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The exports of dehusked coconuts from southwestern Ghana: Implications for coconut farmers' role in a rural virgin coconut oil value chain

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Abstract

The export of coconuts creates competition between local value chain activities and the export market. This article examined the impact of dehusked coconut exports on the role of coconut farmers in the local virgin coconut oil (VCO) value chain in the Jomoro Municipality, Ghana. The study answered the following question: What were the quantities of coconut farmers supplied to local VCO processors before and during the export periods? Simple random sampling was used to select 311 coconut farmers for the study. Both structured and unstructured interviews were conducted using an interview schedule and a semi-structured interview guide, respectively. Quantitative data were analysed using IBM SPSS (version 25), while direct quotes were used to support the quantitative data. The results show that the presence of coconut exporters and the rising price of coconuts were major opportunities for coconut farmers. Exporters bought 100 dry coconuts at GH₵100 while the local VCO processors bought the same quantity at GH₵60. The international market prices for dry (mature) coconuts ranged from €14 to €15 (GH₵98 to GH₵105) per bag of 50 units. The majority of the coconut farmers,

therefore, supplied 70–100% of their coconuts to exporters and 10–30% to local VCO processors. Thus, the exports of coconuts, mainly to Nigeria, Europe and the United States of America, have impacted farmers' roles in the local VCO value chain. The government should partner with local companies to build more processing plants that will offer attractive prices to farmers in order to keep coconuts in the Jomoro Municipality for processing.

Previous Next

Keywords

Coconut farming; *Coconut exporters*; *Coconut processing companies*; *Virgin coconut oil processors*; *Jomoro municipality*

1. Introduction

The global supply of coconut products, except refined oil, is concentrated in the tropics (Abdulsamad, 2016), being almost present in countries between latitudes 26°N and 26°S (Jerard, Damodaran, & Swarnam, 2018). Indonesia, Vietnam and Thailand were the top three global exporters of dehusked coconuts, competing very closely with nearly equal market shares in 2014 (Abdulsamad, 2016; Food and Agriculture Organization [FAO, 2010). Africa contributes 3.4% of the world's coconuts, with the main producing countries being Tanzania, Ghana, Nigeria, Mozambique, Kenya and La Cote d'Ivoire (Muyengi, 2017). Since there are far-reaching and diverse demands for coconut products, especially in temperate countries, there is competition to produce and supply them to the local market or export them to world markets (Das, 2023; Shill, Das, & Chatterjee, 2022; United Nations Conference on Trade and Development, 2016). In many cases, the competition between the export and local markets brings about a raw material shortage for local copra oil mills, leading to their forced closure or production below their capacity (Abdulsamad, 2016).

In Ghana, coconut is a smallholder crop with an average holding of about 1.5 ha (Ministry of Food and Agriculture, 2012). About 80% of coconut production in the country is found in the southwestern coastal belt (van den Broek, Apenteng-Sackey, Arnoldus, Keita, & Waardenburg, 2016), with the Western and Central regions traditionally known for the activity (Issaka, Senayah, Andoh-Mensah, & Ennin, 2012). However, many processing companies in the country complain about the limited and expensive supply because there is an increasing market for dried coconuts, especially within West Africa (van den Broek et al., 2016).

The Jomoro Municipal Assembly has a large traditional agrarian sector, with agriculture employing nearly 60% of its labour force. For years, coconut farming has been a major mainstay for many Jomoro families (Ghana Statistical Service [GSS], 2014). However, coconut processing, an important agro-based livelihood activity in the municipality, is under threat from the direct supply of coconuts to buyers from Nigeria, who pay high prices for coconuts for transportation to that country for local consumption (Ruf, Dziwornu, Salinier, & Courbet, 2010) and onward export to Europe (GSS, 2014). While Ruf et al. (2010) indicate that the Nigerian market receives over 50 percent of the dry coconuts produced in Ghana, the Ghana Export Promotion Authority (2019) estimates that Ghana supply about 60 percent of the coconuts consumed in Nigeria, which has been exporting dehusked coconuts from the Jomoro Municipality, since 2002. This situation has impacted the coconut industry in the municipality by putting pressure on the local VCO value chain (Ruf et al., 2010).

Some studies have been conducted on the coconut industry (Boateng, Ansong, Owusu, & Steiner-Asiedu, 2016; Fernando, Zubair, Peiris, Ranasinghe, & Ratnasiri, 2007; Mak-Mensah & Klutse, 2014; Muyengi, Msuya, & Lazaro, 2015; Mwachiro & Gakure, 2011; Odoom, Edusei, & Piegu, 2016). Using a quantitative approach, Fernando et al. (2007) examined the impact of climate variability on coconut production in Sri Lanka. They reported that the income generated from coconuts increased with increased rainfall amounts and vice versa. However, they did not consider the role of coconut farmers in the coconut value chain. Muyengi et al. (2015) studied the factors that affect coconut production in Tanzania and reported that poor agronomic practices, inadequate input supply and poor extension services were among the major challenges to coconut production. Despite using a mixed method approach in the study, they did not consider how coconut exports affect the role of coconut farmers in the local coconut industry. Mwachiro and Gakure (2011) also focused on the challenges that prevented indigenous communities in Kalifi District, Kenya, from fully benefiting from the coconut industry. The challenges included low prices for coconut products, a lack of proper markets for coconuts, poor farming methods and a lack of financial support. However, they did not examine how the export of coconuts impacted the role of coconut farmers in the coconut value chain or the proportions of coconuts farmers supplied to their customer groups. Besides, their study only adopted a quantitative approach.

In Ghana, Ruf et al. (2010) reported on the effect of coconut exports on the local coconut industry in the Jomoro Municipality. However, even though they indicated that coconut export was leading to a collapse of the local VCO industry in the Jomoro Municipality, they did not do a detailed study of the role of coconut farmers in the local VCO value chain, including the acreages of land cultivated, land ownership, and the categories of customers that provided market opportunities for the farmers. Besides, they did not analyse the proportions of coconuts that the coconut farmers supplied to the various

customer groups and the challenges confronting farmers in their farming business. In a review, Boateng et al. (2016) reiterated the role of coconut oil in nutrition, health and national development. However, they did not focus on how the export of coconuts reduces the raw material availability for coconut oil producers. Odoom et al. (2016) also used the quantitative method to examine the challenges faced by VCO processors in the Jomoro Municipality. These challenges included a lack of well-developed coconut oil extraction technologies, financial constraints and poor transportation networks from coconut farms to the processing centres. However, they did not analyse the proportion of coconuts received by coconut oil processors as a result of coconut export.

The novelty of this study lies in its examination of the impact of coconut export on the role of coconut farmers in supplying coconuts to local VCO processors. This is because the previous studies did not do a detailed survey on the role of coconut farmers in the local VCO value chain or how coconut exports impact such a role. But the effects of the coconut export boom, which commenced in 2002 and peaked in 2019, on the role of coconut farmers in the local VCO value chain need to be carefully assessed for policy intervention. This becomes more justifiable when one considers that local VCO processing is mainly a rural livelihood activity, and the diversion of coconuts from this activity affects the economic well-being of the people employed in it and the quantities of VCO supplied to the Ghanaian market. Besides, while the previous studies mainly adopted the quantitative approach, this study sought to include the qualitative approach in documenting the views of coconut farmers on how dehusked coconut exports impact their role in the local VCO value chain.

