



Awareness of Market Potentials and Utilization of Cashew Fruit: Perspectives of Cashew Farmers in the Brong Ahafo Region of Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. Authors NBA, RAA, AHKA and TA designed the study. Authors RAA and NBA performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RAA and NBA managed the analyses of the study. Authors NBA, RAA, AHKA, TA and MAG managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

In spite of its nutritional and economic values, Cashew apple has received low patronage in terms of commercialization and utilization and policy focus. This has led to underutilization and wastage of fresh fruits, which could contribute to farmer's income. This study explored the state of awareness of the market potential and consumption of cashew apple among farm households in selected areas of Brong Ahafo in Ghana. A total 200 respondents were randomly interviewed in addition to a Focus group discussion. The results indicate there is a large number of farmers with long years of farming and trading in cashew yet trading has mainly been focused on the nuts and not fresh fruits which is nutritive. Contrary to literature in the study area apples has some level of patronage in home consumption, but attempts at exploiting cashew apple market potentials among farmers is low or nonexistent.

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1. INTRODUCTION

Cashew trees were first introduced in West Africa from India in the early 1960s to fight desertification, soil erosion through agroforestry and to establish protected forest areas [1]. Some farmers also used it as a fire protection barrier around forest demarcations or their farms. However, today, the tree crop has become a major cash crop in Africa where it is mostly cultivated. Africa alone produces about 59 percent of the world's production and exports an estimated 95 percent of raw cashews abroad [2], despite dearth of infrastructure and appropriate conditions for cultivation. Statistics show that a few decades ago, African countries produced about 45% representing about 1.2 million tons of global cashew nuts on annual basis and yet only 10% of this production was processed locally [3]. With this level, the west Africa producing countries, contributed about 45% of the total share [4] while Côte d'Ivoire being the largest producer in the sub region and the second largest in the world controlled majority of this production [4]. Côte d'Ivoire for example, stands to earn about USD 127 million in export should it decide to boost annual processing capacity to 100,000 tons by 2020 [3]. This gains could even be higher should the country processed the cashew apple, which is always wasted for lack of knowledge about its nutritive value and income generation potential.

Although Cashew is reported to have originated from Brazil, the crop was popularized as a commodity of international trade by India [5] which is also the largest producer of the commodity [4]. Brazil now holds only 4% of the total cashew production across the globe. The cashew fruit consists of a nut and an apple which is attached to the stalk of its tree. While the crop is regarded as one of the most important tropical cash crops [6], grown mainly for its nuts, its fruits are used in the preparation of juices, alcohol and others such as wine and pulp produced from cashew apple or pseudo-fruit. The pulp is the fibrous part obtained after extracting juice from the apple and could be used as animal feed [7,8]. At the local rural level, cashew tree is found useful in making live fence, shade trees, firewood and charcoal for households. The cashew kernels have a high nutritional value and it is used for human consumption after decortication.

1.1 Study Context

Ghana's economy is strongly supported by its agriculture. However, in recent years, contribution of the sector to Gross Domestic Products (GDP) has been declining for several reasons. This has the potential to reduce the country's revenue base and therefore worsen the poverty situation of the country. In a bid to increase the agricultural revenue base of the country, the Government of Ghana has over the years been adding new crops to the list of export crops (trees and food) that generate money into the national coffers.

Cashew (*Anacardium occidentale*) is one of such crops of interest in Ghana's agricultural revenue stream. In Ghana, cashew nuts have been recorded as the most exported processed and industrial food commodity with about 57,095 MT being exported in 2010 alone [9]. Despite this huge figure, it represents about a 30% decrease from the quantity exported in 2008. Official statistics indicate that Ghana recorded its first export of Cashew in 1991. This was about 15 metric tonnes. In subsequent years, export of the crop rose reaching a high of 3,571 metric tonnes in 1997. This then went up to about 3,893 metric tonnes, cashew valued at USD 1,450,306 in 2002 and then went up reaching about 47,000 metric tonnes, representing around USD 23 million in foreign exchange earnings in 2006. These increases on the average gave a growth rate of between 5 and 8 percent per annum. In 2010 alone, cashew nut exports from Ghana earned the country 24,435,000 USD in foreign exchange [9].

