

**SOCIO-ECONOMIC IMPORTANCE OF *CHRYSOPHYLLUM ALBIDUM* G. DON. IN  
RAINFOREST AND DERIVED SAVANNA ECOSYSTEMS OF ONDO STATE,  
NIGERIA**

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**ABSTRACT:** *This study was carried out to determine the socio-economic importance of *Chrysophyllum albidum* in rainforest and derived savanna ecosystems of Ondo State and examines its level of domestication. From each ecological zone, a local government area (LGA) with good concentration of *C. albidum* trees was selected. The study covered a total of ten villages (i.e. five from each ecosystem). From each village, five farm households with *C. albidum* trees on their farms were selected. A structured questionnaire was administered on the head of each household. Results identified evidence of *C. albidum* trees domestication in the two ecosystems. *C. albidum* fruit is economically important in the two ecosystems and contributes to the socio-economic life of the people. Factors affecting the price of *C. albidum* fruits in the two ecosystems were fruit taste and fruit size. Thus, the demand will improve if sweeter and bigger sized fruits are produced through domestication programme.*

**Keywords:** *Chrysophyllum Albidum*, Socio-Economic Importance, Forest Food Trees, Domestication, Ecosystems, Nigeria

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## INTRODUCTION

In West African countries, forest food trees serve as alternative sources of food, especially during the hungry season (e.g. between November and April when food crops are planted) and thus contribute to food security and increase the diversity of foods necessary to reduce monotony in the diet of rural people. In addition, the edible parts (e.g. fruits and /or seeds) of these tree species could be processed into conventional products like jams, marmalade, alcohol, soaps, candles, jelly and chewing gums, table oil, margarine etc (Shiembo *et al.*, 1996; Adisa, 2002).

The edible products from these forest tree species are important for food security and have been noted to contain high level of vitamin C, minerals, sugar, proteins, etc, thus playing an important role in the nutritional balance of the people (FAO, 1989). Their barks, leaves, fruits, roots, seeds, etc could be used to cure a variety of sickness and diseases (FAO, 1998; Adewusi, 1997), thus contributing to the health care delivery. Also, they contribute significantly to rural poverty alleviation by providing employment and enhancing economic empowerment of rural dwellers

through the collection, processing and marketing of their products such as fruits, seeds, leaves, root, etc. One of the forest food tree species that has been noted to have high socio-economic importance is *Chrysophyllum albidum*.

*Chrysophyllum albidum* fruits, also called African star apple, are widely eaten in southern Nigeria, being especially popular with children and women. The species can be propagated from seeds and buds; though the latter is not easy. *C. albidum* belongs to the family sapotaceae. It is primarily a forest tree species that is widely distributed in West, Central and East Africa (Keay, 1989). The geographic distribution of the species includes: Nigeria, Ghana, Kenya, Sierra Leone, Sudan, Uganda, Niger Republic, Cameroon, Cote d'ivoire, Central African Republic, Chad and Democratic Republic of Congo (Bada, 1997; Onyekwelu and Stimm, 2011).

Despite their importance, *C. albidum* and other forest food tree species have been greatly neglected, especially with respect to their regeneration and improvement. The yield of current crop of trees is decreasing due to old age and the fact that they have been harvested for decades. Thus, if the current practice of allowing *C. albidum* to grow in the wild (i.e. natural regeneration) is allowed to continue, the probability of obtaining its much valued fruit on a sustained basis will be very low. Due to the lack of care and old age, a lot of the trees of the species have died or are in the process of doing so. In Nigeria, *C. albidum* is classified among the endangered tree species (FORMECU, 1999), with a high possibility of going into extinction in the near future except something is done to conserve the species or increase their population. Consequently, this study was carried out to determine the socio-economic importance and ascertain the level of domestication of *C. albidum* in rainforest and derived savanna ecosystems of Ondo State, Nigeria.

## METHODOLOGY

The study was conducted in tropical rainforest and derived savanna ecosystems of Ondo State, Nigeria. From each ecological zone, a local government area (LGA) with good concentration of *C. albidum* trees was selected. The selected LGAs were Akure South (rainforest) and Akoko South west (derived savanna). The study covered a total of ten villages (five from each ecosystem), which were selected during a reconnaissance survey to farms, home gardens and fallowed fields in each village, using selective sampling technique (i.e. based on accessibility of the tree). The selected villages were: Oba-Akoko, Aiyegunle-Akoko, Eti-Oro, Akowonjo and Aiyelanwa for derived savanna, while Iju, Ita-obgolu, Ilara-Mokin, Ero/Isarun and Igbara-Oke were selected from rainforest ecosystem.

A structured questionnaire was developed and used to collect information from villagers (those involved in the management and marketing of *C. albidum*) in order to determine the socio-economic importance of *C. albidum* in the study areas. The questionnaire was used to collect information on the annual yield (fruits) of the trees, the demand of the fruits, annual income from sale of the fruits, etc. The questionnaire was pre-tested before final administration to respondents. Five farm households with *C. albidum* trees on their farms were selected from each

selected village in both ecosystems and the questionnaires administered on the head of each household. Information from the questionnaire was coded to obtain quantitative value for analysis. The data were subsequently analyzed using descriptive statistics.

