

PERFORMANCE OF WILD FRUIT MARKETING IN NIGERIA: A CASE STUDY OF AFRICAN STAR APPLE (*CHRYSTOPHILLUM ALBIDUM*) IN ILORIN METROPOLIS, KWARA STATE, NIGERIA

O. A. Omotesho, A. *Falola and L. O. Adebisi

Department of Agricultural Economics and Farm Management, University of Ilorin,

P. M. B 1515, Ilorin, Nigeria

**E-mail: falolaabraham@yahoo.com*

Cell No: +2348032885450, +2348154557502

ABSTRACT

This study examined marketing of wild fruits in Nigeria using African Star Apple as a case study. The study stemmed from the need to satisfy the nutritional requirements of the populace through efficient marketing of wild fruits. Specifically, the study examined the socio-economic characteristics of African Star Apple marketers in the study area, determined the marketing margins among the intermediaries involved in marketing of the crop, and identified the factors militating against efficient marketing of the commodity in the study area. Descriptive statistics, marketing margin and marketing efficiency analyses were the analytical tools adopted for the study. The findings revealed that marketing of African Star Apple was profitable and efficient in the study area. Majority of the intermediaries were not members of any cooperative society. The study also reveals inadequate credit facilities, seasonal variation in price, high transportation cost and poor storage system as the major problem facing marketing of the commodity in the study area. This is unfavourable to producers, marketers as well as consumers and the economy as a whole. The study therefore calls for formation of cooperative societies by marketers of wild fruits, provision of good roads, development of efficient storage system, credit facilities and market stalls.

Key words: nutritional requirements, wild fruits, intermediaries, efficient marketing

<http://dx.doi.org/10.4314/jaf.v11i1.4>

INTRODUCTION

Global problem of food insecurity is alarming. The food self sufficiency ratio fell from 98% in early 1960s to less than 54% in 1986. In 1990, 18% of the population (14.4 million) was estimated to be critically food insecure. This increased to 36% (32.7 million) in 1992 and further increased to 40.7% in 1996 (Babatunde and Oyatoye, 2005). According to Food and Agricultural Organization (2005), in Nigeria, 11 million people (8.5% of the population) are undernourished.

One of the major problems faced by Nigerian populace is nutritional deficiencies. This is because of the high intake of calorie food and low intake of fibre containing food such as fruits and vegetables. Low fruit and vegetable intake is a main contributor to micronutrient deficiencies in the developing world, especially in populations with low intakes of nutrient-

dense animal source foods such as meat and dairy products (WHO, 2002). Inadequate intake of fruits and vegetables is also increasingly recognized as one of the key risk factors for cardiovascular diseases and some forms of cancer, the two leading causes of death in the world today (International Agency for Research on Cancer, 2003).

The World Health Organization estimates that low fruit and vegetable intake contributes to approximately 2.7million deaths a year from chronic diseases and causes about 31% of ischaemic heart diseases and 11% of strokes worldwide. It ranks low fruits and vegetable intake as the sixth main risk factor for mortality in the world (IARC, 2003). This is very rampant among low income countries like Nigeria of which the rural dwellers constitute major part of this population. High energy food intake at the expense of other nutrients constitutes vitamin and mineral deficiencies that affect people's health and ultimately reduce their level of productivity. Hence there is need for marketing of fruits and other sources of these food nutrients.

The African star apple (*Chrysophyllum albidum*) is one of the most important wide fruits that is cheap and widely consumed in the developing countries, including Nigeria (Bada, 1997; Adepoju and Adeniji; 2012). It is called 'Agbalumo' in Southwestern Nigeria, and 'Udara' in Southeastern Nigeria. It is produced by a tropical edible fruit tree that belongs to the family of Sapotaceae (Ehiagbonare *et al.*, 2008). It is primarily a forest tree species and its natural occurrences have been reported in diverse eco-zones in Nigeria, Uganda, Niger Republic, Cameroon and Coted'Ivoire. It is distributed throughout the southern part of Nigeria. *Chrysophyllum albidum* is a popular tropical fruit tree and widely distributed in the low land rain forest zones and frequently found in villages (Keay, 1989).