For many years in Ghana, the cashew crop has mainly been cultivated for its food (fruit and nut) and other income generation activities and employment avenues. Beside these, there are other economic uses of cashew which still lack exposure and patronage in the country. Observation shows that in many of the cashew farms in the country, a lot of the fleshy apple and some nuts are left to go waste, as a result of the less economic value people place on the fruit. In addition, the fruit has a very delicate skin which makes it highly perishable and unstable for transportation. Some farmers may have little or no knowledge on how to convert the fresh apple into other valuable products for

local and international markets. The loss of revenue from such sources through the inability of economic players to add value to the apple and nuts limits the potential of the crop as a foreign exchange earner, source of employment and income as well as food in the form of snacks.

As part of a broader one, this study aims at transforming Ghana's cashew from a low-priced commodity to an exporter of high quality cashew products in the near future. It specifically explores the level of awareness of farmers in the economic and food-product potentials of cashew, particularly the fresh fruit. These are explored from the perspectives of socio-economics of the respondents as a way of ascertaining diverse social groups' knowledge of cashew value addition.

1.2 Objectives

This study aims at assessing the extent of awareness of the market potentials of cashew fruits and its utilization among cashew farmers in the Brong Ahafo region of Ghana. It specifically aims at identifying the socio-economic characteristics of cashew farmers in the study; ascertain farmers level of knowledge about utilization of cashew apple in the communities surveyed and the market potential of the cashew apple. It also looks at the relationship between farmers' socio-economic characteristics and their awareness of cashew fruit utilization and market potentials as a way for advising government on how to boost the re marketability of the cashew fruits in addition to the marketing of the nuts. This will bring in more income and thereby likely to reduce poverty among farmers.

1.3 Study Area

In Ghana, cashew thrives in several agro-ecological zones but, there is a high concentration of the crop in the middle belt areas, specifically the Brong Ahafo Region of Ghana. Typical cashew communities include Techiman, Wenchi and Sampa. Approximately 40,000 farmers are engaged in cashew cultivation with about 90% of them being smallholder farmers [3]. This study was carried out the former Brong Ahafo Region of Ghana.

Brong Ahafo Region, like the Western Region is one of Ghana's agricultural region. Apart from its

extensive forests reserve and cocoa plantations, the region has a large acreage of food and other tree crops. As a result majority of the people who live in communities of this region are traditionally farmers. In most places of the region, typical traditional farming methods (hoe and cutlasses) are found alongside more modern land management (tractorization). Generally, Agriculture and related activities forms the major economic activities in all districts, employing about 66.4 per cent of the region's economically active population most of the districts. Even in the three most urbanized districts, Sunyani, Berekum and Techiman, those working in agriculture and related sector constitute are more than half of the population in the district except Sunyani which is the capital of the region.

The study was specifically carried out in four districts including the Wenchi, Berekum East, Kintampo North and Jaman North districts where the cashew is mostly cultivated. Generally, these are not non-poor communities. As government seeks to use the endowment of communities to better the lives of the people who live there, this study questions why such important fruits (the cashew apple) are underutilized and left wasted in the bush, when it could be turned into an important economic gains.

2. METHODS OF DATA COLLECTION

An exploratory design employing quantitative data collection technique was used in this study. The survey involved 201 respondents made up of a varied group with different genders, ages and farm sizes. These were sampled randomly from four (4) districts, including the Wenchi, Berekum East, Kintampo North and Jaman North districts. With the exception of Wenchi District, where 51 farmers were interviewed, an equal number of respondents (50) were selected from each of the districts for the survey. Six cashew growing communities comprising Wenchi and Wurompo in the Wenchi district, Babatukuma Sromoase and Badukrom in the Kintampo North district, Fetantaain Berekum East district and Sampa in Jaman North district were selected for the interview using a structured questionnaire. Again a focus group discussion was held with 12 farmers in the cashew-growing communities visited. Some of the variables of importance included in the questionnaire were: sources of financing, land area under cashew cultivation, labour type and inputs land management employed in cashew cultivation. Other factors considered include farmer's age, educational

level, gender, and household size, and farming experience. The study made use of secondary data obtained from the internet, academic journals, libraries and the Ministry of Food and Agriculture (MOFA).

3. RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents were studied. This included age distribution of the respondents, gender, marital status and educational level. While the gender statistics provide an indication of the role an individual can play, the age proffer an indication of the experience of the respondent in terms of cashew farming in this case. The experiences garnered from the respondents could provide some information about their readiness to accept new and productive agricultural technologies or practices [10].

