



Information Needs of Kenaf Farmers in Ogbomoso Zone of Oyo State, Nigeria

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Authors' contributions

This work was carried out in collaboration between the both authors. Author AOA managed the literature searches, analyzed the data, discussed the findings and wrote the final draft of the manuscript. Author ASA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

The constraints to kenaf production are extensive because farmers lack the information to mitigate them. This study determined the information needs of kenaf farmers. The study was carried out in Ogbomoso Agricultural Zone of Oyo State, in the year 2013. Multistage sampling technique was used to select 120 kenaf farmers. Information was collected using focus group discussion and structured interview schedule. Frequencies, percentages and means were used to summarise the data, while chi-square and Pearson Product Moment Correlation was used to analyze the data. Result of analysis showed that kenaf production in the zone is male dominated. The mean age of the farmers was 45 years and the mean household size was five. The mean years of experience in kenaf production was 18years and the mean land area under kenaf plants was 1.4 acres. Many of the farmers either had vocational education or primary education, with an average monthly income of N27, 000. The kenaf farmers unanimously chose agricultural extension agents as their primary source of information on kenaf's cultivation, agrochemical use, processing, utilisation, packaging, storage and marketing. Inadequate market information is the highest ranking constraint, implying that kenaf farmers do not have information on how to access markets to sell their kenaf products. The farmers also did not have a good knowledge of the economic and industrial values of kenaf. Their knowledge of kenaf production was a

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function of their sex, marital status, educational level, income and constraints in kenaf production. It is recommended that agricultural extension services should be involved all through the value chain of kenaf, especially marketing and not only at the cultivation level.

Keywords: Kenaf; agricultural market; agricultural extension; agro-allied industry; fibre.

1. INTRODUCTION

Kenaf (*Hibiscus cannabinus* L.) is a fibre plant native to east-central Africa. It is a common wild plant of tropical and subtropical Africa and Asia. Kenaf is a member of the mallow (*Malvaceae*) family, with okra and cotton as relatives. Kenaf plants grown in dense stands are largely unbranched with straight thin stems and grow to a height of 8 to 14 ft. The word kenaf is believed to have originated in Persia. However, India is the world's leading producer of kenaf, followed by Bangladesh. India's annual output of nearly 350,000 tonnes constitutes more than 60% world production [1]. The leaves are oval (heart shape) or lobed. The flowers could be red or yellow yielding round and pointed fruits; and the stem could be red, green or purple. Kenaf is a photoperiod sensitive plant, requiring day length which is shorter than 12 hours for flowering to occur [2]. It requires a long growing season for high yields with timely planting; adequate rainfall (550-650 millimetres) and a yield of 1 tonne retted fibre per 2.471 acres could be expected [3]. Kenaf is a non woody plant of a very short growth cycle of between 100 to 130 days [4]. It is a renewable fast growing annual crop capable of being grown twice with the aid of irrigation. Under optimum growing conditions, kenaf can form a canopy over the row middles in as little as 5 weeks [5]. Once kenaf shades the row middles, low growing weeds and grasses are shaded out and there is no need for additional weed control.

Kenaf is adapted to a wide range of soil types, but performs best on neutral, well drained, rich sandy-loam soil and high in humus. Kenaf seeds are relatively small and require good seed-soil contact for germination. Therefore, a fine, firm, well-tilled seedbed is necessary. Recommended planting dates are similar to those for soybeans. Seed should be planted less than 2.54 centimeters deep if the soil moisture and seedbed texture are suitable [6]. Kenaf, with its deep tap root and wide spreading lateral root system, is considered to be an excellent user of residual nutrients from previous crops. It is known to be a soil depleting crop. It is a gross feeder on soil nitrogen, potassium and calcium. At harvest, kenaf leaves are left in the field. It is estimated that this leaf material can return from 23 to 45kgs of nitrogen/acre [7]. Kenaf's response to added fertilizers depends on soil nutrient levels, cropping history and other environmental and management factors.