The African star apple fruit is a large berry containing 4 to 5 flattered seeds or sometimes fewer due to seed abortion. The plant has in recent times become a crop of commercial value in Nigeria (Obboh *et al.*, 2009). The fleshy pulp of the fruits is eaten especially as snack and its fruit has been found to have higher contents of ascorbic acid than oranges and guava (Amusa *et al.*, 2003). It is an excellent source of vitamins, irons, flavours to diets (Adisa, 2000). The seeds are also used for local games or discarded (Bada, 1997). *C. albidum* fruit is common in both urban and rural centres especially during the months of December to April. The fruits are not usually harvested from the trees, but left to drop naturally to the forest floor where they are picked up (Amusa *et al.*, 2003). The seed is a source of oil, which is used for diverse purposes (Ugbogu and Akukwe, 2009). The fruit contain 90% anacardic acid, which is used industrially in protecting wood and as source of resin. It is also used to reduce the effect of diabetes in some parts in Nigeria, (Adisa, 2000). Duyilemi and Lawal (2009) reported that the fruit is rich in protein, ash and crude fibre, and has a very low level of toxic minerals compared to conventional fruits. Studies have also examined its antinociceptive, anti-inflammatory and antioxidant activities of eleagnine an alkaloid isolated from the seed's cotyledons (Idowu, *et al.*, 2006, Obboh *et al.*, 2009).

Fruits are very important in human diet, and should be efficiently conveyed and marketed to the public for consumption. However, many studies have focused on marketing of cultivated fruits in Nigeria (Adeyemi and Ogazi, 1998; Apata, 2002; Ajani, 2005; Ajayi and Mbah, 2007; Fakayode *et al.*, 2010), little or no effort has been made to investigate the performance of wild fruit marketing. This study therefore intends to fill the gap in the existing literature. Taking African star apple as a case study, this study examined the efficiency of marketing of the fruit in Ilorin Metropolis of Kwara State, Nigeria. Specifically, the study described the socio-economic characteristic of African Star Apple marketers, measured the degree of market concentration of the traders, examined the marketing channel adopted by the traders, evaluated the marketing margin and marketing efficiency of African Star Apple traders, and identified the problems militating against efficient marketing of African Star Apple. The findings of this study will be of importance to policy makers, researchers, marketers and the general public in order to ensure efficient marketing of wild fruits with the view to ensuring adequate intake of fruits as recommended by World Health Organisation for a healthy living.

METHODOLOGY

The study was carried out in Ilorin Metropolis. It is the capital of Kwara State. It is located on Latitude $8^{\circ} 30'$ and Longitude $4^{\circ} 35'$ of the equator (Kwara State Diary, 2002). The city is located in the transition zone between the deciduous forest (rainforest) of the southwest and the Savannah grasslands of the north and has an estimated population of about 847,582 (NPC, 2006). The city is a confluence of culture populated by the Yoruba, Hausa, Fulani, Nupe, Baruba, Igbo and other Nigerians. The natural vegetation consists broadly of rain forest and the wooded plains which are transversed by the Niger-River and its tributaries. Annual rainfall ranges from 1000mm - 1500mm, while maximum average temperature ranges between 30°C and 35°C . With this climatic pattern and sizeable expanse of arable land and rich fertile soils, the vegetation which is the wooded savannah is well suited for the growth of a wide variety of wild fruits.

The data used for this study were derived from primary and secondary sources. The primary data were generated by means of structured questionnaire augmented with personal interview. The target population for this study is African star apple traders. The sampling techniques involved random sampling of four markets in Ilorin and proportional sampling of 55 wholesalers and retailers based on the number of star apple sellers in each market, each across the four markets making a total of 110 respondents across the markets selected (See Table 1). The secondary data used were derived from journals, related textbooks, the internet, bulletins, statistical annual reports.

Descriptive statistics, C-4 concentration formula, market margin and marketing efficiency analyses were the tools adopted for the study. Descriptive statistics such as frequency distribution, simple percentages, measure of central tendency and figures were used to describe the socio-economic characteristics of the respondents as well as the channel adopted by the marketers.

The C-4 concentration ratio formula was also used to measure the degree of seller concentration of the traders. The formula is as follows:

$$C-4 = \frac{\text{Sales value of four largest marketers (₦)}}{\text{Total sales value (₦)}} \times 100$$

Where: C-4 is ratio of the market

If the result is less than 33% , the market is said to be unconcentrated or approaching perfect competition. If it is between 33% and 50%, it is oligopolistic, If it is greater than 50%, it is monopolistic (Njoku and Eze, 2003).