Cashew farming is a gender sensitive labour activity and therefore the study explored the gender distribution of the work force in the study area. Table 1 shows that majority of the respondents (149) representing 74.1 percent of total respondents, are males, with the rest being females. This gives an indication that cashew farming is a heavily male dominated activity in the study area.

With respect to age composition, the respondents were categorized into 3, those between the ages of 18 and 33, 34 and 60 and those above 60 were 63.7percent, representing the majority were between ages 34 and 60, followed by 28.9percent being above 60 years and 7.5percent falling between the 18 and 33 age brackets.

It was also observed that in all category of age groups, the male population outnumbered the female population. The results of the analysis

(Fig. 1) indicates that majority of the respondents were within the middle age group (34-60). This suggests that cashew farming activities may require a certain level of effort or physical activity that will require masculinity. Wongnaa and Ofori [11] in an earlier report asserted that most of the cashew farmers were ageing and the level of illiteracy amongst them was high as more than 60% of the respondents had received no formal education.

To ascertain the educational background composition of the farmers, their highest level of education was sought. The results indicate that at the time of the survey, a greater part of respondents (37.5%), had had basic education and about (29.0%) were found not to have had any form of formal education. It was also noted that 26.0percent and 7.5percent had secondary and tertiary education respectively.

On marital status, it was observed that most of the respondents (82.1%) were married (Fig. 1). The rest comprised singles, divorcees and widows. The marital status of the respondents gives an indication of the level of responsibility and to some extent how respondents conduct their lives. There was a high rate of land ownership among respondents. The study results indicated that about 86.1percent of respondents claimed they own the land on which they cultivated the crop. This was not skewed in favour of men as it usually is the norm in many communities in Ghana. Rather in the case of this study genders were equitably represented in terms of ownership of land. This shows that the usual reference to the fact that in rural areas women do not lay claim to lands, could only be a presumption and peculiar to some communities and not every community. This is evident in this study with women are actually claiming to have their own land which, were inherited from their husbands and or their deceased parents.

Table 1. Socio-economic distribution of respondents (Gender and Age)

		How old are you?			Total
		(18 - 33)	(34 - 60)	Above 60	
Female	Count	3	35	14	52
	% within Gender	5.80%	67.30%	26.90%	
	% of Total	1.50%	17.40%	7.00%	25.90%
Male	Count	12	93	44	149
	% within Gender	8.10%	62.40%	29.50%	
	% of Total	6.00%	46.30%	21.90%	74.10%
Total	Count	15	128	58	201
	% of Total	7.50%	63.70%	28.90%	

