



## Analysis of Profitability and Socioeconomic Factors in Marketing of African Star Apple (*Chrysophyllum albidum*) in Maiduguri Metropolis of Borno State, Nigeria

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### Abstract

African star apple is a complex crop due to its special characteristics such as perishability, seasonality, and bulkiness that require special handling. Spoilage, damages, and losses during transportation are great for the fruit due to its juicy nature. Despite these unique attributes of the African star apple, many marketers are involved in its trading. Therefore, this study was carried out to examine the profitability and socioeconomic factors in the marketing of African star apple in Maiduguri metropolis. Multi-stage sampling technique was employed to select seventy (70) African star apple marketers comprising, twenty (20) wholesalers and fifty (50) retailers to form the sample size for the study. The specific objectives of the study were to describe the socio-economic characteristics of African star apple marketers, determine the profitability of African star apple and examine the factors influencing the marketing of African star apple in the study area. Both descriptive statistics, gross margin and ordinary least square regression were used for data analysis. Findings on socio-economic characteristics of the respondents revealed that all the wholesalers (100%) were male and the majority of the retailers (96%) were also found to be male. Most of the respondents in the study area were young people who are in their youthful ages and agile for effective marketing activities. The result further revealed that all the wholesalers (100%) were married while for retailers, 92% were also married and only 8% are single. Gross margin analysis showed that marketing of African star apple was profitable for both wholesalers and retailers with a margin of ₦500/basket and ₦2,180/basket respectively. The study further revealed that marital status, marketing experience, educational level and distance to market positively influence the marketing of African star apple while age was found to have a negative influence. It was recommended among others that marketers should form savings and loan groups among themselves for easy access to finance.

**Keywords:** Profitability, Factors, Marketing, African star apple, Borno state

### Introduction

African star apple (*Chrysophyllum albidum*) is a tropical forest fruit species that belongs to the family *sapotaceae* which has up to 800 species and has been incorporated into traditional agroforestry systems (Ehiagbonare *et al.*, 2008). The fruit is mostly cultivated commercially in the rural areas of West Africa and is very common during the months of December to April yearly (Amusa *et al.*, 2003). In Nigeria, the fruit is cultivated in the southern part of the country where the climatic condition supports its growth, and the cultivation is through improved propagation either by seed or stem cuttings (Dolor, 2013). The African star apple fruit is locally called *udara*, *agbalumo* and *agbaluma* in igbo, yoruba and hausa languages respectively. In recent times, African star apple has become a crop with

commercial value in Nigeria due to its nutritional and medicinal value (Obboh *et al.*, 2009; Onyekwelu and Stimm, 2011). Grisbach (2007) noted that the fleshy and juicy fruits of the species which are popularly eaten are potential sources of soft drinks. The fleshy pulp of the fruits has been found to have a higher content of ascorbic acid than oranges and guava (Amusa *et al.*, 2003). Furthermore, Adepoju *et al.* (2012) observed African star apple has high micronutrients of nutritional importance, possesses an excellent value index of nutritional quality, and contains 90% *anacardic* acid which is used industrially in protecting wood and as a source of resin. The seeds of the species are sources of oil that are used for diverse purposes, the leaves are also used as emollients and for the treatment of skin eruptions, diarrhea, and stomach ache (Adisa, 2000;

Ugbogu and Akukwe, 2009). African star apple is rich in ascorbic acid (vitamin c), possesses a pleasant taste and also provides a good source of micronutrients that have nutritional importance. These attributes have lured the public to like the fruit and this is evident by the proliferation of hawkers/retailers the nooks and crannies of Maiduguri metropolis. Marketing of horticultural crops especially African star apple, is more complex due to its special characteristics such as perishability, seasonality, and bulkiness that require special handling. The diets of a significant portion of Maiduguri population are mainly carbohydrates with less or no intake of fruits and vegetables. Low intake of fruit and vegetables was found to be the main contributor to nutrients deficiencies in the developing world where about 77.6% of men and 78.4% of women are reported to consume less than the recommended 400g of fruits and vegetables per day by the World Health Organisation (Hall *et al.*, 2009). African star apple has the required beneficial nutrients and non-nutrient including fiber, vitamins, minerals, and antioxidants for balanced and a healthy diet.

