

Sisal Production Knowledge and Skills amongst Smallholder Sisal Farmers in Korogwe District, Tanzania

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Abstract

Sisal like other crops needs intensive care backed with appropriate knowledge and skills for optimal and quality production. However, smallholder farmers' knowledge and skills particularly on sisal production in Korogwe District in Tanzania is questionable. In fact we are missing some noticeable information on farmers' level of knowledge for a better production. Therefore, this study aimed at determining the level of knowledge and skills pertaining sisal production among smallholder sisal farmers in Korogwe District. A cross-sectional survey was conducted; data collection was achieved through the use of questionnaire and checklists for Focus Group Discussions and Key Informant interviews. Data were analysed both quantitatively and qualitatively using SPSS version 20 program and thematic analysis, respectively. The study findings revealed a considerable low level of knowledge and skills among smallholder sisal farmers in the study area. another important note is that, to a greater extent respondents utilized only one source of information namely the extension agents. Therefore, smallholder sisal farmers in the study area need to be oriented to other sources for increased access to knowledge and skills that will accelerate sisal production.

Keywords: Sisal production, Smallholder sisal farmers, Knowledge and Skills, Tanzania

1. Introduction

Sisal is widely produced as one of the major cash crops where Brazil is the leading producer and exporter of sisal fiber with the industry employing about 700 000 people in Bahia state alone (Cantalino *et al.*, 2015). The contribution of sisal production by smallholder sisal farmers has significant impact as they produce about 25% of the total sisal produced in Tanzania (FAO, 2013). Tanzania is among the biggest world's sisal producers being second after Brazil (IBAM, 2007; FAO, 2019). Sisal industry experienced a severe crisis in the 1980s due to several factors including the competition with synthetic fibers that led to the drastic fall in production and price worldwide. Its market recovered in the early 1990s due to the global agenda on environmental protection through use of biodegradable fibers as opposed to synthetic fibers (Santos *et al.*, 2018; Campanharo *et al.*, 2019). From the year 2006 to 2018 Tanzania sisal production experienced slow recovery with an increase of about 6 530.08 tons which is still very small irrespective to the higher global market prompting for high price (Tanzania Sisal Board, 2018).

Like other crops, sisal production requires intensive care hence the need for appropriate knowledge and skills (Khapayi and Celliers, 2016). Farmers' knowledge plays a key role for increased crop production (Mtega and Ngoepe, 2018). Lack of appropriate agricultural knowledge and skills on crop production results to poor farm management hence low yield and poor quality produce (Omari *et al.*, 2018). It is therefore very important that

farmers possess sufficient knowledge and skills for better production (Marc Corbeels, 2000). In order to achieve this, governments through their agriculture sector and other important stakeholders need functional strategies aiming at imparting knowledge and skills amongst smallholder farmers (UNIDO, 2006; TARI, 2017).

As such, Tanzania government through agricultural sector has set some initiative to supply farmers with some knowledge through various ways including the use of agricultural extension agents, NGOs, sisal companies and the Tanzania Sisal board (Lwoga *et al.*, 2011; Paulin, 2015; Mtega and Ngoepe, 2018). Equally, different information sources media like radios and televisions are helping in addressing this challenge (Mubofu and Malekani, 2020). Albeit, the afore mentioned initiatives have not functioned properly to address the need (Rutatora and Matee, 2001). Several studies conducted regarding sisal crop in Tanzania have little documented about smallholder sisal farmers' knowledge and skills on sisal production in Korogwe District. Therefore, addressing the gap will add to the body of knowledge and will enable stakeholders to come up with appropriate strategies for imparting knowledge and skills to farmers hence increased sisal production in the study area and to the national at large.