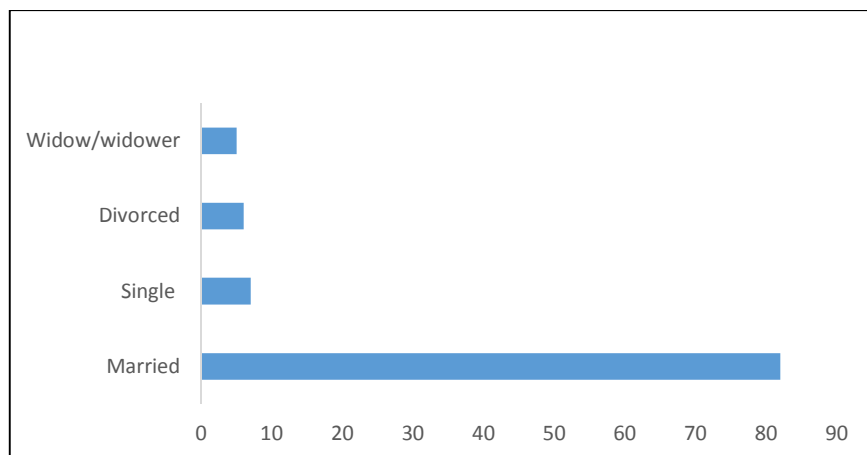


Fig. 1. Marital status of respondents

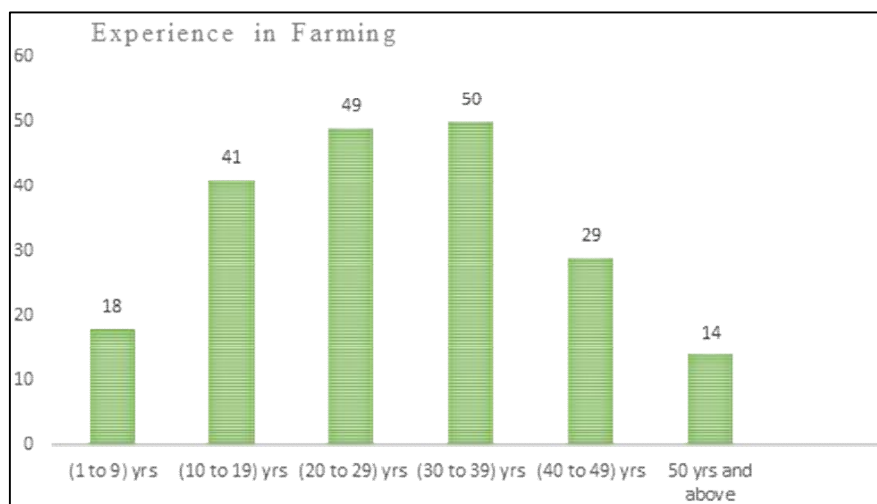


Fig. 2. Farmer experiences (years)

The length of time of farming depicts a normal distribution from three (3) to sixty-five (65) years. The study results show that most of the farmers have been farming for more than three years with greater percentage of 91percentfarming from 10 to 65 years. Those who had farmed for 39 years had the highest percentage (14.9). Comparing the average years of farming to how long they have been farming cashew, it is noted that though for some it is a relatively recent addition to diversify their farms giving reasons such as cashew being more lucrative and long term. The crop can also be intercropped. It was observed that the total land allocated to cashew farming ranged from 1 to 85 acres.

On the issue of labour employed on the cashew farms, the statistics indicate that about 93

percent of the respondents worked on the farms themselves. This meant that they were the primary source of labour for their respective farms and this was the case for both male and female farmers. Aside themselves, 59.9 percent affirmed when asked if they used family as a source of labour and 84.6percent affirmed the used of hired labour. These are shown in Fig. 3.

Fig. 4. shows the distribution of labour types and the role they play in the cashew farms. Although it was not easy to differentiate between which activities were mostly carried out by which category of the social actors, a few activities were distinguished. For example, the statistics indicate that pre-planting activities was mostly carried out by hired labour, friends, spouses and/or children. It was found out that while self

labour was frequently used for planting, it was less frequently used for harvesting. Gathering of fresh fruits was another activity that involved almost all of the various categories of labour identified. Generally, the results show that there was no clearcut farm activity assigned mostly to a particular social group or labour force and that everyone was involved in almost all the different types of activities. The concept of division of labour in cashew farms in the study areas was not prominent. While this could be different looking at it from the perspective of the genders, the data did not support such revelations.

any formal credit facilities. This was not because, facilities such as rural Banks and other commercial banks did not exist in the communities, rather access to credit facilities by the farmers was difficult and frustrating. The study show that, out of the 200 respondents interviewed, 183 representing about 91.5 percent of total respondents stated that they had no access to credit facilities. A few (6.5%) however, stated that they have access to credit facilities. The remaining respondents did not have any idea about credit facilities in the communities or elsewhere. It was noted that the entire 6.5 percent that had access to credit facilities were males. This study however did not find out reasons behind this distribution and access inequality

From the results of the analysis (Fig. 5.), it can be said that most cashew farmers in the communities surveyed did not have access to