Kenaf is resistant to most plant diseases. However, anthracnose is the most serious potential disease problem, while Nematodes and other soil borne pathogens are also the most serious pest constraint to kenaf production [8]. Kenaf plant tolerates a fairly high population of chewing and sucking insects, and since the production emphasis is biomass rather than root, seed, fruit or flower, the required level of insect protection for kenaf may be much less than for most commercial crops. The crop therefore requires little care during its growing period.

The most feasible method of harvesting is chopping the green or air-dried plants. The green material can be stored anaerobically like silage and the air-dried stalks are gathered and shredded. Throughout ages, people have eaten it, fed it to their animals, used it for weaving

and stalking of plants. In Nigeria, it has been used for making ropes and for other domestic purposes such as erecting fence and thatching for dwelling. All the component parts of a kenaf plant, that is, leaves, seeds, outer bast fibre and inner core are of tremendous importance. The leaves are rich in protein (15 - 30%) and are used as animal feed [9]. Kenaf ensiled successfully and the silage is acceptable to young cows. Kenaf leaf, when dried or ground into a meal or pelletized, has a greater crude protein digestibility than that of alfalfa meal. Kenaf leaf and non-stalk portions of the plant are readily consumed by lambs and contained low fibre and high nitrogen concentrations. Where kenaf is grown in home gardens for fibre, the more tender upper leaves and shoots are sometimes eaten either raw or cooked. Kenaf seed can also be processed for edible oil.

The bast fibre can be converted to pulp for newsprint, tea bags, and grass mats (biodegradable mats impregnated with grass and/or flower seeds), hydrocarbon free bags, twine, rugs, ropes and textiles [3]. The bast fibres may also be used as a fibre glass substitute, blended with plastic, or blended with cotton for fabrics. Kenaf like all the other important fibre crops (jute, roselle, hemp, flax and ramie) can be pulped to make a range of paper and pulps comparable in quality to those produced from wood. With forests dwindling and the virgin wood becoming more expensive and the increasing demand for paper products it is understood why the non-wood fibre crops such as kenaf could be so important. Results have been positive in terms of paper quality, durability, print quality and ink absorption. Newspapers made from kenaf pulp have been shown to be brighter and better looking, with better ink lay down, reduced rub off, richer colour photo reproduction and good print contrast. Quality analyses showed kenaf newsprint to have superior tear, tensile and burst ratings. Additionally, kenaf newsprint manufacturing requires less energy and chemicals for processing, an important advantage, both economically and environmentally.

It is concluded that the core can be used as animal beddings, soil amendments, oil absorbents in chemical industries and in ethanol (a bio-fuel that can replace petroleum - *kenafanol*) production [10]. Core fibres are also used as an extrusion aid in plastics, an industrial absorbent (oil spill cleanup), a filter medium for fruit juices, as an additive in drilling mud and for manufacture of particleboard (acoustic tiles). Kenaf fibres (either derived from the bark or the core of the plant stem) can be an excellent source for several other uses such as for fabrics and building materials (low-density panels, wall paper backing, furniture underlay).

Kenaf thus holds a lot of promise of serving as a cash crop for farmers in the savannah. However the economic importance of kenaf, farmers and even extension workers in Nigeria has inadequate information about kenaf management. It is opined that constraints to kenaf production are extensive because farmers lack the technologies to mitigate them [8]. The most useful technology in this context is information on recommended best practices of kenaf value chain. This information is a necessity to avert the trend that [9] found, that farmers are no longer interested in growing the crop as they are faced with harvesting and decorticating problems and also poor economic returns. This study therefore seeks to determine the information needs of kenaf farmers in Ogbomoso Agricultural Zone (known for its dense kenaf cultivation) of Oyo State. The following research questions will be answered by this study: What are the socioeconomic characteristics of the kenaf farmers in the zone? What is their primary source of information on kenaf? What are their kenaf production characteristics? What is their level of knowledge on kenaf? What are the constraints to their kenaf production? The hypotheses of the study are: there is no significant relationship between the socioeconomic characteristics of the kenaf farmers and

their knowledge on kenaf production; and there is no significant relationship between kenaf farmers' constraints to and knowledge on kenaf production.