Performance of African star apple marketing systems was analysed using marketing margin and market efficiency as adopted by Obasi and Mejeha (2008) and Anuebunwa (2007) as follows:

$$\text{Marketing margin} = \frac{\text{Selling Price} - \text{Supply Price}}{\text{Selling Price}}$$

$$\text{Marketing efficiency} = \frac{\text{Value added by marketing (Net Profit)}}{\text{Total Marketing Cost}} \times 100$$

The farmers' share of the consumers' expenditure on African star apple that went into the marketing system was determined through the analysis of the marketing margins. This was determined using the approach adopted by Adekanye (1982), Barau *et. al.*(1993) and Anuebunwa (2008). The approach determined the respondents' gross marketing margin as the difference between cost price and the selling price. This is expressed as follows

$$D = C - A$$

Where D = Respondents gross marketing margin, C = Sales from star apple (₦), A = Cost of star apple (₦).

The farmers' share was then derived, as the difference between the selling price of star apple and the respondents' gross marketing margin and then expressed as percentage of selling price or by expressing farmers selling price (purchase price) as percentage of retail price (selling price).

RESULTS AND DISCUSSION

SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

The socio-economic profile of the traders is presented in Table 2. The result shows that all the traders were female. This may be due to fact that African star apple marketing, like other crops, allows the female to engage in other house works, like child-upbringing and house-keeping (Ayinde and Idris, 2005).

Majority of the traders (76.4% and 78.2% of the wholesalers and retailers respectively) were married. This signifies the possibility of more availability of family labour for marketing activities in the study area. Also 90.8% of the wholesalers and 74.7% of the retailers were more than 40 years old. The mean age of the wholesalers and the retailers in the study area were 50 years and 44 years respectively. This implies that both middle and old age people who are experienced are involved in the marketing of African star apple in the study area. It could also be observed in Table 1 that 54.51% of the wholesalers and 50.90% of the retailers had no formal education. This indicates a high level of illiteracy among the traders. This high level of illiteracy negatively influences agricultural marketing business as it deprives traders from understanding the intricacies of the markets and also prevents them from adapting and using improved marketing strategies (Oluyole, 2005). However, 67.27% and 50.90% of the wholesalers and retailers, respectively, have marketing experience of 15 years and above with an average of 17 and 13 years. This suggests a high level of skill in minimizing the sources of losses in their marketing activities.

Majority of the traders were not members of any cooperative society. The implication of this is that they are likely to be denied of access to credit facilities, collective purchase, etc., offered by cooperative societies. Many of the traders use their personal savings as their source of capital for the business.

MARKETING CHANNEL OF AFRICAN STAR APPLE IN THE STUDY AREA

Marketing channel helps in assessing the importance and performance of the marketing (Olukosi, *et al.*, 2005).

Fig. 1 shows the marketing channel used by the respondents. The figure shows that African star apple is either sold to the wholesaler or the commission agent from whom the retailer purchases the fruits. On the other hand, the retailer gets his stock directly from the gatherer. The fruit is then sold to the consumer.

MARKET CONCENTRATION OF THE RESPONDENTS

C-4 concentration ratio formula was used to assess market concentration of the respondents. The estimation of the ratio for the retailers is as follows:

$$C - 4 \text{ ratio} = \frac{370500}{7131774} \times 100 = 15.57\%$$

Similarly, market concentration of the wholesalers was evaluated as follows:

$$C - 4 \text{ ratio} = \frac{370000}{14338000} \times 100 = 25.73\%$$

Thus, C-4 concentration ratio of 25.73% and 15.57% was obtained for the wholesalers and retailers respectively. This is less than 33%, implying that African star apple marketing approaches pure competition in the study area.

The implications of the results of the C-4 ratio formulars are: African star apple marketing is characterized by many buyers and sellers in the market such that the action of a single participant does not affect the price of the fruit. Also entry and exit in the market is free. There are no strict rules guiding entry to and exit from the market as long as the traders have the necessary capital. These are true of many agricultural produce.

ANALYSIS OF MARKET MARGIN AND MARKETING EFFICIENCY OF AFRICAN STAR APPLE IN THE STUDY AREA

Table 3 reveals the marketing margin analysis per metric tonne. Higher marketing margin was recorded for the wholesalers than the retailers. The gatherers' shares were 82.78 per cent and 88.42 per cent for wholesalers and retailers respectively. This suggests that 17.22% and 11.58% of the consumers expenditure on star apple went to the wholesale and retail marketing system respectively.