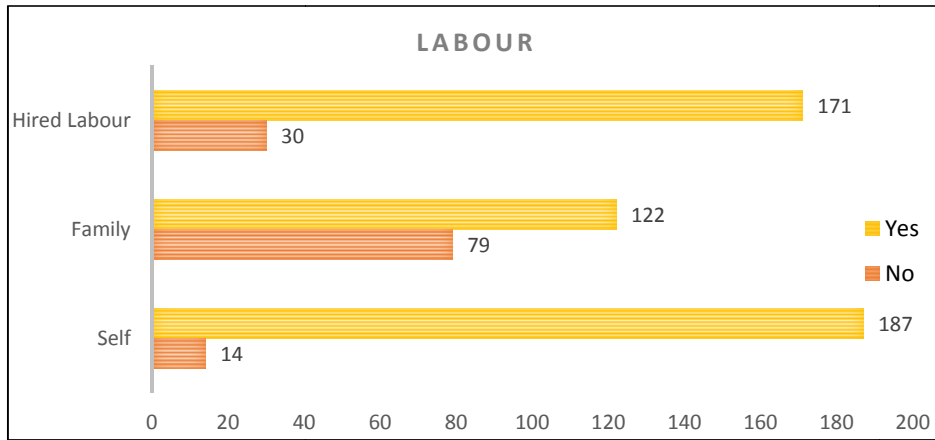


Fig. 3. Labour type employed on farms

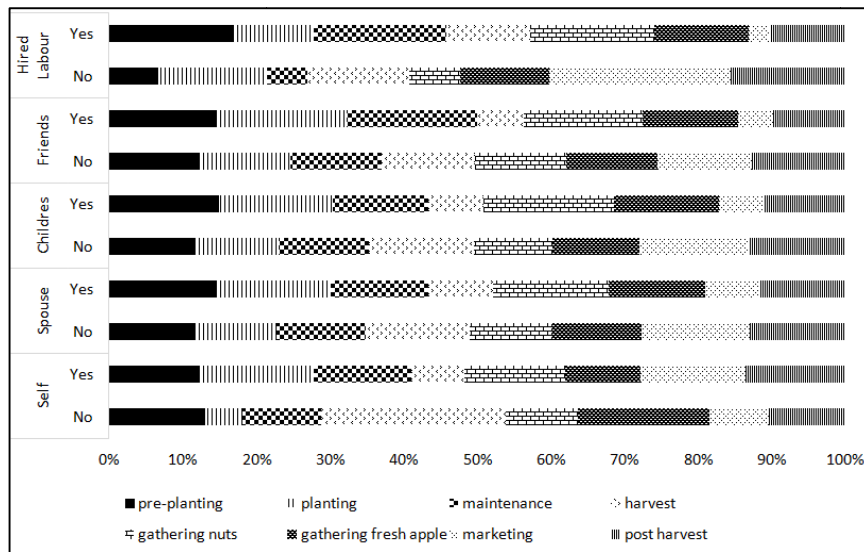


Fig. 4. Labour categories employed for farm work

For sources of credit to finance their cashew farming, personal savings was the principal source with a percentage of 80.6, followed by those from family and friends contributing to about 7 percent. Money lenders and Non-Government Organizations represented 0.5percent each of credit source, with bank loans and micro- finance credit not contributing anything at all to the sources of finance for cashew farmers. This shows that the profitability of the farming in terms of output and sales, coupled with the expenses the farmer has to make both on his/ her family as well as on the farm, determines how much the farmer can save and hence how much the farmer can plough back into the cashew farming. Others also plough back profits made from selling other farm produce such as maize, cassava and yam, and others into cashew farming.

3.1 Field Survey Data

The study results indicated that the entire respondents of the survey did not sell any of the harvested cashew apples. This shows that the apples were of no significant economic importance to the farmers and their families. It indicates that the prime concern of the interviewed farmers regarding the part of the cashew that is sold was the nuts, which really has a huge economic strength in the study area. Since this was the case, subsequent questions that related to the forms in which the apples were sold (as to whether they were sold in the fresh form, dried, processed or juiced), had a negative response. It was absolutely obvious that farmers did not know of the opportunities opened to them in cashew apple markets. The absence of such market in the area could be attributed to several factors including negative perceptions they had about the fruit and the effect is assumed to have on men. It was hinted that when men eat the fruits they may become impotent. This and others scared people, particularly the men who dominated the production of the crop to be interested in the fruit business. The study therefore revealed that at the time of the study, farmers were not benefiting from opportunities in cashew fruit marketing.

Generally, in most parts of Africa it has been found that Cashew apple is not a much-liked fruit. This situation is common wherever the crop is cultivated and this has been attributed to factors such as its bleaching effect on fabrics and high acid and tannin content. According to Suganya and Dharshini [12], cashew fruit is not

readily consumed in its raw state due to its high content of astringent compounds. The case of the study area was quite different. When ripe it is friable and soft in nature, but highly perishable. These and other factors influence the acceptability of the fresh fruit as food or snacks among the societies where the crop is mostly found. Although the literature reports of several processing techniques which have led to a variety of cashew products being produced [13], some have complained that the lack of use and therefore the wastage of the fresh fruits can be attributed inadequate proper processing techniques and facilities available to the farmers.