The study addresses the following questions: What were the roles of coconut farmers in the local VCO value chain, particularly before the coconut export boom? What acres of land did farmers cultivate? What was the level of land ownership among farmers? What were the opportunities for coconut farmers in the wake of the coconut export boom? What were the changes observed by coconut farmers in the demand for coconuts? What quantities of coconut did farmers supply to local VCO processors before the export periods? What quantities of coconut did farmers supply to local VCO processors in the wake of the export boom? And what were the challenges confronting coconut farmers?

2. Theory

Dependency theory guided the study. The theory is frequently employed in the social sciences to describe how states' economies grow. It aims to explain why, in the international system, certain countries are rich and developed while others are underdeveloped or impoverished (Rama & Hall, 2021; Romaniuk, 2017). Dos Santos (1970) defines dependency as a state in which the economies of certain countries are conditioned by the development and expansion of others. Dependency is also described

as the explanation of a state's economic development in terms of foreign impacts on its national development strategies, including political, economic, and cultural influences (Sunkel, 1969). Dependency theorists distinguish between the periphery and the core, or metropolis, of the global economy. The periphery consists of underdeveloped or impoverished nations, whereas the core consists of developed or wealthy nations (Romaniuk, 2017; Ynalvez & Shrum, 2015). The periphery countries have mining, forestry, agriculture, less power, subpar educational systems, and low incomes that cannot support wealthy lifestyles. On the other hand, social elites and industries define the core countries, along with financial power and better systems of education. The interactions among the countries in the core and those in the periphery are greatly influenced by these characteristics (Romaniuk, 2017).

The main principles of dependency theory are that in an interdependent world, the core countries win while the periphery countries lose, and economic growth in the former countries does not lead to progress in poorer countries but usually results in severe economic challenges in such countries (Ferraro, 2008). The core and industrialised nations that constitute the elite metropolis exploit the resources of peripheral or satellite nations, keeping them in a state of dependence and underdevelopment (Ynalvez & Shrum, 2015). In the exchange between developed and developing countries for finished products and raw materials, respectively, the raw material exporters lose while the exporters of finished products benefit. Thus, there is an inherent inequality in the exchange (Kvangraven, 2020). The advanced countries thus become developed through the exploitation of the poorest nations, relying on them for cheap raw materials and labour (Ynalvez & Shrum, 2015). Dependency theorists contend that because foreign interests originating in core nations govern peripheral countries, underdevelopment is not a phenomenon that is directly tied to the internal conditions of a country. It is believed that external connections with core capitalism, especially the United States of America (USA), produce standard peripheral underdevelopment as witnessed in African countries (Nhema & Zinyama, 2016). Mengistu (2022) evaluated the applicability of dependency theory to the study of foreign direct investment (FDI) in the Horn of Africa. He pointed out that the lack of industry in Africa, despite the continent's impressive track record of economic growth, poor macroeconomic indicators, economic espionage, and reliance on foreign economic actors, all demonstrate that FDI in Africa does not yield significant benefits. Dependency theory, thus, may explain why and how FDI linkages result in economic wealth inequality. It follows that the population and local communities in the Horn of Africa have not benefited greatly from FDI. It is possible to overcome underdevelopment, but doing so requires a country to break away from the core countries' domination and the system that their policies and interests establish (Romaniuk, 2017).

Two primary schools of thought in dependency theory have been identified: the American Marxist and the Latin American structuralist (Kay & Gwynne, 2000; Martins, 2022). The Marxist theory of dependency examined dependency in the context of a global capitalist economy that was monopolistic, dynamic, and competitive. This economy extended beyond national borders and gave rise to relationships between its several hegemonic internal bourgeoisies that were characterised by complementarity, subordination, commitment, and/or conflict. They opine that peripheral economies' intrinsic characteristics that subordinated them to a capitalist global economy were the basis for dependency (Martins, 2022). The implication is that communities and national governments could overcome dependency by restructuring the essential characteristics of their economies. The structuralists, also known as liberal reformists, advocate for the reform of existing systems or institutions instead of their total replacement. They opine that gradual changes in existing institutions can bring about major changes in a country's economic system (Gorz, 1987). The implication is that communities and national governments could overcome dependency through the gradual restructuring of their economic systems. While the structuralist strand of dependency aimed to change capitalism on a national and worldwide level, the neomarxist variant of dependency aspired to topple capitalism because it believed that socialism was the only system capable of solving the problems of underdevelopment (Kay & Gwynne, 2000).

Dependency theorists suggest that there should be a clear national economic interest that should be articulated for each country. This national interest can be satisfied by addressing the needs of the poor within a society. To reduce dependence, national governments and community development agencies should endorse policies controlling interactions with the world economy. Poor countries should only engage in interactions on terms that promise to improve the social and economic welfare of their larger citizenry (Ferraro, 1996). Even though dependency theory is approached from a variety of angles, its central tenet is that developed nations—the core—benefit from the existing global system at the expense of developing nations (the periphery) (Kvangraven, 2023). Thus, the export of coconuts as raw materials from Ghana, a developing country, to Nigeria, the United States, and Europe stifles local and rural processing activities and negatively impacts the livelihoods of people who are employed in the coconut processing industry. This situation has implications for food security in Ghana in general and the Jomoro Municipality in particular since VCO is a major food staple in the municipality (Boateng et al., 2016). Thus, while the exports benefit the destination countries, local VCO processing businesses in Ghana suffer.

3. Methods

3.1. Context

Coconut was introduced in the southwestern part of Ghana in the 1920s (Ruf et al., 2010). The plant was cultivated on a large scale in the 1950s after the construction of a coconut processing plant. However, farmers who supplied coconuts to the plant became dissatisfied with the poor terms of trade offered by the managers for their coconuts, and in the 1960s and 1970s, communities along the southwestern coast of Ghana built their own small-scale processing plants (Ruf et al., 2010). Other residents resorted to post-harvest activities, including the transport and sale of coconuts and virgin coconut oil. These traders, who sold oil mainly in Accra, gave loans to farmers and gradually controlled the coconut value chain. Coconut farming and VCO processing and trading, thus, became major income-generating activities along the southwestern coast of Ghana (Amponsah, 2010; Boateng et al., 2016; GSS, 2014; Ruf et al., 2010). However, this local economy that was dependent almost entirely on one crop was fragile. Besides, the locality was largely threatened by the lethal yellowing disease and the Cape Saint Paul Wilt Disease that afflict coconut trees (GSS, 2014; Global Environment Facility, 2012). In this gloomy context for the coconut value chain, demand from Nigeria was at first recognised as a positive development for the region and its farmers. However, local processing businesses began to fail as the Nigerian export business prospered and supply to the local VCO value chain decreased (Ruf et al., 2010). This situation justifies this study, which examines the effect of coconut exports on the role of coconut farmers in the local VCO value chain.

