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Effective Utilization of Coconut Palms for Sustainable Income Generation among Entrepreneurs in Kilifi District: A Case of SMEs in Kaloleni Division

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Abstract

Despite the abundance of coconut palms in Kenya's Coast Province and the crop's importance as Kilifi District's main cash earner, it remains a highly underutilized resource. Most residents view coconut palms merely as sources of fruit, palm wine, firewood, and roofing materials, leading to minimal value addition or industrial exploitation. Hence, this study examined the effective utilization of coconut palms for sustainable income generation among entrepreneurs in Kilifi District focusing on SMEs in Kaloleni Division. This study adopted a descriptive research design using survey methods such as observation, structured interviews, and focused group discussions to collect data. The findings reveal that many small and medium enterprises (SMEs) have not realized the full potential of coconut palms in producing a variety of value-added products that could significantly enhance income levels and improve living standards. The study therefore sought to determine how coconut palms can be effectively utilized for sustainable income generation by identifying existing constraints, potential business opportunities, and the support services required to stimulate enterprise development in the sector. The study concludes that low product prices, limited access to reliable markets, lack of capital, and inadequate awareness of regulations governing palm wine production are the major barriers affecting utilization of coconut palms. The study recommends the establishment of village-based cottage industries to promote local value addition and employment. The government and development organizations should collaborate to build the capacity of selected service providers who will, in turn, train other entrepreneurs at lower costs. Formation of cooperatives and farmer associations should be encouraged to strengthen bargaining power, promote marketing, and facilitate access to financial and technical support. Local investors should be identified and assisted in adopting technologies for producing non-traditional coconut products such as coconut oil, fibre-based crafts, and cosmetics. Enterprise development organizations should lead efforts to implement these interventions, ensuring that coconut palms are fully exploited as a sustainable source of income and rural economic growth.

Keywords: *Coconut Palms, Sustainable Income Generation, Entrepreneurs, SMEs, Kaloleni Division, Kilifi District*

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1.0 Background of the study

In the worlds' developed coconut producing countries, research efforts directed towards the diversified utilization of coconut palms during the past decades has achieved numerous and viable processing technologies. In spite of these achievements, the coconut industry in these countries remains highly dependent on the production and marketing of traditional products such as copra and coconut oil (Banzon et al., 1990). According to Banzon (1994), this scenario has significantly contributed to the main problem facing the coconut palm industry; that is, the low returns from coconut farming. To counter this problem, continuous efforts need to be directed towards the development of new sources of income through product diversification and improved product quality coupled with provision of services that can lead to the development of market focused technologies that can spur effective utilization of the coconut palm. Complementary to this is the need to focus attention on sustained efforts for enhancing the utilization of coconut palm blended with aggressive marketing strategies. The realization of these activities coupled with effective implementation of strategies that are friendly to small and micro enterprises (SMEs) would result in positive growth and excitement of the coconut market thus improving the livelihood of the many small farm holders, the main component t of the coconut utilization sub-sector.

It is timely that coconut-producing areas in the South Pacific concentrate in product improvement, development and diversification through the introduction of value- added products and market promotion of these products (Banzon, 1994). These are experiencing that Kenya can borrow and enhance the utilization of coconut palms for enterprise development. In Kenya's coastal region, coconut remains a subsistence crop mostly consumed domestically as tender nuts for drinking and mature nuts for culinary and social purposes. A small percentage of the production is converted into commercial products such as copra and coconut oil. Research has shown that coconut palm offers many business opportunities which if exploited can lead into improvement of incomes besides augmenting the farm level incomes of coconut farmers (De-Silva, 1989). According to Parsley (1992), comparing with other studies undertaken for agricultural crops, formal coconut research is a recent and an under-resourced effort.

There are over 70 traditional and newly emerging products that are being made from coconuts. Philippines lists about 40 non – traditional coconut products ranging from coconut oil-based fatty alcohol to handicrafts while India and Sri Lanka ship out a wide range of fibre products. In 1995, income from coconut product exports from member countries amounted to about USS 1.5 billion as compared to US$ 1.28 billion in 1994 and US$ 831 million five years ago. This therefore gives a clear indication that there are numerous opportunities within this sector in which small- scale producers can add value to coconut through product diversification, technology improvements and enhanced market assess.

A good example is the production of coconut sugar. It has been observed that income from coconut palm is five times higher if sap is tapped and processed into sugar rather than depend only on its fruit. Charcoal making, handicrafts, and many others are some of the traditional products that are derived from coconuts to increase small and micro- enterprises (SMEs) incomes. Starting as a cottage industry and by using low technology, the utilization of coconut palms has progressed well in Malaysia hence demonstrating the potential for diversification of the coconut industry even in the rural areas (Liyanage, 1990). Given this kind of Scenario, there is need to put in place systems

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that can spur the utilization of the year round readily available coconut palms at Kenya's coastal region, otherwise this locally available resource will continue to remain underutilized.

1.1 Statement of the problem

In Kilifi district, entrepreneurs seem not to have realized that coconut palms can be utilized more effectively and especially by manufacturing SMEs to make a variety of utility products that can improve their incomes and the living standards. Lack of a variety of coconut palm products in the local and export markets provides evidence that SMEs in Kilifi and elsewhere within Kenyas' coastal region have not made any significant efforts to utilize this readily available resource commercially. Some opinion leaders and entrepreneurs in Kaloleni division have raised concern for the need to spur the utilization of this palm for income generation, especially for the divisions' rural residents and in effect the SMEs. To challenge this concern, there is need to understand the dimensions and complexities facing entrepreneurs and service providers (SPs) within the coconut palm supply and service/product demand chain. It is in this realization that, in addition to finding out the opportunities that can be exploited for income generation and constraints faced by entrepreneurs in their attempts to utilize coconut palms, this study will identify services that can be put in place to minimize the constraints faced and recommend a workable system that will contribute towards responding effectively to this gap.