The farmers were asked if their family members ate the fresh cashew apples, rating the frequency as very often, sometimes or not at all, it was noted that there was a relatively narrow gap between those who ate it very often and those who ate it sometimes. A few however did not eat the apples at all. Among the male respondents, 48.3percent representing 71 farmers agreed to the fact that their family ate the fresh apples very often with those who ate it sometimes following closely with a percentage of 42.2 percent. The remaining 9.5 percent said their families did not eat the fresh fruits at all. A similar pattern was reflected among the female partners. Another 48.1percent said their families ate the fresh fruits often, 40.4percent said their families ate it sometimes and 11.5percent said their families did not eat it at all. It can hence be generalized that there is a high frequency of cashew apple consumption by the family of the farmers.

The study attempted to explore respondents' perception about the consumption of the cashew apple, which many do not consider as marketable. The cashew fruit is also not considered as having the potential to increase their income. The likert scale analysis is presented in Table 3.

With cooked food in the house, 69.5percentstated that they will not eat cashew apples. This means that for them, cashew apples are alternatives for food only when there is no food in the house. 26percent would eat cashew apples even with food at home, while 8.5percent were unsure. 48.6 percent also stated that the reason they did not eat cashew apples as food was that it was not eaten as such in their community. However, it was observed that about 47.7percent disagreed with this reason for not eating cashew apples with 5.5 percent not being certain if that was their reason for not eating cashew.

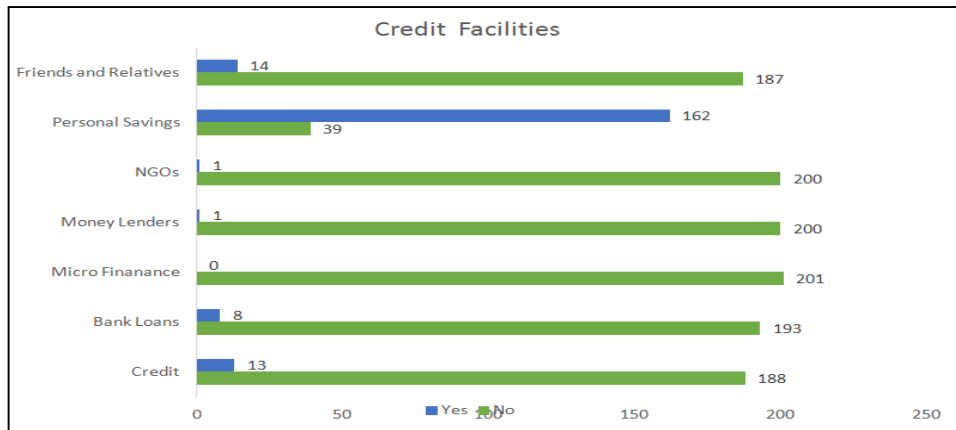


Fig. 5. Credit status of respondents

Table 2. Marketing of cashew apples

	No		Yes	
	Count	Row N %	Count	Row N %
Do you sell some of the harvested cashew apple?	201	100.0%	0	0.0%
Do you sell the cashew apple in its fresh form?	200	99.5%	1	0.5%
Do you sell the cashew apple in its dry processed form?	201	100.0%	0	0.0%
Do you sell the cashew apple in its juice processed form?	201	100.0%	0	0.0%

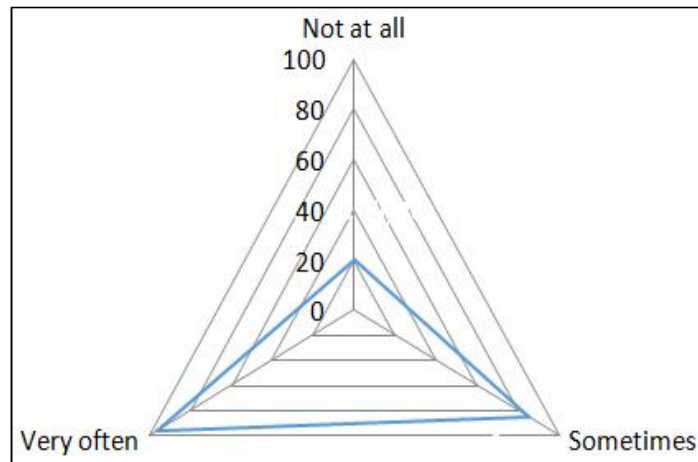


Fig. 6. Consumption of Fresh Cashew fruits

participants however said that they were interested in the apples though there were no market opportunities for them and 3.0percent were unsure. About 77.5percent of the farmers stated that they will prefer cashew juice to eating the fresh apples since it was more attractive, 14.3 percent disagreed with this and 8.2percent

were unsure. According to Wongnaa [14] in a study that cashew production is a profitable venture even in its current state. This gives good grounds for prospecting into cashew fruits being processed into other value added products to make it more attractive for consumption. This will result in market for the apples which currently