2. METHODOLOGY

The study was carried out in Ogbomoso Agricultural Zone which comprises of Five Local Government Areas; these are Ogbomoso North, Ogbomoso South, Ogo-Oluwa, Orire and Surulere Local Government Areas (LGAs). The zone experience both wet and dry season annually. The climate of the area favours arable crops production. The rainy season usually starts in March and last till November. The dry season is usually very hot except during harmattan period when it is cold and dry. Majority of the populace combines subsistence farming with other occupation like trading, civil service and handicraft. The zone lies between latitude 8°29' North of the equator and between 40°30' North of the Greenwich Meridian, with area landmass covering about 37,984 square kilometres and located in the northern part of Oyo State. The vegetation of the zone is dominated by derived savannah vegetation and agriculture is the main occupation of the people.

Multistage sampling technique was used to select the representative sample. Three Local Government Areas (Orire, Surulere and Ogo-Oluwa) were purposively selected from the identified LGAs because of their higher kenaf production. Four kenaf growing communities were randomly selected from each of the chosen LGAs, making a total of twelve communities. The communities are Adafila, Elelu, Tewueju and Atako from Orire LGA; Iba Iya Oje, Iresadu, Obente, Oko Ile from Surulere LGA; and Ajawa, Idi Eye, Lagbedu and Ladanu from Ogo-Oluwa LGA. Ten kenaf farmers were selected each from the listed communities from the document obtained from Ogbomoso Agricultural Development Zone (ADP) Zone office. The selection was done through simple random sampling technique to arrive at a total of 120 respondents used for the study. Information was collected in focus group discussions and data was collected using structured interview schedule. Six interview schedules were returned unusable, leaving 114 of them for analysis. Frequencies, percentages and means were used to summarise the data, while chi-square and Pearson Product Moment Correlation was used to analyze the data on Statistical Package for Social Sciences.

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics

Kenaf production in Ogbomosho zone of Oyo State is a male dominated agricultural enterprise as shown in Table 1 that 84.2% of the kenaf farmers were males. This is basically because female farmers are more interested in food crops production for household food consumption. This was made clear during the Focus Group Discussions (Focus Group Discussions) and was also opined by [11]. Also, kenaf is mainly produced by the adult population of ages between 37 and 54 years. This adult population had a mean age of 45years and constitutes 71.1% of the respondents of the study. The reason for this from the Focus Group Discussions was that it was people in this age category that were keen for more income to cater for their growing households needs. Three quarter of the farmers were married, implying roles and responsibilities to be played, many of which requires finances that could be derived from kenaf production.

In addition, many of the kenaf farmers either had vocational education (42.1%) or primary education (34.2%), while only 2.6% of them had tertiary education. Their educational status is low and may come in the way of farming knowledge acquisition. The mean household size among the respondents is 5, with 57.9% of them having between 4 and 7 individuals living in their houses. On the downside, this equates the dependency ratio, and otherwise, it equates farm labour [12], both influencing kenaf production either negatively or positively. It is positive if the household size equates farm labour which would enhance kenaf production and negative if household size equates dependency ratio which would reduce investment and reinvestment in kenaf production.