3.2. Study design

This study adopted the mixed method approach to research, which integrates quantitative and qualitative approaches in formulating research questions. The study adopted the concurrent triangulation design using a convergence model. In using this design, quantitative and qualitative data are collected at the same time and quantitative results are corroborated with qualitative findings (Creswell, 2014). According to Creswell (2014), the combination of data provides a stronger understanding of a problem or question than either one. A cross-sectional design was adopted for collecting data. The design is best for studies that aim at investigating the prevalence of a problem. It helps to derive an overall picture of a problem as it stands at the time of the study. Moreover, data was collected from cross-sections of the populations of the study communities (Kumar, 2011).

3.3. Research participants and sampling

The research participants were coconut farmers in the Jomoro Municipality. The study used both probability and non-probability sampling techniques in the selection of the study area and the respondents. The sampling procedure involved four stages. In the first stage, the Jomoro Municipal Assembly in the Western Region was selected using

purposive sampling. This was because the southern part of the region was notable for the growing of the coconut palm, which served as a major source of livelihood (Boateng et al., 2016), with farmers in the Nzema districts of the region, including the Jomoro Municipality, cultivating over 30,000 ha, which is about 80% of the total coconut crop in Ghana (GEF, 2012). The Jomoro Municipality, which is located in the southern part of the Western Region, is thus suitable for the study. In the second stage, four communities in the municipality were purposively selected, namely; Ezinlibo, Allowule, New Kabenla Suazo and Mpataba. These communities were selected because they were among the major centres of local VCO production in the Jomoro Municipality, especially Ezinlibo (Odoom et al., 2016).

In the third stage, simple random sampling was used to select a cross-section of coconut farmers. The population of coconut farmers was obtained from lists compiled on them as part of measures to pay compensation for farmers under the Ghana Petroleum Hub Project in the municipality. The 34 communities to be affected by the project included three of the study communities; Ezinlibo, New Kabenla Suazo and Allowule (Ghana News Agency, 2020). At Mpataba, a list of coconut farmers was obtained with the help of the local agriculture officer. The sample for each community was then calculated using Yamane's (1967) formula: $n=N/1+N(e)^2$, where n is the sample size, N is the population of farmers and *e* is the level of precision [0.05 or 5%]. The sample size of coconut farmers in Ezinlibo, for example, was calculated as $n=120/1+120(0.0025)$. In all, a sample of 311 coconut farmers was used (Table 1).

Table 1. Populations and sample size of coconut farmers.

Study communities	Population of farmers	Sample size
Ezinlibo	120[a]	92
Allowule	92[a]	76
New Kabenla Suazo	85[a]	70
Mpataba	87	73
Total	383	311

a List of farmers compiled under the Ghana Petroleum Hub Project (2021).

Following the calculations of the samples of farmers for each of the four communities, simple random sampling, through the lottery method, was used to select the required samples from the individual communities. The sampled people were then traced for the administration of the interview schedule. Some sampled respondents were replaced

when it became evident that they could not be reached after repeated contact. Besides the 311 farmers, qualitative data was solicited from ten farmers.

3.4. Methods for data collection, analysis and presentation

A structured interview was used as the method of data collection for the quantitative data, through the use of an interview schedule. One key strength of a structured interview is that it provides uniform information, which helps to ensure the comparability of data (Kumar, 2011). In addition, through the use of a semi-structured interview guide, information was solicited from ten coconut farmers through unstructured interviews. Information collected covered, among other things, respondents' backgrounds, the key roles of coconut farmers in the local VCO value chain and opportunities available to coconut farmers in the wake of the coconut export boom. Quantitative data in the study was carefully edited, coded and entered into the computer and analysed statistically through IBM SPSS Statistics (version 25.0) and Microsoft Excel. The data were presented using frequency tables, pie charts and cross-tabulations embedded in SPSS and Microsoft Excel. Direct quotes from the unstructured interviews conducted on the ten farmers were used to support the quantitative data.

3.5. Ethical considerations

The Committee on Human Research, Publications and Ethics at the School of Medical Sciences of the Kwame Nkrumah University of Science and Technology (KNUST) and Komfo Anokye Teaching Hospital (KATH), Kumasi, Ghana, approved the study (Ref: CHRPE/AP/219/21). Besides, study respondents were fully briefed on the purpose of the study and their verbal informed consent was obtained before data collection.

4. Results and discussions

4.1. Socio-demographic characteristics of respondents

From Table 2, about 74% of the respondents fell into the three ages of 38–67. The majority (70.1%) of the farmers were males and an appreciable proportion of them had only basic education (47.9%). The majority of the farmers were married (76.2%) as compared to those who were single and those in cohabitation. More than 60% of the farmers had between 11 and 30 years of experience in the coconut farming business. Since the Nigerian coconut exporters started their exporting business in 2002 (Ruf et al., 2010), which was 19 years ago, an appreciable proportion of the farmers were in a good position to report their experiences from the early years of the coconut export concerning the effects of the coconut export on their role in the local VCO value chain. Besides, the study found that a major local player in the export business, popularly known as Tumbaka,

started the export business in 2019. This implied that a farmer with at least three years' experience was in a position to provide useful information on the subject.

Table 2. Socio-demographic characteristics of coconut farmers.

Variables	Frequency (f)	Percentage (%)
Gender		
Males	218	70.1
Females	93	29.9
Total	311	100
Age groups		
18–27	5	1.6
28–37	29	9.3
38–47	64	20.6
48–57	72	23.2
58–67	93	29.9
68–77	35	11.3
78–87	7	2.3
88–97	4	1.3
98+	2	0.6
Total	311	100
Level of education		
Basic	149	47.9
Secondary/Technical	25	8.0
Diploma	25	8.0
Tertiary	25	8.0
Informal	87	28.0
Total	311	100
Marital status		
Married	237	76.2

Variables	Frequency (f)	Percentage (%)
Widowed	28	9.0
Divorced	14	4.5
single	21	6.8
Cohabiting	11	3.5
Total	311	100
Years of experience		
1–5	4	1.3
6–10	29	9.3
11–15	39	12.5
16–20	53	17.0
21–25	54	17.4
26–30	42	13.5
31–35	32	10.3
36–40	29	9.3
41–45	15	4.8
46–50	9	2.9
56–60	5	1.6
Total	311	100

Source: Field Survey, 2021

The proportion of farmers with no formal education (28.0%) was lower than that reported by Kadere, Oniang`o, Kutima, and Njoroge (2004) in their study of coconut farmers in Kenya. However, this survey reports a higher proportion of farmers with basic education (47.9%) than the report of Kadere et al. (2004), who recorded 42.0%. Besides, while Kadere et al. (2004) recorded 11.2% and 2.1% for farmers with secondary and university education levels, respectively, this survey recorded 8.0% for each. The results confirm the findings of Gurbuz and Manaros (2019) who found that in the Philippines, the illiteracy rate of the coconut farmers was low, with the majority having basic and secondary education while a small percentage of them have higher education. The survey is also in line with the findings of Okorley and Haizel (2004), who found that the majority (73%) of the coconut farmers in the Western Region of Ghana have at least ten

years of experience but are less educated. The current study suggests that coconut farming as a livelihood activity is male-dominated and is predominantly undertaken by people with basic education, with the majority of the farmers having between eleven and thirty years of experience.