1.2 Objectives of the study

i. Find out the constraints faced by entrepreneurs in their attempt to utilize coconut palms.
ii. Identify business opportunities that can be exploited for enterprise development.
iii. Identify services that can be put in place to address the constraints and spur development of the opportunities identified in (a) and (b) above.
iv. Recommend interventions that can enable the local community, and entrepreneurs utilize coconut palms for income generation sustainably.

2.0 Literature Review

The literature review is presented in sections.

2.1 Origin, Utilization, and Economic Potential of the Coconut Palm and SMEs

The coconut palm has a long and contested history of origin, with various scholars presenting differing theories. Kahn (1988) suggested that coconuts floated across vast oceans to reach Southeast Asia, Polynesia, India, and other tropical regions, where they sprouted naturally along shorelines. Abedin et al. (1987) and Dransfield (1977) argued that early sea travellers from Malaysia and Indonesia distributed the nuts as they journeyed, using them for food and trade. In contrast, De Silva (1989) and Zanzibar historians claimed that coconuts may have originated from East Africa and were later introduced to Asia through trade. These conflicting accounts highlight the coconut palm's deep historical roots in both Asia and Africa. Since explorers, traders, and historians provide varying perspectives, the true origin of the coconut palm remains inconclusive. Nevertheless, its early global spread established it as one of the most important tropical crops, shaping economies and cultures across continents.

Over the centuries, Arab and Asian traders expanded the commercial and technological value of coconut products. De Silva (1989) recorded that Arab merchants carried coconuts and their shells

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to Europe long before the arrival of Portuguese sailors in East Africa, highlighting an early form of international trade. Jayasundara et al. (1989) observed that by the 14th century, craftsmen in the Maldives were constructing ships entirely from coconut materials—using coco-wood for hulls and masts, and fibre for ropes and sails. These innovations marked one of the earliest recorded uses of coconut palms in engineering and industry. Bennet's (1831) treatise, cited by Gutteridge et al. (19194), later introduced Europe to the vast economic potential of coconuts. By this time, the coconut palm had already become integral to trade networks across Asia and Africa, symbolizing sustainability, innovation, and adaptability in tropical economies.

Despite its uncertain origin, the coconut palm evolved into one of the most versatile tropical crops, providing food, shelter, and industrial raw materials. UNIDO (1980) documented that copra oil serves as the foundation for diverse products such as cooking oil, soap, and shoe polish. The palm's leaves, husks, and stems are used for roofing, ropes, fuel, and timber, while its milk and water are consumed as beverages or cooking ingredients. These attributes make the coconut palm a valuable multipurpose crop capable of generating income in both domestic and export markets. The author therefore questions why Kenyan entrepreneurs have not tapped fully into these opportunities, given the abundance of palms along the coastal region. Expanding investment in value addition—such as producing refined oil, cosmetics, and coconut-based food products—could increase employment and household income while promoting industrialization in rural areas.

Historically, Kenya's coastal region emerged as a significant producer of coconuts, though the timeline of introduction remains debated. Cunningham (1990) suggested that Portuguese explorers brought the crop to East Africa in the 16th century, while Freeman (1962) noted coconut oil trade along the Swahili coast as early as the 1st century AD. The Kilifi District Ministry of Agriculture (2004) reported that coconut palms increased from 456,636 in 1914 to 4.4 million by 2000, cultivated mainly by small-scale farmers. This steady growth highlights the palm's role in supporting rural development through employment and household income generation. With over 150,000 farmers depending on coconuts, the crop's contribution to livelihoods and local economies is evident. Yet, despite its potential, much of Kenya's production remains traditional, with limited commercialization or value addition. Strengthening cooperatives, processing enterprises, and market linkages could transform this long-standing crop into a vibrant industrial sub-sector.

The section on small and medium enterprises (SMEs) demonstrates that despite their economic significance, most remain informal and constrained. The National SME Baseline Survey (1999) showed that 99 percent of Kenyan SMEs are microenterprises, with 97 percent employing fewer than five workers. These enterprises often operate in rural areas using labour-intensive methods, with limited access to credit, modern technology, and skilled manpower. Nevertheless, they are vital for economic growth and job creation, employing millions and accounting for over 74 percent of Kenya's workforce. Their activities reduce rural–urban migration, encourage innovation, and promote poverty reduction. With targeted government support, improved training, and financing opportunities, SMEs can play a pivotal role in processing and marketing coconut-based products. Empowering these small businesses would not only enhance local value chains but also strengthen the economic sustainability of coastal communities.