African star apple is a seasonal and perishable crop that requires efficient marketing to avoid wastage and deterioration. Marketing of perishable agricultural products in Nigeria is beset with poor storage facilities, seasonality, poor transportation, inappropriate handling, grading, and inadequate market communication (Ikechi, 2006). However, despite these shortcomings, literature had revealed fruit marketing as a profitable venture. For instance, Sulumbe *et al.* (2015) discovered that marketing of perishable crops was profitable and efficient in Maiduguri metropolis. Rahman *et al.* (2014) referred to profitability as earning capacity of a product, plant, process or undertaking. The word profitability is composed of two words namely profit and ability; the ability indicates the power of a business entity to earn profit or the ability of a given investment to earn a return from its use (Tulsian, 2014). Additionally, Muhammad *et al.* (2019) found fruit marketing as a profitable enterprise in Maiduguri with appreciable return on investment to both wholesalers and retailers. Relevant literature depicted profitability in fruits and vegetables from both wholesalers and retailers. This study will therefore consider African star apple profitability at wholesale and retail levels. Research emphasis in the study area has been given on conventional fruits like oranges, watermelon, pawpaw, etc. its therefore expedient to empirically know the profitability and socioeconomic factors in marketing of African star apple *agbaluma* in Maiduguri metropolis through the following objectives;

- i. describe the socioeconomic characteristics of African star apple marketers
- ii. determine the profitability of African star apple and
- iii. examine the factors influencing the marketing of African star apple in the study area.

## **Methodology**

### ***The study area***

The study was conducted in Maiduguri metropolis the capital of Borno state, Nigeria. Maiduguri lies between latitude 11°50'48.9"N, and longitude 13° 9' 25.6"E and shares boundaries with Konduga local government area to the North and North-west, and Jere Local Government Area to the South. The population of the metropolis is about 540,016 people where 282,409 were males and 257,607 females (National Population Commission, 2006). This was, however, projected to be about 813,277 people in 2019 at (3.2%) yearly population growth rate. Majority of the inhabitants are farmers, traders and civil servants. The climate of the area is characterized by a dry and hot season with a mean annual temperature of 25°C, the hottest months are March and April with a maximum temperature of 37-40°C. It has an average rainfall of about 500 - 700 mm per annum (National Metrological Agency). The climatic condition of Maiduguri is not suitable for the growth of African star apple fruit, but the inhabitants have a great consumption demand for the fruit and this has given it a very huge market. The fruit is mainly grown in the southern part of Nigeria but is being transported to Maiduguri for trading. This trade pattern has made it possible for the fruit to have both wholesalers and retailers. Maiduguri metropolis is comprised of various fruits and vegetable markets with Gamboru market being the largest where marketing of various fruits and other agricultural products is carried out. Other prominent markets include; Monday market, Custom market, Muna market, and Baga road market.

### ***Sources of Data***

Primary data and secondary information were used in the study. Primary data was collected through the administration of a structured questionnaire to the respondents. The information contained in the questionnaire includes; the socioeconomic characteristics of African star apple marketers and profitability in the marketing of African star apple. Secondary sources of information include; scholarly journals and literature from related publications.