4.2. Size of coconut farms

Table 3 indicates that an appreciable proportion (40.5%) of the farmers cultivated 6–9 acres of farmland, followed by 37%, who had between 2 and 5 acres of farmland. In all, 90% of the farmers had up to 13 acres of farmland. The study is in sync with the report of Young and Pelomo (2014) that coconut farming in the Solomon Islands is in smallholdings, despite its significance to the national economy. The study also affirms the report of Okorley and Haizel (2004), that most (86.7%) coconut farmers in the Western Region of Ghana cultivate between 1 ha (2.5 acres) and 5 ha (12.4 acres) of coconut. According to the GSS (2014) report, agriculture in the Jomoro Municipality, including coconut farming, is primarily carried out by peasant farmers who cultivate in small holdings. The results suggest that coconut production is a small-holding farming business in the Jomoro Municipality.

Table 3. Size of Coconut Farms cultivated by coconut farmers.

Size of farms	Frequency	Percentage (%)
2–5	115	37.0
6–9	126	40.5
10–13	39	12.5
14–17	16	5.1
18–21	10	3.2
22–25	3	1.0
26–29	2	0.6
Total	311	100

Source: Field Survey, 2021

4.3. Land ownership

The majority of the farmers had their farms on family lands, with most of these farmers located at Ezinlibo and Allowule (Table 4). In addition to those farmers who personally cultivated these farms, there were farmers who inherited the coconut farms from their

parents. The land therefore remained family property, while the coconut palms belonged to the farmers. Another group of farmers (23.2%) acquired their farm lands through sharecropping. Under this arrangement, individual farmers obtained land from landlords or families and used the land to cultivate coconuts. When the coconuts bore fruit, the farms were divided into three. While the landlords or families took a third of the farm, the individual farmer had two-thirds. This arrangement existed on the old farms. Under the newly emerging arrangement, farms were divided into two; one-half went to the landlords, while the farmer had the other half. The study, however, found that while these farmers owned the coconut palms, the land actually belonged to those landlords or families that released the land for the sharecropping arrangement. In the event that the coconut palms died, the landowners took over the lands. The results also show that 13.8% of the farmers owned the land on which they farmed. Other farmers (10.9%) had farms on both family lands and lands acquired through sharecropping, while those who had farms on both family lands and personal lands were in the minority. The results confirm an earlier report by Gyapong (2021) that land in Ghana is mostly controlled by families. The current study suggests that an appreciable proportion of coconut farmers in the Jomoro Municipality farm on family lands.

Table 4. Landownership.

Size	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Personal land	12	3.9	10	3.2	14	4.5	7	2.3	43(13.8)
Family land	50	16.1	34	10.9	26	8.4	27	8.7	137(44.1)
Share cropping	26	8.4	15	4.8	12	3.9	19	6.1	72(23.2)
Share cropping and family land	1	0.3	10	3.2	13	4.2	10	3.2	34(10.9)
Share cropping and own	–	–	4	1.3	3	1.0	7	2.3	14(4.5)
Family land and own	3	1.0	3	1.0	2	0.6	3	1.0	11(3.5)
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

4.4. Role of coconut farmers in the local virgin coconut oil value chain

Coconut farmers supplied coconuts to the local VCO processors and VCO traders in two ways, especially in the periods before the export boom. The majority (87.8%) of the farmers either sold or processed coconuts to particular processors or traders. Under this arrangement, coconut farmers had specific VCO processors or traders whom they

identified as customers or business partners, particularly traders. When these farmers harvested coconuts, they either sold the coconuts to these traders, or hired processors who processed the oil and sold it to the traders. Farmers, thus, played a dual role in this process, first by employing processors and, second, by supplying oil to traders. This was predominantly done in the study area because farmers took advantage of this arrangement to access loans from the traders in times of financial challenge. These farmers then used the proceeds from the oil to pay for the loans. Under this arrangement, farmers may lease their lands to traders, or in a few cases, processors. They obtained loans from them and allowed them to manage their farms until the loans were paid off.

The 12.2% of coconut farmers who sold their coconuts or processed their coconuts for sale to any processor or trader were those who were more financially independent and therefore under no obligation to deal with particular processors or traders. The findings affirm the report of Henderson, Henry, and MacAulay (2006) that coconut farmers in North Sulawesi, Indonesia, play a dual role in the coconut oil industry by either providing coconuts to processors or processing coconut oil for sale. The findings of the study also show that, even though Ruf et al. (2010) reported that some coconut farmers in the Jomoro Municipality had been caught up in debtor-creditor relationships with the Nigerian intermediaries in the wake of the export boom, this relationship existed between some farmers, and the VCO traders and processors before the export periods.

4.5. Opportunities for coconut farmers

The greatest opportunities available to coconut farmers in the Jomoro Municipality were the presence of coconut exporters (99.4%), the rising price of coconuts (95.8%), the attraction of company-based VCO processors in the municipality (83%) and the increasing demand for coconuts from local VCO processors (73.6%) [Fig. 1]. The main exporters in the municipality were Nigerian buyers and a native of the municipality, popularly known as Tumbaka. While the Nigerians resided in some communities to purchase coconuts, they also had intermediaries in the communities, popularly known as "agents," who purchased coconuts on their behalf. These intermediaries had designated points with sheds where the purchasing of the coconuts was done. At these points, the coconuts were counted and payments were made. In order to ensure the quality of the coconuts, the cracked and copra coconuts (those without liquid endosperm) were rejected. The farmers sold these to the local VCO processors. Tumbaka, on the other hand, purchased coconuts for companies in Accra for onward export to the USA. This local buyer also had agents in the communities, some of whom moved to the farm gates to purchase coconuts. The high demand for coconuts from these and other buyers led to a rapid rise in the price of coconuts. Two farmers explained in the following words during an in-depth interview:

"Many farmers started cutting down their coconut trees to plant rubber trees. This was due to the low price offered by the local VCO processors and traders. The coconut export has helped to rescue the situation. The Nigerians have helped us. Had it not been for the Nigerians, the price of coconuts would have been much lower. Local VCO processors don't buy the coconuts at a good price." (A 75-year-old male coconut farmer from Allowule; August 2021)

"The VCO processors and traders used to determine the price of coconuts on the basis of the price of VCO in Accra. They bought the coconuts on credit, processed them and later disappointed us with their new price. The Nigerians came and offered better prices" (A 70-year-old male coconut farmer from Allowule; August 2021).