2. Methodology

2.1 Description of the study area

The study was conducted in Korogwe District. Korogwe District is one of the eight districts of Tanga Region, Tanzania. The district was selected purposively based on the main reason that they are areas with large number of sisal farmers; as well a large area of the land is occupied by sisal estates (Msuya *et al.*, 2018). Three wards were involved in the study namely; Makuyuni Ngombezi and Magoma. The District has three major agro-ecological zones namely the mountainous, low wetlands and semi-arid zone. The variations in the topography and climate provide different cropping possibilities. The District has loamy, sandy and clay soils while the natural vegetation is predominantly of the tropical type where sisal grows well in these environmental conditions. The Low wetland zone occupies about 35% of the District, it lies between 600-800 meters above sea level, is hot humid, and has an average rainfall between 800-1000mm per year. Several rivers, including the Pangani and Lwengera drain this area providing irrigation potentials. The main food crops grown are maize, paddy, beans, cassava and potatoes while the cash crops cultivated include cashew nuts, cotton, sisal and tropical fruits like mangoes, oranges and tangerines. Livestock (exotic and indigenous) are reared for milk and meat. In total, Korogwe District has about 1207 small scale sisal growers both in government owned large scale farms (estates) and private farming system (Tanzania Sisal Board, 2016).

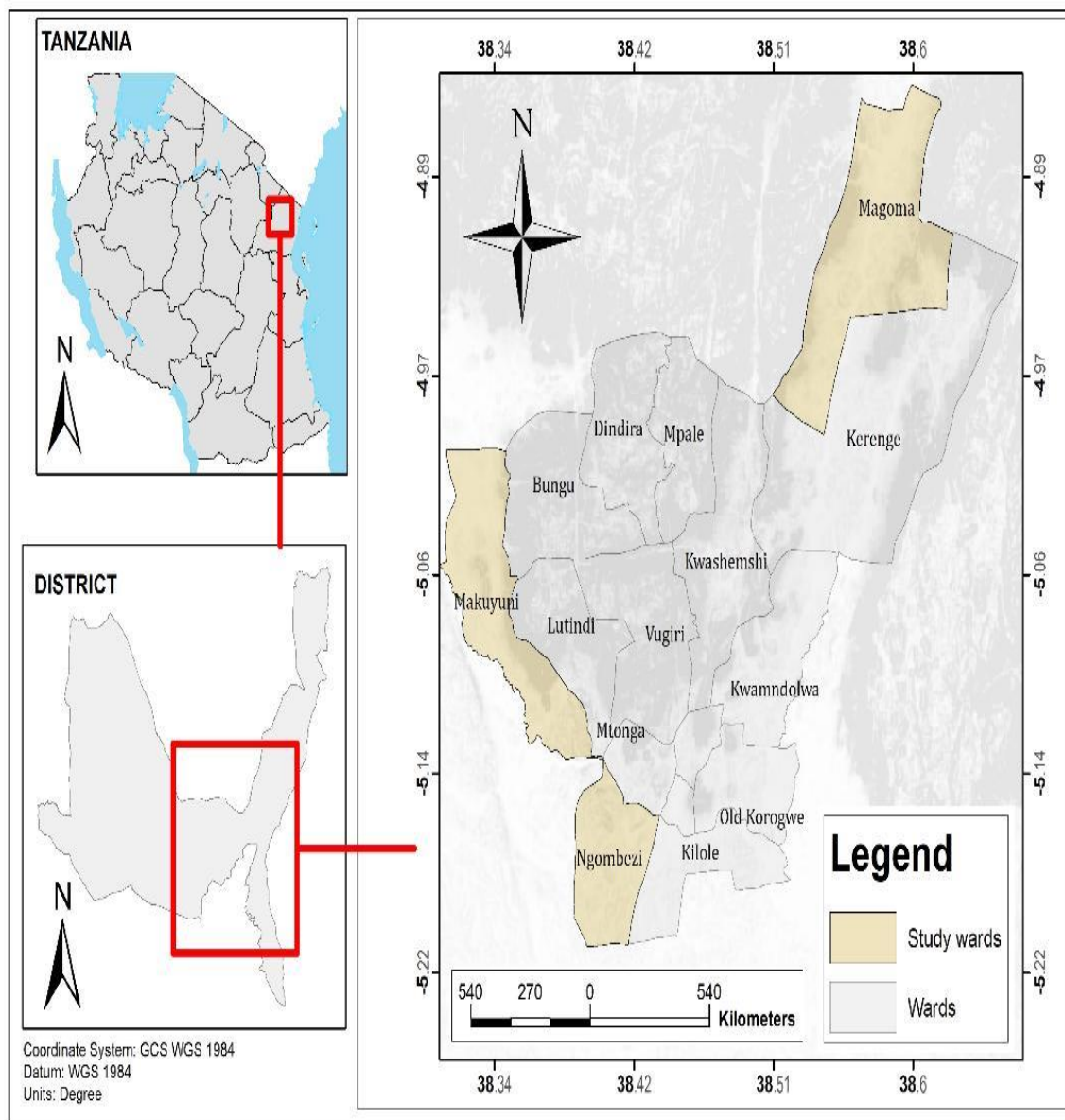


Figure 1: A map showing the study area in Korogwe District Tanzania where three wards were involved namely Makuyuni Ngombezi and Magoma

2.2 Study Design

Pittenger (2003) defined research design as a technique used to collect data that decisively answers empirical questions. In this study, the researcher used cross-sectional research design. According to Omair (2015) cross-sectional research design suits much with sampled representative from the population to generalize the findings to the study population. Additionally, in cross-sectional study design, data collection occurs at one point in time as opposed to longitudinal study design, something that favoured the nature of this study (Johnson, 2010).

2.3 Sample size and sampling procedures

According to Altunışık *et al.* (2004) a sample size ranging between 30 and 500 at 5% confidence level is regarded to be sufficient for many researches. Thus, a sample of 90 respondents was considered enough. The sampling frame for this study was all smallholder sisal farmers in Korogwe district. The sampling frame was obtained from the Tanzania Sisal Board database and it had a total of 1207 smallholder sisal farmers. Out of the