Table 1. Distribution of the socioeconomic characteristics of the kenaf farmers n=114

Socioeconomic characteristic	Frequency	Percentage
Sex		
Male	96	84.2
Female	18	15.8
Age category in years		
<37	24	21.1
37 – 54	81	71.1
>54	9	7.9
Mean=45		
Marital status		
Single	18	15.8
Married	87	76.3
Widowed	9	7.9
Highest educational attainment		
Vocational	48	42.1
Adult	12	10.5
Primary	39	34.2
Secondary	12	10.5
Tertiary	3	2.6
Household size		
<4	27	23.7
4 – 7	66	57.9
>7	21	18.4
Mean=5		
Years of kenaf production experience		
<11	27	23.7
11-26	75	65.8
>26	12	10.5
Mean=18		
Average monthly income from kenaf in naira		
<18,000	21	18.4
18,000 – 37,000	78	68.4
>37,000	15	13.2
Mean=27,000		

Source: field survey, 2013

Moreover, 65.8% of the kenaf farmers have had 11 to 26 years of experience in kenaf production. The mean years of experience in kenaf production among the farmers was 18. This implies that majority of the farmers have had many years to make necessary trials and

errors in the enterprise and are now professionals. The mean monthly income of the farmers from kenaf production was approximately ₦27, 000, with 68.4% of them earning between ₦ 18, 000 and ₦ 37, 000 from kenaf production monthly. This is in tandem with the research findings of [13] that most rural farmers have a monthly income of about ₦ 20, 000. According to the Focus Group Discussions, kenaf was sown, harvested and sold in batches, so it can be used as a supplementary source of income every month.

3.2 Primary Source of Information

Information is a veritable resource or factor of production that guides the use of other factors [14]. Farmers have been known to obtain information from various sources like radio, television, family and friends, print media, farmers' association, internet and agricultural extension agents. All these sources of information were presented to the farmers to choose which is their primary source of information on each of the subjects in Table 2. The kenaf farmers unanimously chose agricultural extension agents as their primary source of information on kenaf's cultivation, agrochemical use, processing, utilisation, packaging, storage and marketing. This places a lot of responsibilities on agricultural extension services as far as kenaf production is concerned in the Ogbomoso zone of Oyo State. The influence of agricultural extension service is mostly (81.6%) felt in the storage of kenaf.

3.3 Level of Kenaf Production

The mean land area under kenaf plant in the study area was 1.4acres as shown on Table 3. Given the recommendation of [5], 100, 000 plants per acres is averagely expected. Therefore, 140, 000 kenaf plants are cultivated by an average kenaf farmer in Ogbomoso zone of Oyo State. That gives an average of 10 to 15 tonnes of fibre according to [1]. The primary uses of kenaf plants were ropes (50.0%), bags (47.4%), oil (34.2%) and fibre (18.4%). This reveals that the potentials of kenaf plants have not been well optimised. Only 34.2% of the kenaf farmers had access to storage facility, likewise only 37.7% of them had institutional support for their kenaf production. This shows that the kenaf farmers did not have adequate access to necessary production facilities and they were not well networked with organisations that could give them necessary supports. Considering the result on Table 2, agricultural extension services are not doing well enough to upgrade the kenaf enterprises of these farmers.

Table 2. Distribution of the primary information sources on kenaf production n=114

Subject	Primary source of information	Frequency	Percentage
Cultivation	Extension agents	81	71.1
Agrochemical use	Extension agents	87	76.3
Processing	Extension agents	84	73.7
Utilisation	Extension agents	78	68.4
Packaging	Extension agents	90	78.9
Storage	Extension agents	93	81.6
Marketing	Extension agents	78	68.4

Source: field survey, 2013

Table 3. Distribution of kenaf production characteristics n=114

Variable	Frequency	Percentage
Land area in acres		
0.4	15	13.2
0.8	21	18.4
1.0	3	2.6
2.0	21	18.4
3.0	3	2.6
4.0	3	2.6
Mean=1.4		
Primary use*		
Oil	39	34.2
Rope	57	50.0
Bag	54	47.4
Core	12	10.5
Fibre	21	18.4
Seed	6	5.3
Jute	3	2.6
Storage facility		
No	75	65.8
Yes	39	34.2
Institutional support		
No	71	62.3
Yes	43	37.7