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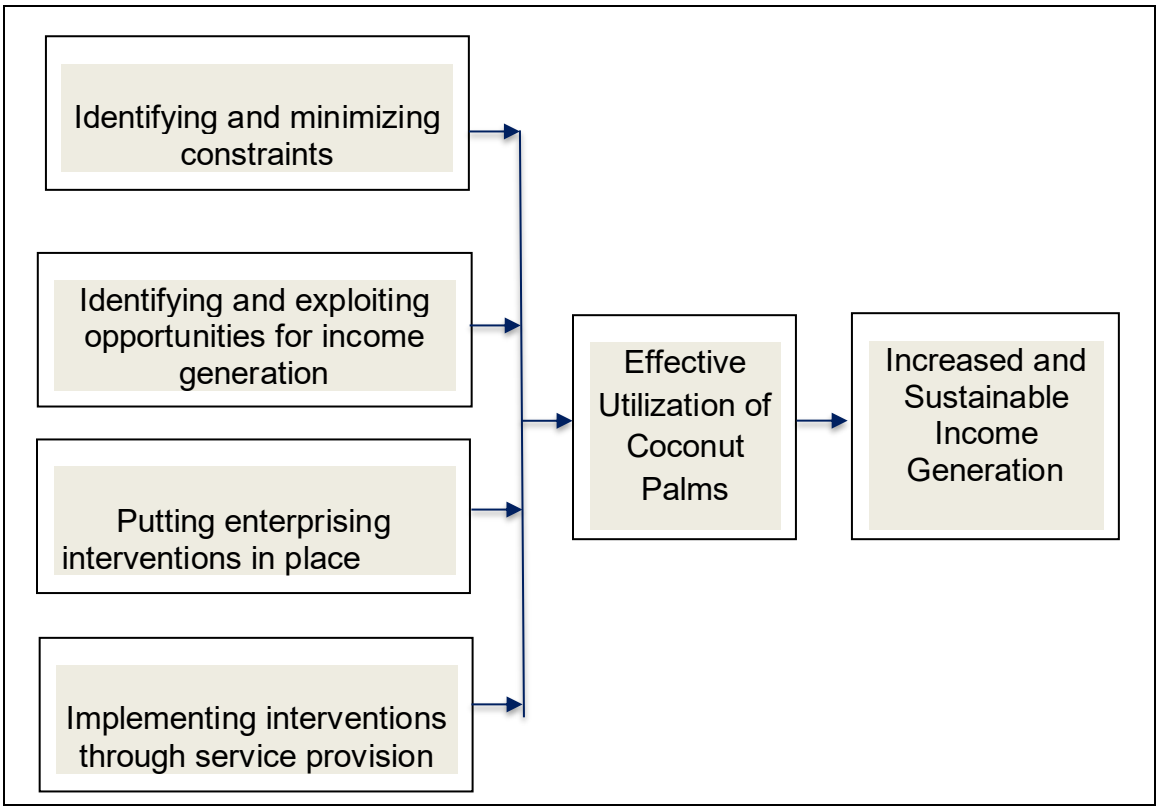
Research by FAO (1996), Banzon and Velasco (1982), De Silva et al. (1989), Rognon (2002), and Laval (1990) reveals that Kenya lags behind other coconut-producing countries such as the Philippines, Fiji, and Sri Lanka, where the coconut industry is highly industrialized. In those countries, entrepreneurs produce a wide range of products including soap, detergents, activated carbon, fibre ropes, and coco-wood furniture. Kenya's slow growth has been attributed to outdated colonial laws, limited research support, weak institutional frameworks, and low awareness among farmers and processors. Despite these constraints, the coconut palm holds great potential for transforming the livelihoods of Kenya's coastal population. With strategic interventions—such as policy reforms, credit facilities, improved technologies, and capacity building—local SMEs can successfully diversify production and expand into regional and global markets. As the author concludes, effective utilization of the coconut palm could make it one of Kenya's most important industrial and export crops, driving sustainable economic growth and rural prosperity.

2.2 Conceptual framework

Figure 1 presents the conceptual framework illustrating the relationship between opportunities, constraints, and entrepreneurial development in the coconut sub-sector. It shows how addressing these challenges through appropriate interventions such as capacity building, financial access, and policy support can enhance the effective utilization of coconut palms. The framework ultimately aims to promote sustainable enterprise growth and increased income generation among SMEs in coconut-growing regions.

Figure 1: Conceptual Framework



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3.0 Research Methodology

The study adopted a descriptive research design that utilized survey methods, including observation, interviews, and focused group discussions, to enable generalization and prediction of findings (Kothari, 2003). The survey approach allowed data collection through structured interview schedules (Mugenda et al., 1999), ensuring the capture of both quantitative and qualitative information. To enrich the quality of data collected, two focused group discussions (FGDs) were held with participants involved in coconut palm enterprise activities. The combination of these methods provided an in-depth understanding of the challenges and opportunities associated with coconut utilization, ensuring reliability and validity of the findings through triangulation. The target population comprised SME owners and farmers engaged in coconut-based income-generating activities in Kaloleni Division. Five main markets-Kaloleni, Mkapuni, Mazeras, Makomboani, and Mariakani-were purposively selected due to their high concentration of coconut-related trade (Kilifi District Development Plan, 2003–2007). A total of 47 respondents, representing 94 percent of the targeted sample, were interviewed. Structured face-to-face interviews and FGDs were used to collect data, addressing literacy limitations among entrepreneurs. The collected data were edited, coded, and analyzed using descriptive statistics in SPSS, with results presented in tables and charts to support interpretation and recommendation of suitable interventions for promoting sustainable utilization of coconut palms.

4.0 Findings of the Study

This chapter presents the findings as reported by respondents during their response to the research questions that were investigated. Responses were received from 47 interviewees and one focused group discussion (FGD), which was held primarily to cross-check the validity of the data collected. Presentation of the findings follows the sequence of research questions investigated. The first section gives the general characteristics of the businesses both social and economic, while the second gives the descriptive analysis of the questions explored in the study.

4.1 Basic information and characteristics of the business

The tables given below illustrate the frequencies and the corresponding percentages for the respondents' basic information and the characteristics of their businesses.

Table 1: Distribution of respondents by location

Physical Location	Frequency	%tage
Kaloleni	11	23.4
Makomboani	10	21.3
Mariakani	08	17.0
Mkapuni	06	12.8
Mazeras	11	23.4
Other areas (Mombasa)	01	02.1
Total	**47**	**100.0**

Kaloleni and Mazeras had the highest number of respondents with each representing about 23.4%. One entrepreneur (from Mombasa town), representing about 2.1% was found Kaloleni and interviewed.

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Table 2: Distribution of respondents by business registration

Is your business registered?	Frequency	%tage
Yes	05	10.6
No	42	89.4
Total	**47**	**100.0**

Out of the 47 entrepreneurs who were interviewed only 10.6 had their businesses registered. The highest number, represented by 89.4%, was not registered.

Table 3: Respondents by form of ownership

Form of Ownership	Frequency	%tage
Sole proprietorship	44	93.6
Partnership	02	04.3
Limited Company	00	00.0
Other (self-help group)	01	02.1
Total	**47**	**100.0**

Table 3 indicates that 93.6% of entrepreneurs were operating as sole proprietors, 4.3% as partnerships and none as a limited company. One respondent who represented a self-help group manufacturing mats and brooms for income generation was also interviewed.

Table 4: Distribution of respondents by number of employees

No. of Employees	Frequency	%tage
1-10	46	97.9
11-50	01	02.1
Above 50	00	00.0
Total	**47**	**100.0**

About 98% of the businesses interviewed employed workers ranging from 1-10, with 71% of these employing not more than three workers. However, all the respondents stated that they engage casual workers as demand for their produce increases and vice versa.