20 wards in Korogwe District, three wards namely Magoma, Ngombezi and Makuyuni were selected purposively for the study as they are heavily involved in sisal cultivation. Only one village was selected from each ward by a simple random technique, and the selected villages were Mabogo, Chekeleni and Mswaha from Magoma, Makuyuni and Ngombezi wards respectively. Respondents were selected by using a Simple Random sampling technique to obtain 30 respondents from each village resulting into 90 respondents. Furthermore, two Key Informants from each village were interviewed. In addition, we conducted 3 FGDs one in each village with about 8-10 members.

2.4 Data Collection

A Semi structured questionnaire used for interviewing respondents. Also, FGDs and Key Informant interviews were conducted to obtain respondents views about the subject matter using a checklist. Key informants were conducted, two from each village comprising of six of them. The selection of the Key informants considered gender, age, education and experience on sisal production. Primary data were collected from the sisal farmers using the interview guide and checklists. Secondary data were collected from Tanzania Sisal Board on the farmers' activities such as land area, market trends, production and sales. Also supplementary information was obtained through direct observation three visits to each village at an interval of two weeks. The focus was to assess factors affecting sisal production by smallholder sisal farmers in Korogwe District, Tanzania.

2.5 Data analysis

2.5.1 Quantitative data analysis

Quantitative data was analysed by using Statistical Package for Social Sciences (SPSS) version 20 program. The tests were done at a 95% confidence level whereby a significance level of < 0.05 was considered to be statistically significant. Statistical test named one way ANOVA and descriptive statistics were done. A one way ANOVA was performed to determine knowledge level and skills of respondents; this was done by taking into account the total scores of every respondent as per questionnaire interview.

2.5.2 Qualitative data analysis

Qualitative data from Focus Group Discussions and Key Informant interviews were analysed using content analysis; the audio responses were transformed into text format, it was then organised into computer files for easy retrieval. The gathered information was crosschecked in relation to other sources on the subject matter. Finally, themes were carefully analysed in order for the researcher to interpret the information beyond the data gathered so as to make valid and reliable conclusions

3. Results and Discussion

Results in Table 1 indicate more men getting involved in Sisal production, two thirds of all respondents (66.7%) were men who were mainly crop growers (74.4%) and controlled land. The common range of dependent children and adults was found ranging between 1-4.