Source: field survey, 2013; *Multiple responses

3.4 Constraints in Kenaf Production

All farmers are faced with many challenges in their agricultural enterprises; however some challenges are not easily overcome and thus constrain the enterprise. These constraints differ from one agricultural enterprise to the other; therefore Table 4 ranks the constraints in kenaf production among the farmers. Inadequate market information is the highest ranking constraint, implying that kenaf farmers do not have information on how to access markets to sell their kenaf products. This corroborates [15] that stated that fibres are underutilized worldwide, which adversely affects fibre market chain. This constraint is followed by inadequate production and processing information. The remaining constraints blame the three top constraints on agricultural extension service delivery that they depend on for information on kenaf. The fourth constraint was unclear extension materials; the fifth was inadequate extension methods; the sixth was little extension contact; and seventh was irrelevant extension information. The implication of this is that kenaf farmers consider these situations not to be challenges but to be constraints, meaning that the farmers have considered these situations to be status quo in their kenaf enterprise.

3.5 Levels of Knowledge on Kenaf Production

The knowledge on kenaf production is varied across cultivation, harvesting, processing, local utilisation, industrial utilisation, seed variety, climatic requirement and economic viability. Considering the total knowledge base on kenaf production among the farmers, there was an equal divide between the proportion of farmers with high (50.0%) and the ones with low (50.0%) knowledge of kenaf production. In descending order and as shown on Table 5, the knowledge of the farmers on kenaf production were processing (89.5%), seed

variety (78.9%), local use (73.7%), climatic requirements (68.4%), cultivation (57.9%), economic viability (55.3%), industrial use (50.0%) and harvesting (36.8%). This implies that there is a knowledge dearth in the kenaf harvesting practices of the farmers and their knowledge of the industrial uses and economic viability of kenaf is low. Also, their knowledge of the recommended or best practices in the cultivation of kenaf plants is low. The low knowledge of the industrial uses of kenaf further support the assertion of [15]. The result could also infer that there is no much to the processing of kenaf, the farmers are only familiar with the kenaf varieties given to them by the agricultural extension agents and they are very familiar with the local use of kenaf. Also, there is nothing special about the climatic requirements of kenaf to the farmers. On the other hand, the farmers really did not know the economic and industrial values of kenaf.

Table 4. Distribution of the constraints in kenaf production n=114

Constraint	Not a constraint	Mild constraint	Severe constraint	Mean	Rank
Little extension contact	18.4	63.2	18.4	1.00	6 th
Inadequate production information	10.5	31.6	57.9	1.46	2 nd
Insufficient processing information	13.2	36.8	50.0	1.35	3 rd
Unclear extension materials	10.5	65.8	23.7	1.11	4 th
Inadequate extension methods	10.5	73.7	13.2	1.03	5 th
Irrelevant extension information	15.8	60.5	23.7	0.94	7 th
Inadequate market information	2.6	7.9	89.4	1.87	1 st

Source: field survey, 2013

Table 5. Distribution of the levels of knowledge on kenaf production n=114

Level	Frequency	Percentage
Cultivation		
Low	48	42.1
High	66	57.9
Harvesting		
Low	72	63.2
High	42	36.8
Processing		
Low	12	10.5
High	102	89.5
Local use		
Low	30	26.3
High	84	73.7
Industrial use		
Low	57	50.0
High	57	50.0
Seed variety		
Low	24	21.1
High	90	78.9
Climatic requirement		
Low	36	31.6
High	78	68.4
Economic viability		
Low	51	44.7
High	63	55.3
Total		
Low	57	50.0
High	57	50.0

Source: field study, 2013

3.6 Testing of Hypotheses

Chi-square analysis on Table 6 shows that there is an association ($p=0.002$) between sex of the kenaf farmers and their knowledge of kenaf production. The cross tabulation shows that larger proportion of the male farmers had higher knowledge of kenaf production. This goes further to reveal that females were not active cultivators of kenaf plants. Also, the knowledge of kenaf production among the farmers varied with their marital statuses ($p=0.004$) and educational level ($p=0.019$). This research finding agrees with [16] that stated that marital status and educational level influences rural employment and activities in most parts of Nigeria.