Table 5: Distribution of respondents by average weekly sales.

Average Weekly Sales	Frequency	%tage
Less than KShs. 5,000	41	87.2
KShs. 5,000 – 10,000	03	06.4
Above KShs. 10,000	03	06.4
Total	**47**	**100.0**

The average monthly sales for about 88% of the businesses were less than KShs. 5,000.00, with only 6.4% having a monthly turnover of more than KShs. 10,000.00.

4.2 Constraints faced by entrepreneurs

See table 6 below.

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Table 6: Respondents by problems preventing use of palms for income generation

No.	Main Problems	Frequency	%tage of Cases
1	Low prices	22	46.8
2	Lack of reliable market	18	38.3
3	Lack of capital	13	27.7
4	Mistrust amongst producers, buyers and brokers and failure by buyers to pay for debts	11	23.4
5	High cost of transport	10	21.0
6	Harassment by local police and local council	07	14.9
7	Lack of preservation equipment for perishables	06	12.8
8	Seasonal production	05	10.6
9	Poor working tools	04	08.5
10	Poor husbandry and spoilage of palms by pets	04	08.5
11	Competition	04	08.5
12	High cost of borrowing	04	08.5
13	Lack of quality control and grading of produce	03	06.4
14	Insecurity	03	06.4
15	Lack of production skills and high processing cost	02	04.2
16	Lack of awareness on licensing policies if any	02	04.2
17	Scarcity of product	01	02.1
18	Low demand	01	02.1
19	Hunger	01	02.1
20	Palms grown in other people's farms (ancestral)	01	02.1
21	High consumption of palm wine	01	02.1

The main problems preventing entrepreneurs from utilizing coconut palms effectively for enterprise development were sought and the responses recorded. As illustrated in the table above, the main problems faced are low prices, lack of reliable markets and capital followed by mistrust amongst producers, buyers and brokers coupled with their failure to pay for debts. The high cost of transporting coconuts or coconut palms unprocessed materials was cited as one of the problems facing the entrepreneurs in their attempts to utilize coconut palms for income generation. The least experienced problems included high consumption of palm wine.

Table 7: Distribution of respondents by control measures required

Needed Regulations	Frequency	%tage of Cases
Legalize palm wine	6	25.0
Regulate/control prices	5	20.8
Establish wholesale/central market	4	16.7
Form co operatives	4	16.7
Do allow trade with upcountry people	3	12.5
Control harvesting of timber	2	08.3
Stop harassment by provincial administration	1	04.2
Establish coconut bottling industry	1	04.2
Form coconut board	1	04.2
Form policies to govern the business	1	04.2
Force husbandry	1	04.2

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Most of the respondents (25%) strongly stated that there is urgent need to pot formally legalize palm wine. About 21% wanted prices regulated in order to shield farmers and producers from unscrupulous buyers and brokers. The respondents also need regulations to govern or structure the marketing of their products. This is evidenced by about 17% of the respondents who preferred that a central market for coconut palms products and by-products be established. A similar number recommended that a cooperative society be established. Other observations made included the need to stop harassment by provincial administration, formation of a coconut board, development of policies to govern businesses utilizing coconut palms for income generation and enforce husbandry practices.

4.3 Business opportunities

Figure 2: Distribution of respondents by coconut palm products made

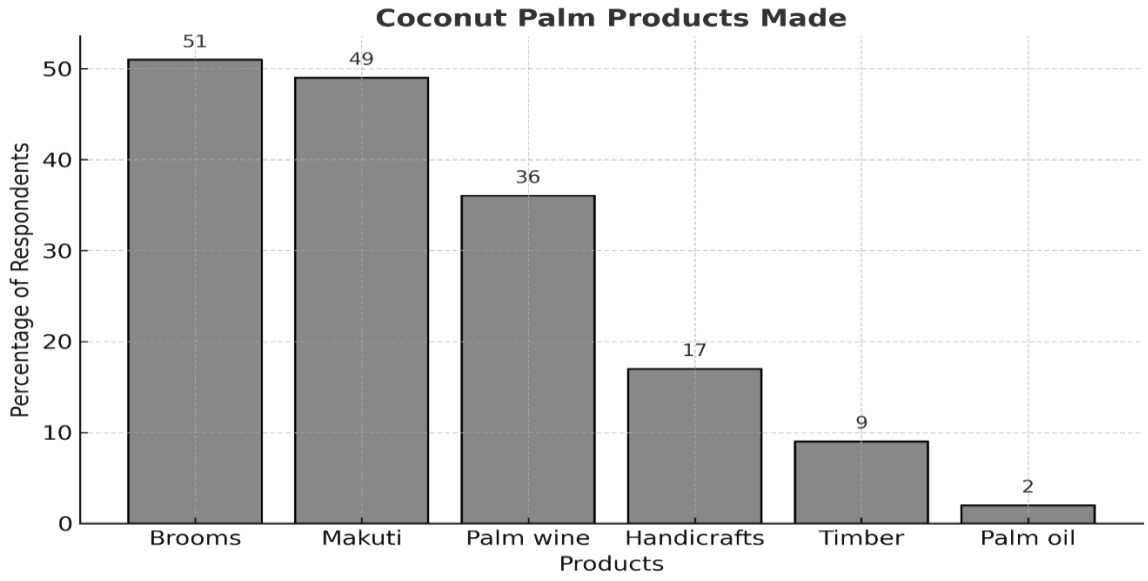

Figure 2 illustrates that 51% of the businesses make brooms while "makuti" was made by 49% of the respondents. Palm oil was the least known with 2%. Most of the products made are those that require minimum processing and relatively low investments.