Demographic characteristics of study respondents

Characteristic	Category	Frequency	Percentage
Sex	Male	60	66.7
	Female	30	33.3
Age	18 - 25	2	2.2
	26 - 36	10	11.1
	37 - 50	41	45.6
	51 and above	37	41.1
Marital status	Single	6	6.7
	Married	65	72.2
	Widowed	17	18.9
	Divorced	2	2.2
Education level of respondents	Non-formal education	12	13.3
	Primary education	49	54.4
	Secondary education	12	13.3
	College (Certificate and Diploma)	11	12.2
	University	6	6.7
Experience of respondent	Below 15 years	39	43.3
	15 years and above	51	56.7
Major occupation of respondent	Crop farmer	67	74.4
	Crop farming and livestock keeping	22	24.4
	Business and crop farming	1	1.1
Main source of income	Crop Farming	67	74.4
	Livestock keeping	1	1.1
	Crop farming and livestock keeping	22	24.4
Land ownership	Yes	78	86.7
	No	12	13.3
Controller of land	Husband	74	82.2
	Wife	16	17.8

4.4.2 Knowledge and skills on sisal production

The study shows that small scale farmers had varied level of knowledge on sisal production though were aware about the need for adherence to principles of good sisal agronomic requirements. However, the acquired knowledge seemed not to be fully put into practice by the farmers in the study area. The results revealed only 35.6 % of the respondents had considerable good knowledge and skills on sisal production. The scores were grouped into two groups where a cut-off point of 49% score was set and respondents who scored below 49% were regarded as having low knowledge and skills, and those who scored above 49% were regarded as having high knowledge. Based on results in Table 2, about two thirds of respondents (64.4%) had low knowledge of sisal production.

Table 2: Knowledge on sisal production with respect to villages in the study area

Village	Knowledge level of respondent		Total
	Low knowledge	High knowledge	
Mabogo	23(76.7%)	7(23.3%)	30(100%)
Chekeleni	19(63.3%)	11(36.7%)	30(100%)
Mswaha	16(53.3%)	14(46.7%)	30(100%)
Total	58(64.4%)	32(35.6%)	90(100%)

Also, upon further statistical analysis for the comparison of mean scores of respondents with respect to place of residence (village) revealed that there was no statistical significant difference in knowledge and skill among respondents with respect to place of residence (Table 3). This implies that smallholder sisal farmers in the study areas had almost an equal level of knowledge and skills based on area of residence hence all needed attention regarding knowledge and skills.

A report by UNIDO (2006) and TARI (2017) about Kenya and Tanzania recommended that there should be major strategies aiming at imparting knowledge and skills to smallholder farmers in order to raise sisal production. The findings concur with the study in Ethiopia by Marc Corbeels, 2000) who insisted on the importance of farmers given with sufficient knowledge and skills for better production Also, though farmers can participate in some harvesting activities sisal processing requires involvement of professionals and money for hiring or acquiring the required technology (Dlamini *et al.*, 2014).

Table 3: One way ANOVA output indicating variation in knowledge level on sisal production across the three study villages

Village of respondent	Sig.	95% Confidence Interval	
		Lower Bound	Upper Bound
Magoma	1.000	-6.96	7.41
Makuyuni	1.000	-9.77	4.61
	1.000	-7.41	6.96
Ngombezi	1.000	-9.99	4.38
	1.000	-4.61	9.77
	1.000	-4.38	9.99

4.4.3 Involvement of smallholder sisal farmers’ in various stages of handling sisal

The findings show that sisal farmers were engaged in series of activities from harvesting, processing and stocking of sisal bales. Of all respondents, 64.4% of farmers were highly engaged in cutting of sisal leaves during harvesting followed by bales of fibre 37.8% and stocking sisal fibre bales 34.4% while very few farmers engaged in sorting of fibre 2.2% and 12.2% brushing and grading of fibre (Table 4). Sisal farmers were engaged more in harvesting, transportation, packaging and stocking as compared to processing activities. This was due to the fact that, farmers were responsible for cutting and transportation of raw sisal from the farm to the factory; then after handling the sisal to the factory processing was done by few responsible persons as experts. Finally, farmers were highly engaged in packaging, transporting and stocking to counter check their products ready for selling via various agents like AMCOS (Table 4).