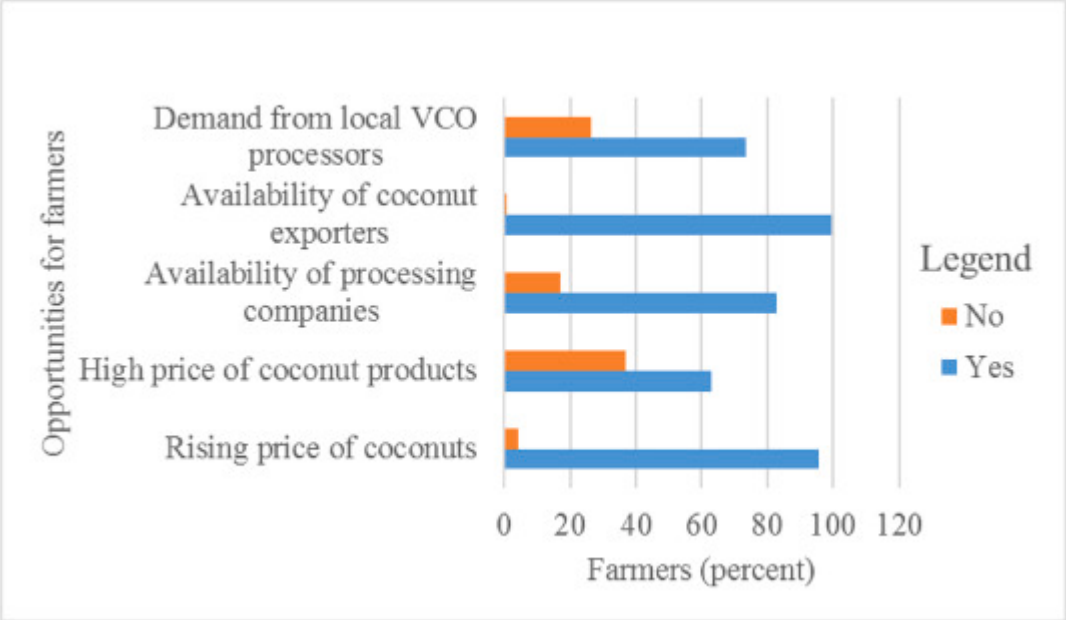

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Fig. 1. Opportunities for coconut farmers.
Source: Field Survey, 2021

Two companies had invested in VCO production in the municipality: Truecoco Ghana Limited and Savanna Fruits Company Limited. While Truecoco Ghana Limited mainly bought coconuts from the surrounding communities, including Ezinlibo and Allowule, Savanna Fruits Company Limited operated only in selected communities by organising farmers into groups and buying coconuts from them. New Kabenla Suazo, one of the study communities, had farmers who had been organised by the company and therefore supplied coconuts to it. The two companies specialised in the production of organic (cold-pressed) VCO. Savanna Fruits hired local women who processed the oil for companies in the United States of America and France. While Savanna Fruits began operations in the municipality in 2014, Truecoco Ghana Limited was established in the

municipality in 2017. Despite their limited activities, these two companies provided opportunities for farmers as sales outlets.

The study found that the export had drastically reduced the quantity of coconuts available for the local VCO business. This had a ripple effect on the quantity of VCO produced, leading to high demand for the oil. This in turn increased the demand for coconuts by VCO processors. The majority of the farmers also perceived the rising price of coconut products as an opportunity. The products included coconut mesocarp (coir fibre), endocarp (shells) and coconut seedlings. The mesocarp was purchased for the production of organic fertilizer at Takoradi while the endocarp was used for the production of activated charcoal.

The farmers who did not recognise the presence of the exporters as an opportunity included those who were dissatisfied with the prices offered. These farmers reported that the price of coconuts had not been stable. In addition, some farmers did not perceive the presence of the companies as an opportunity because of the limited mode of operation of the companies. Savanna Fruits Company Limited, for example, mainly bought coconuts from farmers within their organised groups. Besides, 26.4% of the farmers did not see the availability of VCO processors as a viable opportunity because the processors bought coconuts at a low price compared to the exporters. Moreover, 37% of the farmers did not recognise the business of selling coconut products as an attractive one. The study found that the prices of coconut products were low. The price of a *size 5* sack of endocarp, for example, was GH₵10.00 while the mesocarp from 100 coconuts was sold at GH₵15. The mesocarp was available on coconut farms and in the homes of farmers while the endocarp could be obtained in the homes and purchasing points of intermediaries.

The results confirm the report of Ruf et al. (2010) that the major reason for the dominance of the Nigerian exporters in the coconut market in the Jomoro Municipality was the higher price they offered. In North Sulawesi, Indonesia, Henderson et al. (2006) reported that besides copra production, other by-products from coconut were produced. Some small-scale farmers used coconut shells to produce charcoal, which was sold to collecting traders for onward sales to activated carbon processors or charcoal exporters. However, unlike the situation in the Jomoro Municipality, the coir fibre was not utilized commercially in North Sulawesi, Indonesia.

4.6. Changes observed by coconut farmers in the demand for coconuts

The majority of farmers reported increased demand for coconuts from Nigerian exporters, compared to 19.6% who reported otherwise (Fig. 2). Similarly, 71.1% of the coconut farmers reported that there had been an increased demand for coconuts from local exporters. About 58% of the farmers perceived an increased demand for coconuts

from company-based VCO processors, namely, Truecoco Ghana Limited and Savanna Fruits Company Limited while 77.5% of the farmers indicated that the demand for coconuts from local VCO processors had increased. The various customer groups created diversity in the coconut market for farmers. The study suggests that even though farmers appreciated the presence of Nigerian buyers, they were also aware of the emerging trend where local exporters of dehusked coconuts competed with their Nigerian counterparts. In some cases, the competition had led to rivalry among the buyers (Ghana Export Promotion Authority, 2019). The study confirms an earlier report by Bashirat (2012) that Ghana, specifically the southwestern part of the country, is a major exporter of dry coconuts in West Africa.

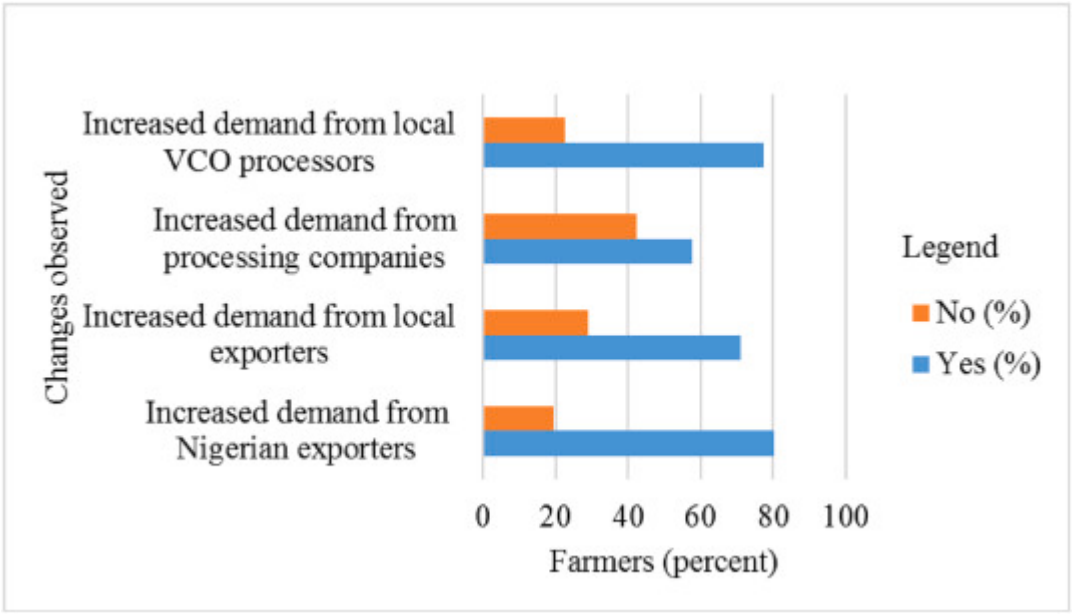

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Fig. 2. Changes observed by coconut farmers in the demand for coconuts.
Source: Field Survey, 2021