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Table 8: Level of product awareness

No.	Type the Product	Count	%tage of Responses	%tage of Cases
1	Fresh nuts	44	7.6	97.8
2	Husked nuts	40	6.9	88.9
3	Matured nuts	42	7.3	93.3
4	Copra	40	6.9	88.9
5	Coconut seedlings	27	4.7	60.0
6	Copra meal	12	2.1	26.7
7	Coconut oil	34	5.9	75.6
8	Desiccated coconut	03	0.5	06.7
9	Defatted coconut	01	0.2	02.2
10	Toasted coconut	-	-	-
11	Cream/powder	19	3.3	42.2
12	Coco chips	01	0.2	02.2
13	Coco chemicals	03	0.5	06.7
14	Coir fibre	07	1.2	15.6
15	Cocopeat	01	0.2	02.2
16	Mattress	24	4.2	53.3
17	Twisted fibre	01	0.2	02.2
18	Brittle fibre	01	0.2	02.2
19	Coir mats	16	2.8	35.6
20	Ropes	24	4.2	53.3
21	Brushes	08	1.4	17.8
22	Brooms	34	5.9	75.6
23	Coconut shell	35	6.1	77.8
24	Shell charcoal	05	0.9	11.1
25	Shell flour	01	0.2	02.2
26	Vinegar	06	1.0	13.3
27	Sugar	07	1.2	15.6
28	Timber	21	3.6	46.7
29	Furniture	18	3.1	40.0
30	Handicrafts	19	3.3	42.2
31	Soap: laundry/toilet	19	3.3	42.2
32	Shampoo	04	0.7	08.9
33	Hair/body oil	20	3.5	44.4
34	Wood	18	3.1	40.0
35	Coconut sweets	02	0.3	04.4
36	Coconut water	11	2.1	26.7
37	Mouth wash	-	-	-
38	Margarine	02	0.3	04.4
39	Ice cream	01	0.2	02.2
40	Dyes	01	0.2	02.2
41	Shaving creams	01	0.2	02.2
42	Lipstick	01	0.2	02.2
43	Activated carbon	02	0.3	04.4
44	Coconut husk chips	576	100.0	1,280.0

NB: 45 valid, 2 missing cases.

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Respondents did appreciate the wide range of products that can be made from coconut palm and nuts. Fresh and mature nuts were the most obvious as seen by the high awareness levels of about 98% and 93% respectively. The least known products were lipstick, shaving creams, dyes, ice cream, shell flour, twisted and brittle fiber, cocopeat, and defatted coconut represented by about 2% in each category. The highest level of awareness is in produce that is harvested and directly used or sold with little or no processing at all.

Figure 3: Distribution of respondents by main coconut palm product produced

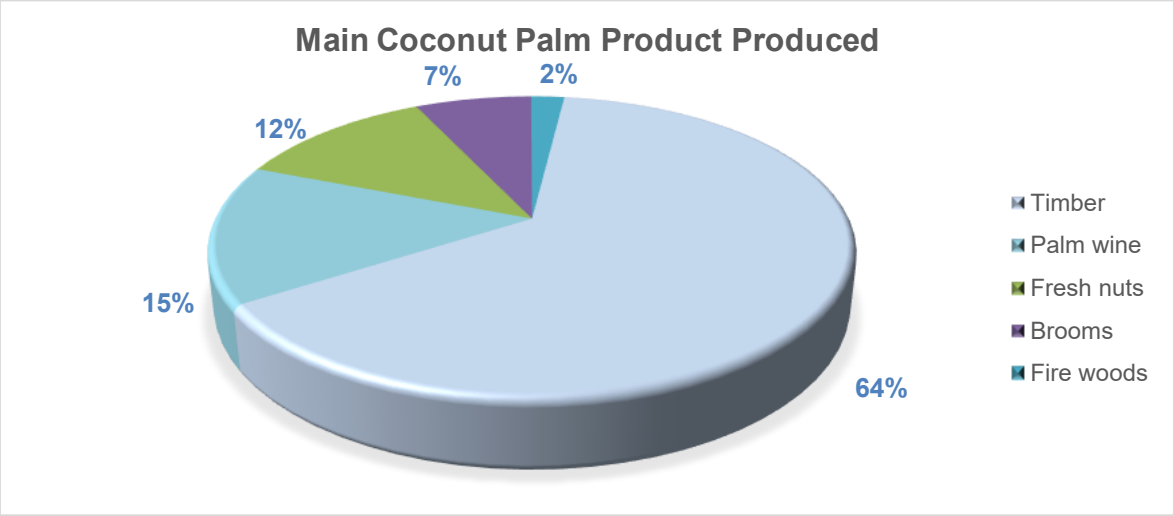

Figure 3 above illustrates that palm wine was identified by 64% of the respondents as the main coconut palm product. Other products considered as main included coco wood timber (15%), and firewood, represented by 2% of the respondents. Ironically, palm wine, which is regarded as the main product by the respondents, is illegal in the face of government regulations and laws.