CONSTRAINTS TO EFFICIENT MARKETING OF AFRICAN STAR APPLE IN THE STUDY AREA

Table 4 shows the barriers to efficient marketing of African star apple. Majority (74.5%) of the respondents complained of inadequate credit facilities. According to the respondents, inadequate credit could not make them build or rent stalls and expand their business.

High cost of transportation from point(s) of purchase to the point(s) of sale was another problem faced by 70.9% of the respondents. The respondents complained that most of the roads from farm gates to their markets stalls were not motorable, resulting in high cost of transportation of their commodity.

Another barrier to efficient marketing of the fruit in the study area was inability to store the fruit for a long time. Many (60.9%) of the respondents lamented that they had to sell the fruit to consumers immediately after purchase due to high perishability of the fruit.

CONCLUSION AND RECOMMENDATIONS

It can be inferred from the study that African star apple marketing in the study area approaches pure competition. The study also shows that marketing of wild fruits is profitable and efficient in the study area. However, the study reveals some challenges that need to be overcome to enhance wild fruit marketing.

Therefore, in order to ensure efficient marketing of African star apple, and wild fruits in general, there is need to encourage more traders to form or join cooperative societies. This

will make them benefit from economics of scale in tackling their common problems. It will also help them to have much access to credit facilities as groups rather than their personal fund which is put into the business, thereby improving marketing efficiency of wild fruits.

Besides, Government should put in place necessary infrastructure especially good roads to ensure effective transportation of produce as this will help to minimize the cost of marketing operations and improve marketing efficiency of the fruits.

Ministry of Agriculture in collaboration with research agencies, institutes and universities should develop efficient technologies for preservation of wild fruits thereby prolonging the shelf life of such fruits. This will not only increase the availability of wild fruits across season but also enhance food security in Nigeria.

REFERENCES

- Adekany, T. O. (1982) "Marketing Margins for Food: Some Methodological Issues and empirical for Nigeria." *Canadian Journal of Agricultural Economics*, 30:333- 344.
- Adepoju, O. T. and Adeniji, P. O. (2012). Nutrient composition and micronutrient potential of three wildy grown varieties of African star apple (*Chrysophyllum albidum*) from Nigeria. *African Journal of Food Science*, 6(12): 344-351.
- Adeyemi, S.A. and P.S. Ogazi (1998). Export Potentials for fruits Grown in Nigeria National Horticultural Research Institute (NIHORT) Bulletin. Ibadan, 1-56.
- Adisa, S. A. (2000). Vitamin C, Protein and Mineral contents of African Apple (*Chrysophyllum albidum*) In: *Proceedings of the 18th Annual Conference of NIST* (Eds) Garba, S. A., Ijagbone, I. F., Iyagba, A. O., Iyamu, A. O., Kilani, A. S. and Ufaruna, N. Pp. 141-146.
- Ajani, O. I. Y. (2005). Economic Analysis of the Marketing of Fruits in Lagos State, Nigeria: A Case study of Oyingbo, Oshodi and Ikotun Markets. *Nigerian Journal of Horticultural Science*, 10:38 – 46.
- Ajayi, A.R. and Mbah, G.O. (2007). Identification of Indigenous Ripening Technologies of Banana and Plantain Fruits among Women – Marketers in Southeastern, Nigeria. *Journal of Agriculture, Food, Environment and Extension*. 6(2): 60 – 66.
- Amusa, N. A., Ashaye, O. A. and Oladapo, M. O. (2003). Biodeterioration of the African Star and marketing in eastern Ethiopia. *Dry Lands Coordination Group Report No 46*. Gensen
- Anuebunwa, F.O. (2007). Analysis of Seller Concentration and Market Performance in Rice Marketing System in Ebonyi State of Nigeria. *Journal of Sustainable Tropical Agricultural Research* 22:37 -40.
- Anuebunwa, F. O. (2008). Performance of the Fresh Okra Marketing System in Southern Area of Ebonyi State, Nigeria. *Journal of Sustainable Tropical Agricultural Research* 28:8 - 13.
- Apata, O.M. (2002). Marketing of Citrus Fruits (Sweet Orange) in Some Selected Markets in Ibadan. An Unpublished Ph.D Thesis Submitted to the Department of Agricultural Economics. University of Ibadan.
- Ayinde, O. E. And Idris, A. O. (2005). Inter-market and Seasonal Variation in Price: A Appraisal of Maize Marketing in Kwara State. *Agrosearch*, 7(1):51 – 61.

