mbondoni	33	22.00%	100.00%
Income level	0-20,000	48	32.00%	32.00%
	20,001-40,000	96	64.00%	96.00%
	40,001-60,000	6	4.00%	100.00%
Dependency on agriculture	Highly dependent on Agriculture	66	44.00%	44.00%
	Slightly dependent on Agriculture	82	54.67%	98.67%
	Least dependent on Agriculture	2	1.33%	100.00%
Size of land	Up to 5 acres	109	72.67%	72.67%

Variable	Details	Frequency	Percentage	Cumulative
	6 to 10 acres	32	21.33%	94.00%
	11 to 15 acres	9	6.00%	100.00%

Table 2. Relationship between the gender and awareness of sisal cultivation as a commercial activity.

		Gender	Awareness of sisal cultivation as commercial activity
Gender	Pearson Correlation	1	0.102
	Sig. (2-tailed)		0.215
	N	150	150
Awareness of sisal cultivation as commercial activity	Pearson Correlation	0.102	1
	Sig. (2-tailed)	0.215	
	N	150	150

Majority of the informants (81.33%) were aware of sisal cultivation as a commercial activity while 18.67% were not. Only 20.0% of the respondents practiced sisal cultivation for commercial purposes while 80.0% did not. Most of the informants (72.7%) who did not practice sisal cultivation for commercial purposes were not decided whether or not to start. Those who were not ready and willing to start were 14.0% while those who had plans to start were 13.3%. A previous study by Kivaisi *et al.* (2010) revealed that sisal can commercially be cultivated as an agro-industrial crop for production of bio-energy. Besides, Muthangya *et al.* (2009) illustrated that there was a great potential of methane generation from enhanced anaerobic digestion of sisal leaf decortications residue (SLDR) by biological pre-treatment using fungi.

Table 3. Association between age and awareness of sisal cultivation as a commercial activity.

		Awareness of sisal cultivation as commercial activity	Age
Awareness of sisal cultivation as commercial activity	Pearson Correlation	1	0.020
	Sig. (2-tailed)		0.809
	N	150	150
Age	Pearson Correlation	0.020	1
	Sig. (2-tailed)	0.809	
	N	150	150

There was a relationship between the income level and awareness of sisal cultivation as a commercial activity (P value=0.650>P=0.05). We had a negative Pearson correlation of -0.037 indicating that there was a negative relationship between the awareness of sisal cultivation as a commercial activity and income levels (Table 4). Glewwe *et al.* (2001) noted that household income levels have a direct correlation with involvement of local farmers in agricultural activities. According to Abdullah and Samah (2014), changes in the structure of household income and consumption affects role of agriculture in the portfolio of household income and provides useful background information on patterns of changes in living standards. As households grow rich, we expect their demand for agricultural goods to change, with implications for agricultural prices and, possibly, cropping patterns (Benjamin and Brandt, 2004).

Table 4. Association between the income level and awareness of sisal cultivation as a commercial activity.

		Awareness of sisal cultivation as commercial activity	Income Level
Awareness of sisal cultivation as commercial activity	Pearson Correlation	1	-0.037
	Sig. (2-tailed)		0.650
	N	150	150
Income Level	Pearson Correlation	-0.037	1
	Sig. (2-tailed)	0.650	
	N	150	150

Conclusion

By analysing the various factors affecting sisal cultivation, it is apparent that socio-economic factors (gender, age, education level, land size, income and awareness levels) have a direct implication on farming and adoption of sisal as a cash crop, with high potential to improve farmers' livelihoods. Further, cultivating sisal as a source of income was the major factor encouraging uptake of the crop's cultivation in the study area, though still at low levels. It is therefore imperative to encourage more farmers especially the youth to take up sisal farming as a commercial venture in order to improve their livelihoods. This can be realized through sisal product development and diversification so as to enhance income potential from the crop. The Government of Kenya should establish a development authority modelled towards bringing together small scale sisal farmers in the arid and semi-arid areas for the purpose of establishing sisal cottage industries and marketing. This would minimise the danger of the small scale sisal farmers from being exploited by middle-men in the sub-sector.

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