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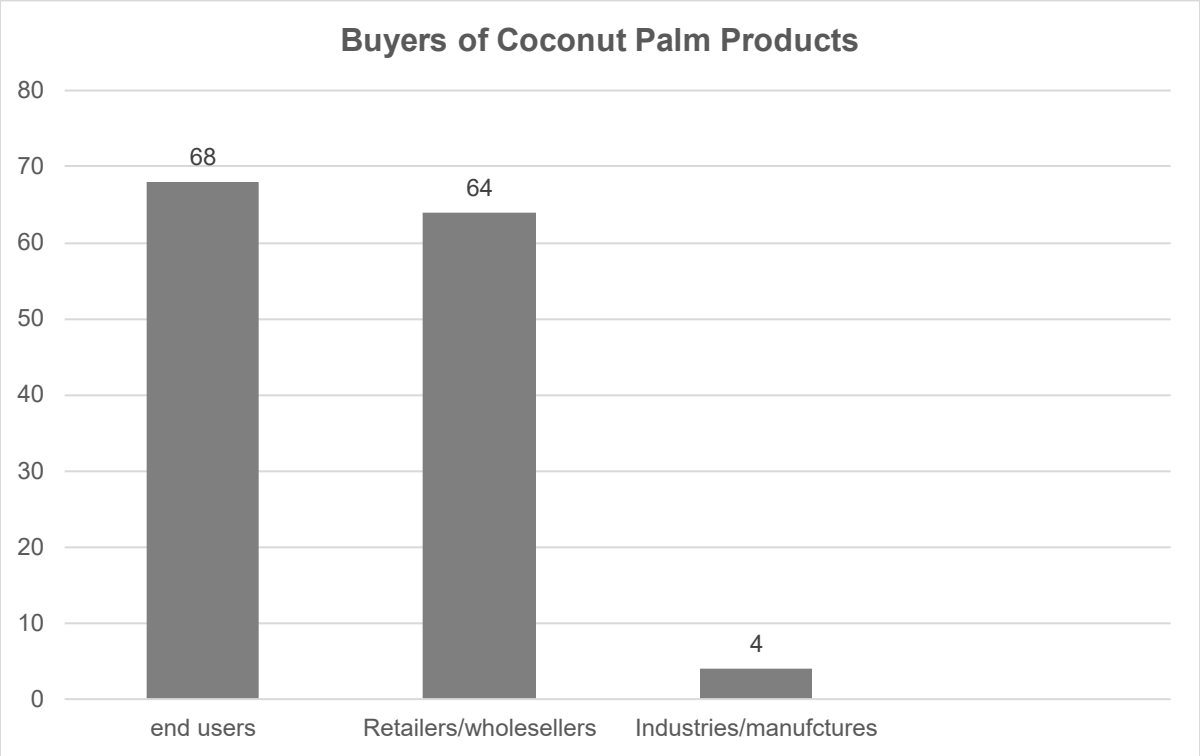
Figure 4: Distribution of product by main buyers



It was found that majority (68%) of the respondents sell their produce to end- users while retailers and wholesalers constitute 64% of the respondents' customers. Only 4% of the respondents sell to industries and manufacturers. This suggests that there are no proper links between industries and businesses, or there is not much manufacturing going that requires coconut products as a raw material or as a base for manufacturing other products.

Table 9: Distribution of respondents by reasons for low sales/prices.

Reasons for Low Sales/Prices	Frequency	%tage
Lack of unity amongst farmers, producers and brokers	08	17.0
Un-harmonized prices, competition resulting in low incomes	19	38.3
Seasonal production	04	08.5
Shortage of wine because a lot of it is taken to Mombasa city	0	06.4
Lack of knowledge of where to get better markets	02	04.3
Lack of preservatives and quality control	04	08.5
Police harassment	02	04.3
Total	**42**	**83.3**

In spite of strong demand for coconut products, businesses still get low sales and low prices for their produce. Table 9 above lists lack of unity amongst producers and brokers as the main reason for this scenario as testified by 29% of the respondents. Competition was also listed as another reason for the low prices by 29% of the respondents. Police harassment was amongst the least

mentioned by 7% of the respondents. It is generally seen that low returns for the produce is due to lack of uncoordinated marketing approach.

Table 10: Respondents Interest in Learning how to Make Coconut Palm Products

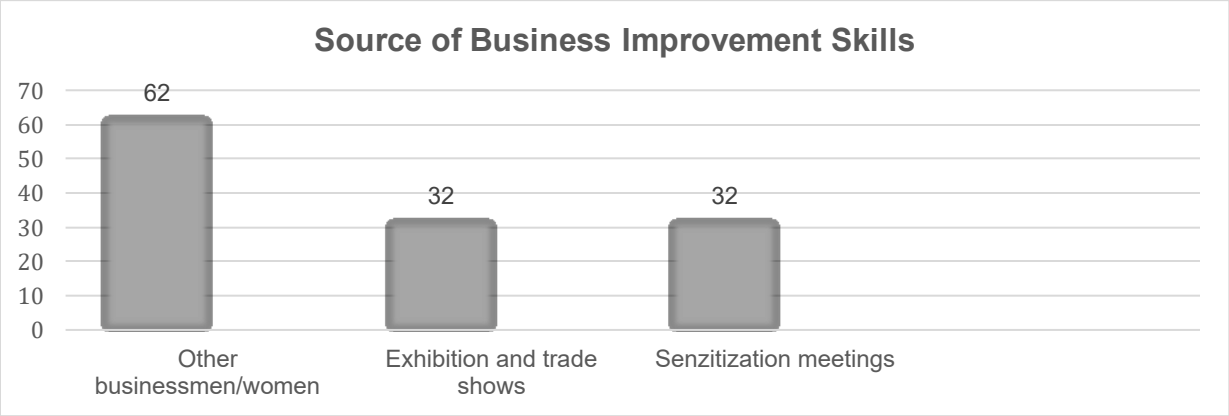
Reasons for Interest	Frequency	%tage
Try other business opportunities and diversify production	**19**	**40.4**
Start commercial production and earn more income	28	59.6
Produce high quality products by value addition	05	10.6
Learn new technology and stabilize production	04	08.5
Train others (become training service providers)	04	08.5
Produce for domestic use and minimize expenses	05	10.6
Total	**65**	**138.2%**

Respondents have a strong desire to overcome the constraints and earn income from the coconut palm. Table 10 above shows that 60% of them need to learn new skills with the main objective of making more income by commercializing production.

4.4 Business skills and services

Figure 5 presents distribution of respondents by source of business improvement skills.

Figure 5: Distribution of Respondents by Source of Business Improvement Skills



About 62% of the businessmen/women acquired their business skills from colleagues in business. Exhibitions, trade shows and sensitization meetings provided 32% of the respondents with an opportunity to be exposed to or learn the skills they use.