4.7. Customers for coconut farmers

Table 5 indicates that a significant majority of the coconut farmers dehusked and sold coconuts mainly to exporters and local VCO processors. The study found that, due to the high price of coconuts offered by exporters, farmers sold coconuts of high quality to them while the smaller coconuts or those of lower quality were supplied to the local VCO processors at a cheaper price. Among the 2.3% of farmers who did not supply coconuts to exporters were those who had local VCO processors as relatives and hence supplied coconuts to them to keep them in business. Besides, 10.3% of the farmers who did not supply coconuts to the local VCO processors included those whose coconuts were in smaller quantities and hence had nothing left after dealing with the exporters. The third largest group of customers were the processing companies while local coconut

consumers, including consumers of tender and unhusked coconuts, recorded the least percentage. Because of their proximity, the largest suppliers of coconuts to the companies were located at Allowule and New Kabenla Suazo. While Allowule was located near Truecoco Ghana Limited, Savanna Fruits Company Limited operated at New Kabenla Suzo.

Table 5. Customer groups for coconut farmers.

Customer groups	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total	
	f	%	f	%	f	%	f	%	f	%
Exporters										
Yes	89	28.6	75	24.1	68	21.9	72	23.2	304	97.7
No	3	1.0	1	0.3	2	0.6	1	0.3	7	2.3
Total	92	29.6	76	24.4	70	22.5	73	23.5	311	100
Local VCO processors										
Yes	78	25.1	69	22.2	63	20.3	69	22.2	279	89.7
No	14	4.5	7	2.3	7	2.3	4	1.3	32	10.3
Total	92	29.6	76	24.4	70	22.5	73	23.5	311	100
Companies										
Yes	7	2.3	27	8.7	17	5.5	12	3.9	63	20.3
No	85	27.3	49	15.8	53	17.0	61	19.6	248	79.7
Total	92	29.6	76	24.4	70	22.5	73	23.5	311	100
Local consumers										
Yes	2	0.6	2	0.6	–	–	7	2.3	11	3.5
No	90	28.9	74	23.8	70	22.5	66	21.2	300	96.5
Total	92	29.6	76	24.4	70	22.5	73	23.5	311	100

Source: Field Survey, 2021

The study, thus, showed that the interaction between coconut farmers and the processing companies was stronger in the communities closest to the two companies. This confirms the views of Yin et al. (2019) that the shorter the distance between two entities, the stronger the interactions between them. The current study suggests that, with the advent of coconut exporters, the proportion of farmers who supply coconuts to

exporters is greater than the proportion that supplies coconuts to the local VCO processors. Besides, the probability of farmers supplying coconuts to the processing companies is based on their proximity to them. The results of the study also suggest that the sale of coconuts to local consumers was at a minimal level.

The majority of the farmers supplied at least 70% of their coconuts to the coconut exporters (Table 6). Farmers who did not sell coconuts to exporters were in the minority. Even though the supply of coconuts to exporters prevailed in all the communities, Ezinlibo and Allowule played a key role in this supply chain. The two communities, for example, recorded the highest percentages of farmers who supplied 70% and at least 90% of coconuts to exporters. The results confirm the report by Ruf et al. (2010) and GSS (2014) that exporters, particularly Nigerians, divert large quantities of coconuts meant for the local VCO value chain, leading to the collapse of these processing businesses. The study, thus, confirmed the report of Ruf et al. (2010) that the Nigerian market absorbs over 50 percent of the dry coconut produced in Ghana and that of the Ghana Export Promotion Authority (2019) that Ghana supplies about 60 percent of the coconuts consumed in Nigeria. The study, however, found that in addition to the Nigerians, there were coconut exporters from southwestern Ghana who supplied the US market.

Table 6. Proportions of coconuts sold to coconut exporters per harvest.

Percentages to exporters	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total f(%)
	f	%	f	%	f	%	f	%	
Nil	3	1.0	1	0.3	2	0.6	1	0.3	7(2.3)
Less than fifty percent	–	–	–	–	3	1.0	–	–	3(1.0)
Fifty percent	7	2.3	4	1.3	5	1.6	4	1.3	20(6.4)
Fifty-five percent	–	–	3	1.0	2	0.6	1	0.3	6(1.9)
Sixty percent	5	1.6	15	4.8	8	2.6	7	2.3	35(11.3)
Sixty-five percent	1	0.3	2	0.6	1	0.3	1	0.3	5(1.5)
Seventy percent	25	8.0	15	4.8	8	2.6	11	3.5	59(19.0)
Seventy-five percent	7	2.3	4	1.3	11	3.5	14	4.5	36(11.6)
Eighty percent	20	6.4	21	6.7	12	3.9	15	4.8	68(21.7)
Eighty-five percent	7	2.3	3	1.0	5	1.6	4	1.3	19(6.1)
Ninety percent	7	2.3	3	1.0	5	1.6	6	1.9	21(6.8)
Greater than ninety percent	10	3.2	5	1.6	8	2.6	9	2.9	32(10.3)

Percentages to exporters	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total f(%)
	f	%	f	%	f	%	f	%	
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

From Table 7, the majority of coconut farmers supplied 10–30% of their coconuts to local virgin coconut oil processors per harvest. Farmers who supplied 35–50% of their coconuts to local VCO processors were in the minority. However, 2.3% of the farmers supplied up to 100% of their coconuts to local VCO processors per harvest. The results, thus, show a wide gap between the proportions of coconuts supplied to exporters and those supplied to the local VCO processors. The current study, thus, agrees with the school of thought on dependency that the exchange of raw materials between developing economies and relatively developed ones is largely at the expense of the former (Shrum, 2001; Ynalvez & Shrum, 2015). The current study suggests that the large quantities of coconuts supplied by farmers to the exporters largely drain the local VCO value chain of its raw material base and pose an impediment to the survival of the local VCO processing businesses. The dependency of the United States and Nigerian markets on Ghana for coconuts is, therefore, at the expense of the sustainability of local processing businesses in Ghana and a threat to the supply of VCO on the Ghanaian market.

Table 7. Percentage of coconuts supplied to local VCO processors per harvest.