### ***Sampling Technique***

Multi-stage sampling technique was used in selecting the respondents. A total of seventy (70) African star apple marketers comprising, twenty (20) wholesalers and fifty (50) retailers were selected to form the sample size for the study. In the first stage, Gamboru and Monday markets in Maiduguri metropolis were purposively selected being the two prominent fruits markets with high trading activities. In the second stage, 10% of both wholesalers and retailers were selected from the available list of marketers as obtained in their respective associations to form the sample for the study as shown in the table below;

### ***Analytical Technique***

Both descriptive statistics, gross margin, and inferential statistics were used for the study. Descriptive statistical tools such as frequency, mean and percentages were

used to analyze the socio-economic characteristics of African star apple marketers i.e. objective (i). Gross Margin analysis was also used to determine the profitability of African star apple marketing objective (ii) and Ordinary Least Square was used to examine the factors influencing marketing of African star apple i.e., objective (iii). The Gross Margin is expressed as the difference between the gross revenue and the total variable cost of the marketing process. It is expressed as follows;

$$GM = GR - TVC$$

GM = Gross Margin (₦)  
 GR = Gross Revenue/Income (₦)  
 TVC = Total Variable Cost (₦).

The ordinary least square regression model was used to analyzed the factors influencing the marketing of African star apple. i.e., objective (iii). The model is expressed in explicit form as;

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

Where, the dependent variable (Y) is marketing efficiency

The independent variables are:  $X_1$  = age

$X_2$  = Gender

$X_3$  = Marital status

$X_4$  = Household size

$X_5$  = Marketing experience

$X_6$  = Educational level

$X_7$  = Distance to market

a = Constant  $b_1$  -----  $b_7$  = coefficient of independent variables

e = Error term

## Results and Discussion

### *Socio-economic characteristics of African star apple Marketers*

Result on Table 2 showed that all the wholesalers (100%) were male and majority of the retailers (96%) were also found to be male. This indicates that African star Apple marketing is mainly a male dominated enterprise in the study area. However, 4% of the retailers were found to be female. This showed that women are gradually but insignificantly getting involved in African Star apple marketing. The low participation of women in marketing activities in some states in northern Nigeria conforms to Lawal *et al.* (2020) who observed that most of pineapple marketers in Kano were male. Result on age for wholesalers showed that (50%) of the respondents were within the age range of 35-50 years, 30% are above 50 years, and 20% are between 20-35 years. For retailers, majority (72%) of the respondent were within the age range 20-35 years, 24% were within 35-50 years, and only 4% are less than 20 years. This implies that most of the respondents in the study area are young people who are in their youthful ages and agile for effective marketing activities. All the wholesalers (100%) were married while for retailers, 92% were also married and only 8% are single. This implies that, majority of the marketers were married and this might have a positive effect on the need to fend for the family and also add to the availability of family labour in the

marketing activities. Dikwal (2002) observed the significance of marriage as a source of family labour and partnership in decision making and overall management of business enterprises. The result in Table 2 further revealed that majority (65%) of the wholesalers had formal education while (35%) had attended informal education. For retailers (72%) had attended formal education and (28%) had informal education. This showed that all the marketers were literate in one way or the other implying that education played a role in decision-making process for better marketing strategies. About (40%) of the wholesalers had household size of 11 – 15 members, 35% had above 15 members and 25% had between 6-10 members. For the retailers, majority (58%) had 6-10 members, 24% had 11-15 members, 8% had 3-5 members, 6% had less than 3 members and only 4% had above 15 members. About (45%) of the wholesalers had 16-20 years of marketing experience, 35% had 11-15 years, 15% had 6-10 years and only 5% had above 20 years. For retailers, the majority (80%) had 6-10 years, 14% had 11-15 years, 4% had 1-5 years and 2% had 16-20 years of marketing experience. This implies that majority of the marketers have high years of experience in African Star Apple marketing. The majority (60%) of the wholesalers had a distance of 5-10km away from the nearest market, 30% are less than 5km away, and 10% had to travel between 10-15km to the nearest available market. For the retailers, (56%) are 5-10km away from the nearest market and about 44% are less than 5km away from the market. This means that most of the respondents are not too far from the market areas and can always access it.