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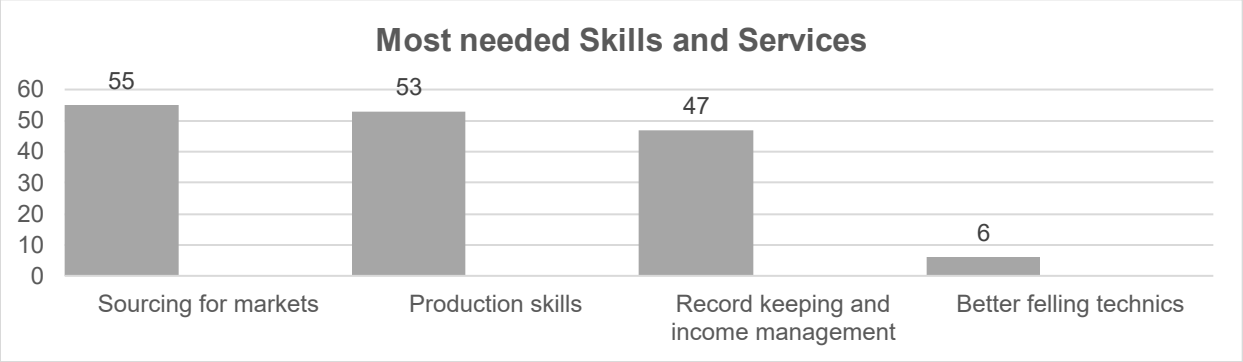
Figure 6: Distribution of respondents by cost of training

The figure 6 above shows that 57% of the businesses have invested below Ksh. 1000.00 to acquire some related training while only 14% have spent amounts ranging from KShs. 2000.00 – 5,000.00. This implies that the businesses are more likely to access training if it is less costly or free of charge.

Figure 7: Distribution of Respondents by Most needed Skills and Services



Business development services were recorded to be required in order of response such sourcing for marketing 55%, production skills 53%, record keeping and management of incomes 47%, whereas 6% required better coco wood felling techniques.

Table 11: Respondents by most used tools

Machines/Tools Used	Frequency	Percentage
Hand manual tools	22	88.0
Power driven machines	01	04.0
Manual machines	01	04.0
Hand power driven tools	01	04.0
Total	**25**	**100.0**

About 88% of the producers use hand manual tools, while categories employing the use of power driven, manual machines and hand power driven tools are represented by 1% each.

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Table 12: Respondents by tools lacking

Tools Lacking	Frequency	Percentage
Saws	03	06.4
Wine processing & packaging equipment	03	06.4
Rubber bands	02	04.3
Knives	02	04.3
Vehicle for transport	01	02.1
Planes	01	02.1
Chisels	01	02.1
Scrappers	01	02.1
Solar copra drivers	01	02.1
Machine for making ropes and branches	01	02.1
Others	30	63.8
Total	**47**	**100.0**

Additionally, 6.4 % of the producers lack good sales. As illustrated in table 12 above, a similar proportion needs wine processing equipment. These are mainly businesses that are involved in processing. The high reflection of 30% represents which are providing pure services for which the providers do not realize the need for any machines and tools.

4.5 Possible interventions as suggested by respondents

The respondents were unanimous that something needs to be done in order to spur and make utilization of coconut palms sustainable.

Table 13: Responses on the need for strategies to improve utilization of palms

Need for Strategies to Improve Utilization of Coconut Palms	Frequency	Percentage
Yes	32	97.0
No	01	03.0
Total	**33**	**100.0**

Table 14: Responses on interventions supporting utilization for income generation

Lack of Interventions to Support Utilization of Coconut Palms for Income Generation	Frequency	Percentage
Yes	32	97.0
No	1	3.0
Total	**33**	**100.0**

As seen on tables 13 and 14 above, 97% of the respondents called for strategic interventions aimed at improving the utilization of coconut palms. About 88% said nothing has been in this effect and thus the huge potential remains untapped.

Table 15: Interventions Supporting Utilization of Palms for Income Generation

Intervention	Count	%tage of Responses	%tage of the Cases
Oil processing	5	26.3	36.4
Soap making	4	21.1	27.3
Sensitization on use of senile coco wood	3	15.7	27.3
Training in sawing coco wood	4	21.1	36.4
Marketing	1	5.3	18.2
Preservation of wine	2	10.5	36.4
Total Responses	**19**	**100.0**	**172.7**

36 missing cases, 11 valid cases

The study found that respondents acknowledge existence of some initiatives supporting the utilization of coconut palm. These include oil processing and training in sawing coco timber. This constituted 36.4% of the respondents in each category. Least acknowledged was marketing with 18% of the respondents in real need to link up with reliable markets. From the responses above, it can be noted that the impact of such interventions has not been clearly felt, nor have their effectiveness been clearly established across the board.

Table 16: Suggestions for future interventions

Suggested Future Interventions	Count	%tage of Responses	%ge of Cases
Provide security of land tenure	01	01.4	02.6
Plant more coconut palms	02	02.7	05.1
Train in production skills	18	24.7	46.2
Link to reliable markets	08	11.0	20.5
Minimize use of middlemen	02	02.7	05.1
Form co-operatives or groups	10	13.7	25.6
Train in savings and credit management	01	01.4	02.6
Train storage of toddy	02	02.7	05.1
Improve pricing	03	04.1	07.7
Avoid police or council harassment	02	02.7	05.1
Form friendly policies	04	05.5	10.3
Husbandry practices	07	09.6	17.9
Grade nuts	03	04.1	07.7
Provide savings and credit services	03	04.1	07.7
Legalize palm wine	05	06.8	12.8
Do not allow foreigners to dominate local businesses	01	01.4	02.6
Establish farmers oil press factory	01	01.4	02.6
Total Responses	**73**	**100.0**	**187.2**

8 missing cases, 39 valid cases.

Table 16 above shows that, majority of the respondents, represented by 46%, would like training in production skills. About 26% called for the formation of co-operatives to enhance production,

processing and marketing of the products. The least mentioned were represented by only 2% in each category and these were; need to provide security of land tenure, desire to train in savings and credit management, calls to ensure that foreigners are not allowed to dominate local businesses and the need to establish a farmer's oil press factory.