Table 6. Chi-square test of hypothesis one

Variable	Chi-square value	df	p-value	Decision
Sex versus knowledge	9.500	1	0.002	Significant
Marital status versus knowledge	11.103	2	0.004	Significant
Educational level versus knowledge	11.769	4	0.019	Significant

Source: field study, 2013; Significant at $p \leq 0.05$

According to Table 7, farmers' knowledge of kenaf production varied with their average monthly income. The higher their average monthly income from kenaf production, the higher their knowledge of kenaf production. This means that farmers with higher income had more access to necessary information on kenaf production. The access may be demand driven, where farmers go out of their way to get information from extension services; or supply driven, where extension agents target high income farmers, either for rewards or higher chance of extension effectiveness as explained in [14]. However, higher knowledge of kenaf production by some of these farmers might be what translated to higher income from kenaf production.

Kenaf farmers' knowledge of kenaf production was not dependent on their household size and farming experience because there was no significant relationship between household size ($p=0.649$), farming experience ($p=0.300$) and knowledge of kenaf production. There was an inverse relationship ($r= -0.028$) between the farmers' ages and their knowledge of kenaf production, implying that the older farmers had less knowledge of kenaf production though the relationship between age and knowledge was not significant. The inverse relationship between age and knowledge corroborates the lack of significant relationship between farming experience and knowledge. The research finding corroborates [17] that agricultural knowledge and information do not necessarily increase with age and years of farming experience of farmers.

Lastly, there was an inverse and significant relationship between constraints in kenaf production ($r=-0.139$, $p=0.042$) and knowledge of kenaf production as shown on Table 8. The higher the constraints, the lower the knowledge, implying that the more knowledge of kenaf production acquired by the farmers, the less the constraints they face in kenaf production. In other words, the farmers that are more constrained in kenaf production were the ones with low knowledge of kenaf production. This agreed with [18] that agricultural information need and knowledge gap of farmers revolve around resolution of farming problems.

Table 7. Pearson product moment correlation test of hypothesis one

Variable	r-value	p-value	Decision
Age versus knowledge	-0.028	0.771	Not significant
Household size versus knowledge	0.043	0.649	Not significant
Farming experience versus knowledge	0.098	0.300	Not significant
Monthly income versus knowledge	0.194	0.038	Significant

Source: field study, 2013; Significant at $p \leq 0.05$

Table 8. Pearson product moment correlation test of hypothesis two

Variable	r-value	p-value	Decision
Constraints versus knowledge	-0.139	0.042	Significant

Source: field study, 2013; Significant at $p \leq 0.05$

4. CONCLUSION AND RECOMMENDATIONS

Kenaf production in the study area was male and adult dominated. Many of them were married and had vocational education. The mean household size, years of experience and monthly income from kenaf production among the farmers were 5 years, 18 years and ₦27, 000 respectively. The farmers unanimously had agricultural extension agents as their primary source of information on every aspect of kenaf production. The mean land area under kenaf plant in the study area was 1.4 acres, while the primary uses of kenaf plants were ropes, bags and oil. Only few of the farmers had access to storage facility and institutional support for their kenaf production. Inadequate market information is their highest constraint, followed by inadequate production and processing information.

The farmers had less knowledge of harvesting, industrial uses and economic viability of kenaf. Larger proportion of the male farmers had higher knowledge of kenaf production. These farmers' knowledge of kenaf production varied with their average monthly income and was not dependent on their household size and farming experience. The older farmers had less knowledge of kenaf production and the farmers that are more constrained in kenaf production were the ones with low knowledge of kenaf production. It is recommended that youth, ones that are already farmers and those new to farming, should be sensitized on the economic viability of kenaf and trained on the best practices in kenaf production. Also, agricultural extension services should be involved all through the value chain of kenaf, especially marketing and not only at the cultivation level. Other private service providers should be encouraged to be more involved in kenaf production in order to complement the services of agricultural extension.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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