### *Profitability of African Star Apple Marketing*

The average cost and return associated with African star apple marketing is presented in Table 3. The components of the variable cost for the marketers include cost of purchase or price of purchase, market charges, cost of loading and offloading, container cost, damage cost and transportation cost. However, the retailers in the study area do not incur loading and offloading cost, container cost and transportation cost. The average variable cost for wholesalers was ₦7,500.00 per basket of African star apple fruit with purchase and transportation cost being the highest. This high cost is due to the fact that the fruit is not cultivated in the study area but mainly in the southern part of the Nigeria. The calculated gross margin for wholesalers was ₦500/basket. For retailers, purchase cost was found to be the highest, and no cost incurred on loading and offloading, transportation and container cost. This is because retailing begins at the point of purchase from the wholesalers. Furthermore, a gross margin of ₦2,180/basket was realized for retailers. This implies that African star apple marketing is profitable for both wholesalers and retailers. However, the retailers have more profit per basket than the wholesalers because, African star apple at wholesale level were not graded based on size and quality. The retailers sold in pieces at different prices based on grade and size thus, tend to realize a higher profit. This is in line with the findings of Sanusi *et al.* (2016) who found fruit and vegetable



marketing to be profitable in Odeda local government area of Ogun State, Nigeria.

#### **Factors Influencing Marketing of African Star Apple**

Table 4 revealed the result of ordinary least square regression of the factors influencing marketing of African star apple for both wholesalers and retailers in the study area. The result on Table 4 revealed that age had negative coefficients for both wholesalers and retailers (-.02893 and -.00667) respectively and inversely influences marketing. This conforms to the *a priori* expectation which postulates that trader's activities decreases with age i.e., the older the trader, the less active he/she tends to be. This result is in line with the findings of Apata and Apata (2003) who indicated that younger traders tend to be more innovative in their marketing activities. The coefficients of gender and household size for both wholesalers and retailers were found to be insignificant, this implies that they do not affect marketing of African star apple in any way. Marital status had a positive coefficient ( $p < 0.01$ ) for retailers, this implies that marketers that are married tend to be more involved in marketing than the unmarried. However, for wholesalers, marital status is insignificant which means it is not a major determinant of African star apple marketing. Another significant variable in determining marketing of African star apple is marketing experience. It was found to be positive and significant at ( $p < 0.05$ ) for wholesalers and not significant for retailers. This implies that an increase in the marketing experience will increase the marketing of African star apple by 5% for wholesalers. While for retailers, the marketers do not require any experience to venture into the enterprise. The coefficients of educational level were positive at ( $p < 0.01$ ) for wholesalers and ( $p < 0.05$ ) for retailers. This implies that an increase in level of education of the marketers will increase marketing of African star apple by 1% and 5% for wholesalers and retailers respectively. This result agrees with the view of Ibrahim *et al.*, (2020) who found that educational level has a positive influence on marketing of fruits and vegetable. Distance to market has a negative coefficient ( $p < 0.005$ ) for wholesalers and ( $p < 0.001$ ) for retailers. This implies that the farther the distance to the nearest market, the more likely the reduction in marketing of African star apple in the study area. This result concurs with the findings of Mukundi *et al.*, (2013) who found that increased distance to the market will lower the level of market participation of agricultural products sellers and hence increase the marketing costs.

#### **Conclusion**

The study concluded that marketing of African star apple is profitable and efficient in the study area. The marketing of the fruit is dominated by male whom were most married with long years of experience in the business. The major factors influencing marketing efficiency of African star apple fruit were marketing experience, level of education, marital status and distance to market.

#### **Recommendation**

- i. Women should be encouraged by government and non-governmental organization to engage in marketing of African star apple fruit, this will help to ripe the benefits of the good returns earn in the business and the high market potentials of the fruit.
- ii. Government and non-governmental organization should fund research in developing technologies that would preserve the fruit for a long time and reduce post-harvest loss and increase the availability of the fruit and increase income of its marketers.
- iii. Furthermore, the marketers should be encouraged to form savings and loan groups among themselves for easy access to finance. This will help them to expand the capital base of their businesses and facilitate access to finance as a group from formal financial institutions.