Table 4: Smallholder sisal farmers’ involvement at various stages of sisal processing

Stages	Number of respondents	Percentage
Cutting of sisal leaves	58	64.4
Transportation of sisal leaves	15	16.7
Sisal Processing into fibers	18	20.0
Drying sisal fibers	12	13.3
Sorting of fibers	2	2.2
Brushing and grading of fibers	11	12.2
Bailing of Fibers	34	37.8
Stocking of bailed sisal fibers	31	34.4

*The results in column of number of respondents and percentages are multiple responses

After the observation, the researcher had an opportunity to assess how farmers used to carry out sisal production practices right from farm to the final destination in the market. Observation was done at an interval of two weeks in every village and the approximate rating on every stage of sisal production was recorded, lastly the average rating was computed (Table 5) whereby about 46.7% of the farmers in the study area used to cut sisal leaves properly, 61.1% did proper transportation of sisal leaves to the processing machines, proper processing

of sisal leaves into fibers was done by 88.7%, proper sisal fibers grading by 91.1%, proper fibers packaging 92.2%, Proper stocking of fiber bales 83.3% and proper transport to the market by 87.8%. The findings revealed that there was a big challenge on cutting sisal leaves as farmers tend to cut more leaves per plant in favor for quantity hence affecting quality of sisal fibers.

Stage	Status	Frequency (average)	Percentage
Proper cutting of sisal leaves	Done	42	46.7
	Not done	48	53.3
Proper transportation of leaves	Done	55	61.1
	Not done	35	38.9
Proper processing into fibers	Done	80	88.7
	Not done	10	11.3
Proper fibers grading	Done	82	91.1
	Not done	8	8.9
Proper packaging of fibers	Done	83	92.2
	Not done	7	7.8
Proper stocking of bales	Done	75	83.3
	Not done	15	16.7
Proper transport to the market	Done	79	87.8
	Not done	11	12.2
Intercropping	Done	82	91.1
	Not done	8	8.9

*The results of frequency and percentages are multiple responses

Table 5: Sisal farmer’s practices across the value chain

4.4 Strategies for enhancing knowledge and skills to farmers on sisal production in Tanzania

Results from the study area revealed that farmers received knowledge and skills from various agricultural agents though a large percentage of the farmers were not reached by these agents due to shortage of funds to facilitate the process. Similar finding were reported by Rutatora and Mattee (2001) who claimed that many districts in Tanzania are unable to finance extension services from own sources without external support. Likewise other scholars (Khapayi and Celliers, 2016: Omari *et al.*, 2018) pointed out that, lack of appropriate agricultural knowledge and skills on crop production results to poor farm management hence low yield with poor quality.

4.5 Farmers’ sources of knowledge and skills in sisal production

The results showed that farmers received knowledge and skills mainly from five sources including agriculture extension officers, smallholder sisal farmers, Tanzania Sisal Board staff, Agriculture Marketing Cooperative Society and Katani Company Limited (Figure 2). The results show various sources of knowledge and skills for small scale sisal farmers; agriculture extension officers by (53.3%) followed by fellow sisal farmers (42.2%),

24.4% by Katani Company Limited, AMCOS by 20% and Tanzania Sisal Board Staffs (18.9%) (Figure 2). This implies that smallholder sisal farmers shared knowledge and information through the networks within themselves and to a great extent with extension agents.