- Babatunde, R. and Oyatoye, E. (2005). Food Security and Marketing Problems in Nigeria: The Case of Maize Marketing in Kwara State. Accessed on 17/07/2012 from <http://www.tropentag.de/2005/abstracts/full/102.pdf>
- Bada S. O. (1997). Preliminary information on the ecology of *Chrysophyllum albidum* G. Don, in west and central Africa In: Proceedings of a National workshop on the potentials of the star Apple in Nigeria (eds) Denton OA, Ladipo DO, Adetoro MA, Sarumi MB, pp. 16-25.
- Barau, A.D. Olukosi, J.O, Amin, Y.A (1993). "Performance of the Nigeria seed cotton market under the deregulated marketing system" *Agricultural Systems in Africa*, 3 (1): 64-69.
- Duyilemi O.P. and Lawal I.O. (2009). Antibacterial activity and phytochemical screening of *Chrysophyllum albidum* leaves. *Asian Journal of Food and Agro-Industry. Special Issue*, pp 75 – 79.
- Ehiagbonare, J. E., Onyibe, H. I. and Okoegwale, E. E. (2008). Studies on the isolation of normal and abnormal seedlings of *Chrysophyllum albidum*: A step towards sustainable management of the taxon in the 21st century. *Scientific Research and Essay*, 3 (12):567-570.
- Fakayode, S.B., Omotesho, O.A., Babatunde, R.O. and Momoh, A.A. (2010). The Sweet Orange Market in Nigeria, How Viable? *Research Journal of Agriculture and Biological Sciences*, 6(4): 395-400.
- Food and Agricultural Organization (2005). Economic and Social Department. "The State of Food Insecurity in the World 2025: Eradicating World Hunger – Key to Achieving the Millenium Goals."
- Idachaba, F.S. (2004): Food Security in Nigeria: Challenges Under Democratic Dispensation, 9th ARMTI Annual Lecture, Ilorin, 24/3/2004.
- Idowu, O., Iwalewa, E.O., Aderogba, M.A., Akinpelu B.A. and Ogundami A.O. (2006). African Star Apple (*Chrysophyllum albidum*) in Storage and the Effect on its Food Value. *Afr. J. Biotechnol.*, Apple in Nigeria, pp. 16-25.
- International Agency for Research on Cancer (2003). "Fruit and Vegetable Promotion Initiative" Report of the Meeting, Geneva, August 2003.
- Keay, R. W. J. (1989). Trees of Nigeria. A Revised Version of Nigerian Trees (Vol.1 and 2).
- Kwara State Diary (2002).
- National Population Commission (2006). The Nigeria Population Census 2006. Accessed on 23/2/2012 from http://www.population.gov.ng/index.php?option=com_content&view=article&id=89

Njoku, M.S and Eze, A. (2003). Profitability and Marketing Structure Analysis for Table Egg Production in Abia State, Nigeria. Proceedings of Annual Conference of Nigeria Animal Production. Pp 321&322.

Obasi, I.O. and Mejeha, R.O. (2008). "Structure, Conduct and Performance of Rice Market in Abia State, Nigeria." *International Journal of Agriculture and Rural Development (IJARD)* 11(1):160-165.

Oboh, I.O., Aluyor, E.O. and Audu, T.O.K. (2009). Use of *Chrysophyllum albidum* for the Removal of Metal Ions from Aqueous Solution. *Scientific Research and Essays*. 4 (6): 632-635.

Ugbogu, O.C. and Akukwe, A.R. (2009). The Antimicrobial Effect of Oils from *Pentaclethra* University, Michigan, USA. Vol. 2(3):56-59.

Olukosi, J. O., Isitor, S. U. And Ode, M. O. (2005). Introduction to Agricultural Marketing and Prices: principles and Applications Living Books Series, Abuja.

World Health Organization (2002). The World Health Report 2002. Reducing Risks, Promoting Healthy Life. Geneva, World Health Organization.