Percentages to local VCO processors	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Nil	14	4.5	7	2.3	7	2.3	4	1.3	32(10.3)
Ten percent	10	3.2	8	2.6	11	3.5	10	3.2	39(12.5)
Fifteen percent	12	3.9	8	2.6	6	1.8	7	2.3	33(10.6)
Twenty percent	18	5.8	23	7.4	18	5.8	22	7.1	81(26.0)
Twenty-five percent	6	1.9	8	2.6	12	3.9	14	4.5	40(12.9)
Thirty percent	19	6.1	16	5.1	10	3.2	10	3.2	55(17.7)
Thirty-five percent	–	–	–	–	–	–	2	0.6	2(0.6)
Forty percent	3	1.0	5	1.6	3	1.0	1	0.3	12(3.9)
Forty-five percent	–	–	–		1	0.3	1	0.3	2(0.6)

Percentages to local VCO processors	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Fifty percent	7	2.3	–	–	–	0	1	0.3	8(2.6)
Greater than fifty percent	3	1.0	1	0.3	2	0.6	1	0.3	7(2.3)
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

Table 8 indicates that the highest proportion of coconuts supplied to company-based VCO processors was 40%. This was supplied by 1.6% of the farmers. The results show that 7.4% of the farmers, which was the largest proportion, supplied 20 percent of their coconuts to the companies per harvest. Allowule and New Kabenla Suazo played an important role in the proportions of farmers who supplied coconuts to the processing companies. The majority (79.7%) of the farmers, however, did not supply coconuts to the two companies. The results confirm earlier findings (Abdulsamad, 2016; van den Broek et al., 2016) that the quantities of coconuts exported, in most cases, outweigh the quantities supplied to local processing plants. This negatively impacts the production activities of these companies. The study suggests that there is low consumption of dry coconuts by processing companies in the Jomoro Municipality.

Table 8. Percentage of coconuts supplied to processing companies per harvest.

Percentages to companies	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Nil	85	27.3	49	15.8	53	17.0	61	16.6	248(79.7)
Ten percent	2	0.6	9	2.9	–	–	3	1.0	14(4.5)
Fifteen percent	2	0.6	1	0.3	–	–	–	–	3(1.0)
Twenty percent	2	0.6	12	3.9	6	1.9	4	1.3	24(7.4)
Twenty-five percent	1	0.3	1	0.3	1	0.3	–	–	3(1.0)
Thirty percent	–	–	4	1.3	5	1.6	5	1.6	14(4.5)
Forty percent	–	–	–	–	5	1.6	–	–	5(1.6)
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

Table 9 indicates that the majority of the coconut farmers did not sell coconuts to local consumers. This was common to all the communities. The local consumers included buyers of both dry, unhusked and tender (green) coconuts from urban communities such as Obuasi and Kumasi. Only 2.3% of the farmers sold 5 percent of their coconuts to local buyers per harvest. Mpataba was the main location for tender coconut sales. Despite many research findings on the sales of tender coconuts in Ghana (Abankwah, Aidoo, & Tweneboah-Koduah, 2010; Codjoe, Debrah, & Osei-Asare, 2021; Oduro-Yeboah, Ackah, Akonor, Amponsah, & Mboom, 2020), the current study found that many farmers in the Jomoro Municipality did not sell their coconuts at the tender stage. The current study suggests that while trading in dry and dehusked coconuts was common in the Jomoro Municipality, farmers did not sell their coconuts at the tender stage.

Table 9. Percentage of coconuts supplied to local consumers per harvest.

Percentages to local consumers	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Five percent	1	0.3	2	0.6	–	–	4	1.3	7(2.3)
Ten	1	0.3	–	–	–	–	3	1.0	4(1.3)
None	90	28.9	74	23.8	70	22.5	66	21.2	300(96.5)
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

4.8. Descriptive statistics for continuous variables

The mean quantity of coconuts supplied by farmers to processors per harvest before the export periods was 7352 (Table 10). These were periods in which coconuts produced in the Jomoro Municipality were mainly supplied to the local VCO processors. While the mean coconut obtained by farmers per harvest during the export boom was 2282.80, the mean coconuts supplied to VCO processors was 568.01 (24.9%) compared to 1560.45 (68.4%) supplied to the coconut exporters. Processing companies received the lowest mean number of coconuts from farmers (standard deviation=383.993 coconuts). While there have been great changes in the quantities of coconuts obtained by farmers per harvest due to the high frequency of harvests, instigated by the high demand for coconuts, the proportions of coconuts supplied to local VCO processors in comparison to the proportions supplied to the exporters varied widely. This situation posed a threat to the survival of local processing businesses (Ruf et al., 2010) and the availability of VCO in the local market. The large quantities of coconuts supplied to exporters at the expense of the local VCO processors impeded their capacity to produce VCO to feed local consumers.

This is because when raw materials from the agriculture sector decrease, non-farm industrial activities that rely on the agriculture sector for input suffer since reduced input will directly imply reduced industrial output (Fatusin, Fagbohunka, & Yoade, 2019; Mhazo, Mvumi, Nyakudya, & Nazare, 2011).

Table 10. Descriptive statistics for continuous variables.

Descriptive statistics	Quantities supplied to processors per harvest before the export boom	Current Quantities obtained per harvest	Current Quantities supplied to processors	Current Quantities supplied to exporters	Current Quantities supplied to companies
Mean	7352	2282.80	568.01	1560.45	133.93
Standard deviation	4493.387	2283.558	1023.150	1538.326	383.993
Variance	20190530.82	5214178.923	1046836.013	2366446.893	147450.368

Source: Field Survey, 2021

4.9. Prices offered by customers for different categories of coconuts

Coconut exporters and their agents bought 100 dry coconuts at GH₵100 while the local VCO processors bought the same quantity at GH₵60 (Table 11). Coconut farmers, therefore, sold the high-quality dry coconuts to the exporters and their agents, while the second grade coconuts (i.e., dry coconuts without liquid endosperm known as "copra") and smaller ones were sold to the local VCO processors. The processing companies also bought 100 coconuts at GH₵95. While local consumers bought 100 dry coconuts at GH₵90 or GH₵95, those who wanted the tender (green) coconuts bought them at GH₵50 or Gh₵55 for 100 coconuts of the exotic hybrid coconut, popularly known as agric. However, they paid GH₵40 or GH₵45 for tender coconuts harvested from the West African Tall, which was the local breed. The low price paid for the tender coconuts did not motivate farmers to sell their coconuts at that stage. The results reflect the views of Ampadu-Ameyaw and Awunyo-Vitor (2014) that farmers respond favourably and promptly to incentive packages, including the price of commodities. This study suggests that the relatively higher price of coconuts offered by the exporters and their agents accounted for the large quantities of coconuts supplied to them. The prices offered by the exporters reflected the price of coconuts on the international market. The import prices for mature coconuts ranged from €14 to €15 (GH₵98 to GH₵105; €1 was equivalent to GH₵7 in August 2021) per bag of 50 units. Thus, one coconut cost €0.28 to €0.3 (GH₵1.96 to GH₵2.1). Tender (green) coconuts had a price range of €0.80 to €1 per piece. However,

prices are affected by several factors including origin, season, demand, freight cost and the types (young and mature), quality and sizes of coconuts. For example mature coconuts from countries like Dominican Republic and Costa Rica cost about €19 per sack of 40 units, while those from Ivory Coast cost about €11.50 per sack. This is due to higher freight costs and larger fruit sizes. Occasional air freight can also increase the price of coconuts in Europe. Besides, prices in summer are generally higher because of increased demand (Centre for the Promotion of Imports from developing countries, 2020).

Table 11. Prices offered for different categories of coconuts.