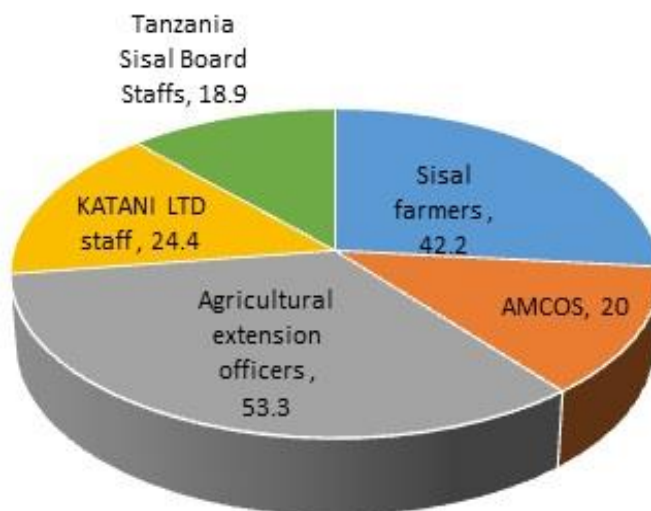


Figure 2: Percentages of farmers’ source of knowledge and skills on sisal production

4.5.1 Results from FGDs and key informants

Participants from all the villages reported that most of the time they shared information among themselves and to lesser extent from agricultural extension services through extension officers who provided knowledge and skills to the farmers but infrequently and reached only a small proportion of the smallholder sisal farmers. They said they had a problem in accessing the right information and sometimes they have to hire some people to provide them with the right information they needed.

For example, one of the Key informant in Mabogo said "Getting the right information at the right time here in our area is a big challenge since responsible people who are knowledgeable from the government make few visits per year, therefore we are used to teach and share information among ourselves" (Key informant interview 18/3/2020).

However, the findings are contrary to those of Lwoga *et al.* (2011) who pointed four main sources of information and knowledge for where 72.9% were friends, followed by extension officers (71.8%) and the rest were family members (56.9%) and input suppliers (43.6%). Likewise, the study by Mubofu and Malekani (2020) conducted in Iringa Tanzania noted the sources of agriculture information were radios, religious leaders, village leaders and seminars as the main channels used by extension officers to disseminate agricultural information to farmers.

4.5 More sources of knowledge and skills amongst Smallholder Sisal Farmers

Katani Company Limited staff claimed to engage on educating farmers on sisal production and worked closely with farmers who were interested to learn on good sisal production practices. Equally, extension agents claimed to play their part in educating sisal farmers from within estates and outside the estates. As a proof of the claim above, sisal farmers supported that they received information from extension agents though most of the time they organised themselves and pay some staff who are off job on local arrangements when they are in real need. For example, one Key Informant from Mswaha said “at the time we have urgent need for the professional advice we normally organize ourselves to bring a staff by payment particularly during off hours.

Further, Tanzania sisal board staff claimed to visit farmers to see the trend of sisal husbandry. Through the use AMCOS for example, sisal farmers are educated on good husbandry of the crop for quality and quantity harvest. However, the board acknowledged the challenge of not meeting majority of the farmers timely. Same argument was reported by AMCOS member that it has been not easy for them to reach farmers timely and frequently following shortage of staffs.

4.6 Conclusions and Recommendations

4.6.1 Conclusions

The study findings show that the level of knowledge and skills among smallholder sisal farmers is considerably low. It was also observed that to a great extent smallholder sisal farmer’s utilized only one source of information namely the extension delivery service from agricultural extension officers. Though, sharing information amongst themselves was also found common. This means that smallholder sisal farmers in the study area need adequate knowledge and skills through appropriate means that is easily accessible by the majority of the farmers.

4.5.2 Recommendations

Based on the study findings, it is recommended that:

1. There should be special programs aiming at boosting the level of knowledge and skills to small scale sisal farmers on sisal production with close supervision by the responsible authorities. Thus, the government should train and retrain more extension workers specifically on sisal value chain. This will help in resolving the challenge of shortage of qualified extension workers.

2. Ministry of Agriculture and other agricultural stakeholders should organize special programs aimed at providing knowledge and skills to farmers on sisal production through media that are easily accessible.

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