Table 3. Perception of market potentials of cashew

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I eat fresh cashew apple as food even when I have some cooked food in the house.	54.5%	15.0%	4.5%	8.0%	18.0%
I often have cravings to eat fresh cashew apples but I don't because I have an allergy.	64.0%	22.0%	5.0%	4.5%	4.5%
I do not eat fresh cashew apples because I am no longer a young man.	58.8%	25.1%	5.0%	6.5%	4.5%
I need to eat actual food and not cashew apples because people do not eat them as food in this community.	24.1%	23.6%	5.5%	16.6%	30.2%
I do not allow my family and friends to eat cashew apples because I need to sell them for money.	75.9%	18.6%	4.0%	0.0%	1.5%
I don't eat cashew apples because it is unhealthy due to the chemicals it contains	69.7%	20.2%	5.1%	2.0%	3.0%
I am not interested in fresh cashew apples because it has no market Opportunities.	16.1%	13.1%	3.0%	19.6%	48.2%
I will prefer cashew apple juice to eating the fresh fruits because that is more attractive.	8.7%	5.6%	8.2%	20.4%	57.1%
I do not eat cashew apple because it does not satisfy my hunger.	29.5%	27.0%	7.0%	13.0%	23.5%
Even if I have the desire to eat something unhealthy, I will not eat cashew apples because they are just not good.	47.5%	34.3%	8.6%	3.5%	6.1%
I eat the cashew apple because it tastes very nice.	5.5%	2.5%	6.0%	19.6%	66.3%

are of no use to the farmers. It is a notion that cashew is unhealthy because they have some compounds which are not good for the health. When farmers were asked if this was a reason that deterred them from eating the apples, 81.8 percent disagreed whereas 9.6percent agreed and 8.6percent were unsure.

4. CONCLUSION AND POLICY IMPLICATIONS

Ghana aims at increasing its exports of cashew through an enhancement agriculture export programme [15]. This study was designed to explore the state of awareness of cashew farmers on the use of the fruit or cashew apple. Although rich in vitamins and other minerals essential for the human body, the results indicate that consumption and utilization of the fruit among farmers is still

low. It was observed that in many cases the fruit (apple) is usually left to rot when the nut is harvested. This is in spite of its nutritional qualities. It may therefore be worthwhile for a process to be engineered in the country to convert the cashew apple harvested into food products that may support the pro-poor agenda in the country.

In this study attempt was made to explore the extent of awareness of the market potential and utilization of cashew apple (fruit) among farmers in the BrongAhafo region, where the cash crop is largely cultivated. The study indicated that in the case study communities, farmers were not really interested in the fresh cashew apple due to its perceived uselessness. The farmers did not consider that they could make any substantial profit from processing the fresh fruits. Findings from

this survey indicate the readiness of cashew farmers to get more economic benefits from the cashew fruits which are usually wasted. Cashew apple can be processed into a variety of snacks and food, with high economic and nutritional value, to improve food security in Ghana. It therefore pre-supposes that the utilization of the cashew fruit through value addition and post-harvest management will provide additional income to the farmers and create new employment opportunities for the youth.

Overall, the study suggests that strategies that seek to encourage and promote the commercialization and utilization of cashew apple (fruit) should take into consideration factors that seem to spur awareness and utilization of fruits in the country. These include farmer background characteristics, assets portfolio in the form of land for growing of the tree crop, and other resources controlled by farmers, and as well as community characteristics such as proximity to markets and establishment of processing industries.

Given the high nutritional value and the large volumes of the apples produced by go waste every year, cashew apple products may contribute substantially to a healthy diet of the consumers as well as increase the incomes of cashew growers and hence improve the profitability. The establishment of Ghana's new industrialization policy drive and the focus on cashew as one of the trees government seeks to encourage will be game changer in the quest to improve the rural economies and in a way reverse the rural urban migration of the youth.

The growth of the sector is likely to improve the state of such industries as well as enhance state competitiveness of the cashew value chain in the country. This will create new agricultural and industrial employment opportunities in support of the current government's objective of rural industrialization. Experts say, the processing of cashew in the country is likely to reduce poverty in rural cashew growing areas considerably.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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