Description of Coconuts	Categories of Customers	Price Range per 100 Nuts (₵)	Price if Farm is in Remote Location (₵)
Dry Dehusked Grade 1	Coconut Exporters/Agents	100	–
	Processing Companies	95	–
	Locals	95	90
Dry Dehusked/Undehusked Grade 2	Local/Native Virgin Coconut Oil Processors	60	–
Fresh (Tender) Hybrid	Local Coconut Vendors	55	50
Fresh (Tender) Local	Local Coconut Vendors	45	40

Source: Field Survey, 2021

4.10. Challenges facing coconut farming

Table 12 shows that the main challenges that confronted coconut farmers were farm crime (coconut theft) and the destruction of farms by the Cape Saint Paul Wilt Disease. Spatially, while the Cape Saint Paul Wilt Disease was a major challenge at Mpataba, farm crime was a major problem in the other three communities. Ezinlibo, a coastal community, was worst affected by coconut theft.

Table 12. Challenge facing the farming business in the jomoro municipality.

Greatest challenge(s)	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Farm crime	54	17.4	47	15.1	45	14.5	–	–	146(46.9)
Cape Saint Paul Wilt Disease	4	1.3	3	1.0	–	–	36	11.6	43(13.8)

Greatest challenge(s)	Ezinlibo		Allowule		New Kabenla Suazo		Mpataba		Total
	f	%	f	%	f	%	f	%	f(%)
Cape Saint Paul Wilt Disease and farm crime	19	6.1	10	3.2	17	5.4	37	11.9	83(26.6)
Farm crime and cost of weeding	2	0.6	7	2.3	4	1.3	–	–	13(4.2)
Fluctuations in the price of coconut and coconut disease	2	0.6	5	1.6	–	0	–	–	7(2.3)
Reduction of price of coconut due to interest on loan	3	1.0	2	0.6	–	–	–	–	5(1.6)
Aging coconut and low yield	3	1.0	–	–	4	1.3	–	–	7(2.3)
Other	5	1.6	2	0.6	–	–	–	–	7(2.3)
Total	92	29.6	76	24.4	70	22.5	73	23.5	311(100)

Source: Field Survey, 2021

It was commonly reported at Ezinlibo that thieves climbed and cut bunches of coconuts from the trees at night. The results, thus, show that farm crime was a major challenge, preventing farmers from getting the maximum profit from their farming business. Three farmers explained the problem in the following words during in-depth interviews: *"Now the coconuts do not fall from the trees. The thieves climb and pluck them.* (A 52-year old male farmer at Ezinlibo; August 2021).

"If you detect the thieves on the farm quickly, then you have to come back silently to the house, lest your life be in danger" (A 67-year old male coconut farmer from Ezinlibo; September 2021).

"Now the farm is for everybody, so anybody can get up and go there to harvest. The slogan of the thieves is that they share no boundary with anyone, so they visit anyone's farm. Now, there is nothing like a farm owner. Strangers go anywhere to harvest coconuts, irrespective of whether they know the owner or not. Thieves have taken over farms from their owners. I used to get 10,000 coconuts per harvest, but now I get 400. Every two weeks, people steal from the farm by the time I get there" (A 64-year old male farmer at Ezinlibo; September 2021).

The other challenges facing farmers were fluctuations in the price of coconuts, a low price of coconuts due to interest on loans from coconut buyers, and a low yield from coconut palms due to aging. It was indicated that the price of coconuts was not stable,

while some coconut buyers reduced the price of coconuts due to loans they gave to farmers. The results of the study affirm the report by Ruf et al. (2010) that the high demand for coconuts in the Jomoro Municipality and the associated increased price have instigated a high level of farm crime and intergenerational conflict between the elderly and the youth, who are noted to engage in the theft. The results of the study, however, contradict the report of the GSS (2014) that the Cape Saint Paul Wilt Disease jumped over Jomoro into Ivory Coast. This study found that while the disease was causing the mass destruction of coconut farms at Mpataba, pockets of farms had also been destroyed in other communities, including Ezinlibo. The fluctuations in the price of coconut experienced by farmers are in sync with Abokyi et al.'s (2020) finding that instability in smallholder farmers' income in developing countries due to unstable farm prices has been a challenge for farmers and agricultural policymakers over the years.

5. Conclusion and recommendations

The greatest opportunities available to coconut farmers in the Jomoro Municipality were the presence of coconut exporters and the rising price of coconuts. The attraction of processing companies and the increased demand from local VCO processors were also recognised by the majority of coconut farmers as opportunities that ensured the diversification of the coconut market. The study found that the majority of the farmers contributed to the local VCO value chain by harvesting and processing coconuts for particular traders and processors whom they recognised as business partners. As part of the partnership, some farmers leased their coconut farms to the processors and traders for loans. These roles, however, were changing as a result of the export. The largest proportion of farmers had observed increases in the demand for coconuts from local and Nigerian exporters as well as local VCO processors. The study found that the majority of the farmers sold coconuts to exporters and local VCO processors. The quantities of coconuts supplied to processing companies were influenced by proximity to the companies. Thus, exporters and local VCO processors were the main customer groups for farmers. However, while the majority of the farmers supplied at least 70% of their coconuts to exporters, they supplied 10–30% to local VCO processors. Coconut export has, therefore, changed coconut farmers' role in the local VCO value chain by attracting farmers to supply coconuts to the international market. The main factor for this change was the price of coconut. The low quantities of coconuts sold to the local VCO processors, compared to the years before the export boom, reduced the quantities of raw materials available to the local VCO value chain. An assessment of the current state of the local coconut industry in the Jomoro Municipality, based on the findings, reveals that the industry is benefiting coconut exporters more than the activities of local processors. This has negative implications on the sustainability of local VCO processing businesses. The

major challenges confronting coconut farmers, however, were farm crime and the spread of Cape Saint Paul Wilt Disease.

Since there are currently two processing companies in the Jomoro Municipality, the government of Ghana should partner with local companies to build more processing plants in the municipality under the one-district, one-factory project to keep coconuts in the municipality for processing. The Jomoro Municipality should put in place the necessary measures such as tax holidays to attract companies that hire the services of local people to process coconuts in the municipality. These companies should offer attractive prices to farmers to motivate them to supply coconuts to the companies. The employment of local people to process VCO in these companies will help secure jobs in the local VCO value chain. This strategic approach could help balance the competition between local value chain activities and the export market, ultimately benefiting coconut farmers and other value chain operators in the region.

This study was conducted in only one Municipality in the Western Region of Ghana. The findings could, therefore, not be generalised for all the coconut producing districts in Ghana. It is recommended that a similar study in the future will include the other coconut-producing districts for the purpose of generalisation. It is also recommended that a similar study consider using a combination of quantitative (inferential statistics) and qualitative research methods. This can provide a more comprehensive understanding of the issues at hand, allowing for both statistical analysis and a deeper exploration of the experiences and perspectives of coconut farmers.

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CRediT authorship contribution statement

Emmanuel Honlah: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Writing – original draft, Writing – review & editing. **Alexander Yao Segbefia:** Conceptualization, Formal analysis, Methodology, Supervision, Validation, Writing – review & editing. **David Forkuo:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Kabila Abass:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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