4.6 Focused group discussion

One FGD, comprising eight key players in this industry, was held. The group identified the main constraints affecting the utilization of coconut palm, business opportunities which local entrepreneurs can take advantage of, and the corresponding services that are required to spur production. The constraints identified were failure by producers to source for markets, lack of promotional programmes, lack of awareness and failure by the government and researchers to disseminate information, mistrust among local traders and lack of commitment. Besides, the group observed that lack of guidelines and exposure to do good technology for producers has resulted in poor production in the rural farms. Noted was the absence of desiccating machines. Palm wine processing and bottling equipment, shell grader (for grinding shell into powder), coir and oil processing machines. Producers struggle to make their products using traditional technology. SMEs lack the support they need in order to develop. Exploitation by agents and merchants was reported to be a major drawback. It was noted that this take advantage of the high poverty levels experienced by the farmers to pay very low premiums for services rendered by the locals and their produce. Producers who are in dire need to expand find it difficult because of their inability to borrow from financial institutions. This is mainly because financial institutions require collateral and or guarantors as a prerequisite for providing credit. In identifying viable business opportunities, this group listed the products which were considered to have high potential in accessing the local market. These were summarized and presented in table 17.

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Table 17: Business Opportunities Identified through the focused group discussion

Parts of the Coconut Palm	Business Opportunities
Log	Timber for furniture & roofing, construction & fencing poles, fabricating tools and machine parts
Coconut shell	Grind into powder and mixed with pyrethrum to make mosquito coils, bangles. Earrings, hair clips, cooking spoons, ceiling insulator covers, lamp shades and traditional mugs locally referred to as *Kata.*
Coir fibre	Door mats, mattresses, seating coaches, ropes, toilet paper, firewood, sponge for cleaning utensils, painting brushes, powder for mulching (growing media for flowers-used instead of soil), and first aid for fresh wounds (*referred to as dawa ya ranga and used instead of spirit)*
Roots	Palm root wine
Fronts	Tapping palm wine, making fruit baskets, wall mats, and fishing traps *(tsatsa ama mgono was samaki)*
Makuti	Wall traditional cottages-attractive for tourists
Copra*(mbata)*	Production of oils, base for production of soap and lotions. Copra waste is packaged and sold for used as animal, poultry and human feed.
Fresh nut	Making cakes and sweets. Milk used for boiling rice and peas (*mbaazi*) amongst other delicacies.
Tender or immature nut (dafu)	Fresh water is used as a quencher, health drink and as a substitute for mothers' milk for newborns. (Fresh water recommended by MOH in places where there is outbreak of cholera because it has high gloss content). Also sold to wash out faces/body to remove pimples, flush out retained placenta, plus other additives, its used traditionally to treat various diseases e.g.: Asthma (t*sori*)
Mature nuts	Used as seed (propagation material), produces palm wine and is used as vinegar (*siki)*, spirits. Fermented wine used as eye drops, palm wine sored for over 12 weeks used as acid.

5.0 Conclusion

The study concludes that most enterprises dealing with coconut palm products in Kilifi District remain informal, unregistered, and operate without designated workshops or business premises. The majority of production occurs within rural homesteads, with only a few traders occupying market stores such as those in Mariakani. The absence of organized farmer associations, cooperatives, and partnerships has slowed business growth and perpetuated poverty among local entrepreneurs. Most of these enterprises are owner-operated, employing only a few casual workers occasionally, leading to low productivity and minimal turnover. Although some entrepreneurs recognize the potential for producing unique coconut-based products, none have ventured into such innovation due to inadequate technical exposure, lack of creativity, and limited access to modern processing technologies. The absence of business registration, unclear licensing procedures, and overlapping alcohol control laws—especially concerning palm wine—further

constrain the growth and formalization of these enterprises, leaving them vulnerable to administrative harassment and policy uncertainty.

It is further concluded that the limited use of modern tools, obsolete machines, and lack of preservation or packaging technology have restricted product diversification and quality improvement. Entrepreneurs' dependence on traditional skills passed from one producer to another has led to duplication of low-value products with little differentiation. This indicates an urgent need for structured capacity-building programs that focus on innovation, quality enhancement, marketing, and efficient utilization of senile coconut palms. Training should emphasize record keeping, financial management, and improved felling and processing techniques. The willingness among entrepreneurs to acquire new knowledge and pay minimal fees for training demonstrates the sector's readiness for transformation. Equipping them with modern technology, affordable credit, and access to structured markets will not only reduce wastage and post-harvest losses but also promote industrial growth and sustainable income generation within Kilifi's coconut-based enterprises.

6.0 Recommendations

The study recommends that group systems should be introduced through the formation of associations and cooperatives to minimize key constraints such as low prices, weak market access, and limited bargaining power. These cooperatives should be empowered to develop and market value-added products, promote fair pricing, and advocate for better market policies. To strengthen trade and product promotion, the associations should undertake organized marketing campaigns and establish a central coconut produce market supported by a marketing board to coordinate linkages between farmers, producers, and consumers. Financial institutions and enterprise development organizations should collaborate to design affordable financial products tailored for SMEs in the coconut sector. Once established, cooperatives should receive training in savings and credit management to build self-sustaining financial capacity. Additionally, mediation services should be introduced to resolve buyer–seller disputes, while joint transportation and central collection centres should be set up to minimize operational costs. Awareness programs should also be implemented to educate entrepreneurs on licensing procedures, legal rights, and policy compliance to reduce harassment from authorities.

The study further recommends that cooperatives should be supported to acquire preservation and processing equipment to enhance the quality and shelf life of coconut products. The CDA, Ministry of Agriculture, and KARI should form a joint working committee with NGOs and private stakeholders to train farmers on improved husbandry practices and introduce high-yielding species such as the Zanzibar dwarf. Producers should also be trained in modern production, quality control, and marketing to strengthen competitiveness. Farmers should be sensitized on the importance of land demarcation and ownership rights to reduce conflicts over palm use. Palm wine tapping should be regulated, and a winery with a bottling facility should be established to ensure hygienic production and create new income opportunities. The CDA should lead efforts to support SMEs while encouraging self-reliance through exhibitions, shows, and training programs. Finally, the establishment of village-based cottage industries should be prioritized to enhance value addition, create employment, and promote sustainable utilization of coconut palms for income generation.

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