APPENDIX

Table 1: Sampling Procedure adopted for the Study

Markets	Number of Wholesalers	Number of Retailers
Ipata	24	24
Oja-oba	19	19
Oloje	7	7
Okolowo	5	5

Source: Field survey, 2012

Table 2: Socio-economic Profile of the Respondents

Variable	Wholesalers			Retailers		
	Frequency	Percentage	Mean	Frequency	Percentage	Mean
Gender						
Female	54	98.2		55	100	
Male	1	1.8		0	0	
Marital Status						
Single	2	3.6		6	10.9	
Married	42	76.4		43	78.2	
Widowed	2	3.6		1	1.8	
Divorced	9	16.4		5	9.1	
Total	55	100		55	100	
Age (years)			50.5			55
≤ 30	1	1.8		3	5.4	
31-40	4	7.2		11	20	
41-50	17	30.9		32	58.3	
51-60	31	56.3		9	16.4	
>60	2	3.6		0	0	
Total	55	100		55	100	
Educational Level						
No formal education	30	54.5		28	50.9	
Primary education	17	30.9		17	30.9	
Secondary education	3	5.5		5	9.10	
Quranic Education	5	9.1		5	9.10	
Total	55	100		55	100	
Marketing experience (years)			17.78			13.93
1 – 10	10	18.1		14	25.4	
11 – 20	23	41.8		38	69.2	
> 20	22	40.1		3	5.4	
Total	55	100		55	100	
Source of fund						
Personal savings	21	38.2		28	50.9	
Money lenders	6	10.9		6	10.9	
Relatives and friends	19			21	38.2	
Banks	2	3.6		0	0	
Cooperatives	7	12.7		0	0	
Total	55	100		55	100	
Cooperative membership of respondents						
Members	24	43.6		9	16.4	
Non members	31	56.4		46	83.6	

Source: Field Survey, 2012

Table 3: Marketing Margin and Gatherers' Share

Cost/Revenue Items	Wholesalers (Average cost ₦ /ton)	Retailers (Average cost ₦/ton)
Purchase price of African star apple (A)	47030	51,470
Marketing costs		
Variable cost		
Transportation cost	1790	960
Packaging material	260	120
Fixed cost		
Rent	1140	-
Sanitation fee	750	660
Security fee	250	150
Total marketing cost (B)	4190	1890
Total cost	51220	60,100
Selling price (C)	56810	58,210
Gross market margin (D) [D = C – A]	9780	6740
Marketing margin (Net marketing margin) [D – B]	5590	4850
Gross marketing margin as % of selling price	17.22	11.59
Gatherers' share	82.78	88.42
Marketing efficiency(%)	10.94	8.69

Source: Field Survey, 2012

Table 4: Barriers to Efficient Marketing of African Star Apple

*Constraint	Frequency	Percentage
Lack of credit	82	74.5
High cost of transportation	78	70.9
Lack of storage facility	67	60.9
Others	55	50.0

*Note: Multiple Response

Source: Field Survey, 2012

List of Figures

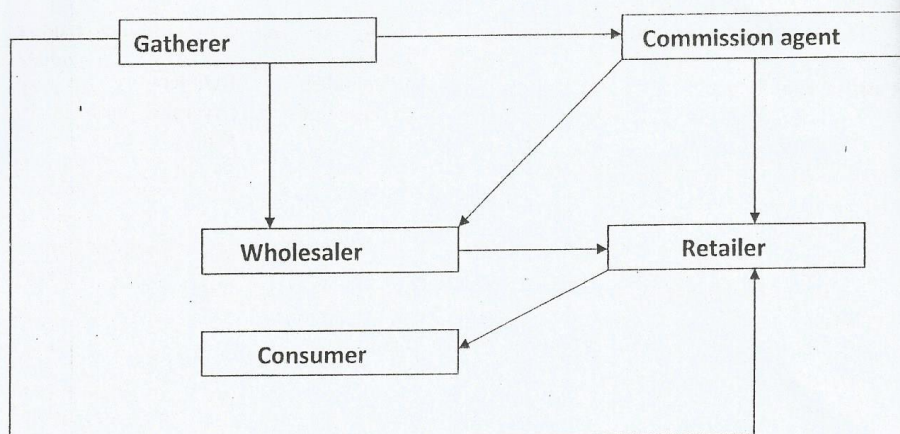


Fig. 1: Marketing Channels of African Star Apple in the Study Area