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**Table 1: Sampling procedure**

<b>Market</b>	<b>Wholesalers</b>	<b>Percentage (10%)</b>
<b>Gamboru</b>	130	13
<b>Monday</b>	72	7.2
<b>Sub-total</b>	202	20.2
	<b>Retailers</b>	<b>Percentage (10%)</b>
<b>Gamboru</b>	306	30.6
<b>Monday</b>	200	20
<b>Sub-total</b>	506	50.6
<b>Grand total</b>	708	70.8

*Source: Market survey, 2021*

**Table 2: Socio-Economic Characteristics of African Star Apple Marketers**

Variables	Wholesalers		Retailers	
	Frequency	*Percentage	Frequency	*Percentage
Gender				
Male				
Female	20	100%	48	96.0%
Age (years)				
Under 20	--	--	2	4.0%
20-35	--	--	2	4.0%
36-50	4	20.0%	36	72.0%
Above 50	10	50.0%	12	24.0%
Average	6	30.0%	--	--
Marital status	42.7500		31.7000	
Single				
Married	--	--	4	8.0%
Educational level (years)	20	100%	46	92.0%
Formal				
Informal	13	65.0%	36	72%
Average	7	35.0%	14	28%
Household size (no)	0.6500		0.8000	
<3				
3—5	--	--	3	6.0%
6—10	--	--	4	8.0%
11—15	5	25.0%	29	58.0%
above 15	8	40.0%	12	24.0%
Average	7	35.0%	2	4.0%
marketing experience (years)	12.4500		8.9600	
1—5				
6—10	--	--	2	4.0%
11—15	3	15.0%	40	80.0%
16—20	7	35.0%	7	14.0%
above 20	9	45.0%	1	2.0%
Average	1	5.0%	--	--
distance to market (km)	14.8500		9.3000	
<5				
5—10	6	30.0%	22	44.0%
10—15	12	60.0%	28	56.0%
Average	2	10.0%	--	--

*Source: Market survey, 2021*

**Table 3: Profitability of African Star Apple Marketing**

Variables	Wholesalers	Retailers
	Amount (Naira/Basket)	Amount (Naira/basket)
Gross Revenue/Income	₦8000	₦10,500
<b>Variable cost</b>		
Purchase price	₦6000	₦8000
Market charges	₦50	₦20
cost of loading/offloading	₦50	--
Container cost	₦100	--
Damage cost	₦100	₦300
Transportation cost	₦1200	--
Total Variable Cost	<b>₦7,500.00</b>	<b>₦8,320.00</b>
GM	₦500	₦2,180

*Source: Market survey, 2021*

**Table 4: Factors influencing marketing of African Star Apple.**

Variables	Wholesalers			Retailers		
	Coefficient	t-value	p-value	Coefficient	t-value	p-value
Age	-.0289322	-7.28	0.000***	-.0066739	-1.23	0.227
Gender	.0001422	0.24	0.811	.0007268	0.44	0.661
Marital status	.0019649	1.00	0.338	.209265	19.50	0.000***
Household size	.0029202	0.74	0.475	.0008663	0.06	0.951
Marketing experience	.0026672	1.92	0.048**	.0102644	1.47	0.014
Educational level	.0050556	6.311	0.000***	.001222	2.61	0.012**
Distance to market	-.0067309	-3.12	0.009**	-.1961669	-10.22	0.000***
R <sup>2</sup>	0.9874			0.9801		
Adjusted R <sup>2</sup>	0.9801			0.9768		
F-ratio	134.56			296.23		

*Source: Market survey, 2021. Significant at 5% \*\*, Significant at 1%\*\*\**