## RESULTS AND DISCUSSION

Domestication of indigenous fruit trees emerged as a farmer – driven, marked-led process and has become an important initiative in the tropics (Akinifesi *et al.*, 2006; Leakey *et al.*, 2005) due probably to their nutritional and socio-economic importance. The results obtained in this study show that people that have *C. albidum* on their farms are mostly males, which is to be expected since the questionnaire were administered on household heads. They are married and their age ranged between 41 and 50 years. This age range is active and will thus ensure active labour force for the domestication of the species.

The result (Fig 1) show that 32% and 44% of the respondents in derived savanna and rainforest ecosystems respectively that own *C. albidum* trees on their farms do not have a formal education. Thus, respondents with no formal education are higher in the rainforest ecosystem than in derived savanna ecosystem. This implies that the percentage of respondents with formal education is higher than those without formal education in derived savanna ecosystem while respondents with formal education are less than those without formal education in rainforest. The higher educational level of the people in derived savanna ecosystem may have contributed to higher domestication level of the species in this ecosystem. Educational level may also affect future domestication of the forest fruit tree species. This is because it is easier to create awareness among educated people than among the non-educated.

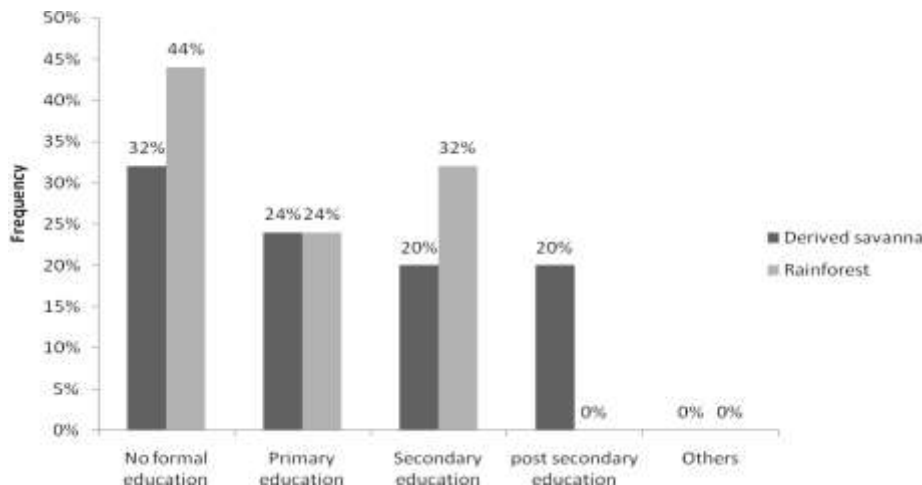


Figure 1: Educational Level of the Respondents

The results on Figure 2 show that the *C. albidum* trees in derived savanna ecosystem are between 21 and 40 years old while in the rainforest ecosystem, the age of most of the trees ranged between 31 years and over 40 years. This shows that most of the *C. albidum* trees in derived

savanna are younger than the *C. albidum* trees in rainforest which reveals that domestication activities in derived savanna is much more than in the rainforest ecosystem.

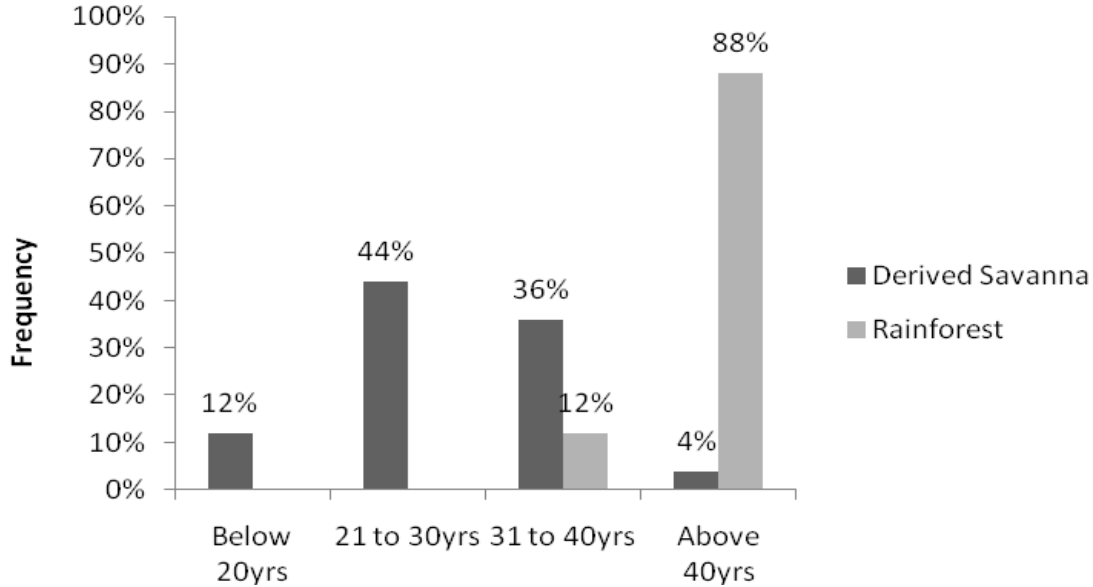


Figure 2: Age distribution of *Chrysophyllum albidum* trees

The results on Figure 3 show that in derived savanna ecosystem, most of *C. albidum* trees are located within farmlands and homegardens while 100% of the trees in the rainforest zone are located 100% within farmlands. Thus, no *C. albidum* tree was found in homegardens in the rainforest ecosystem. The trees within farmlands in rainforest ecosystem are over 40 years of age.

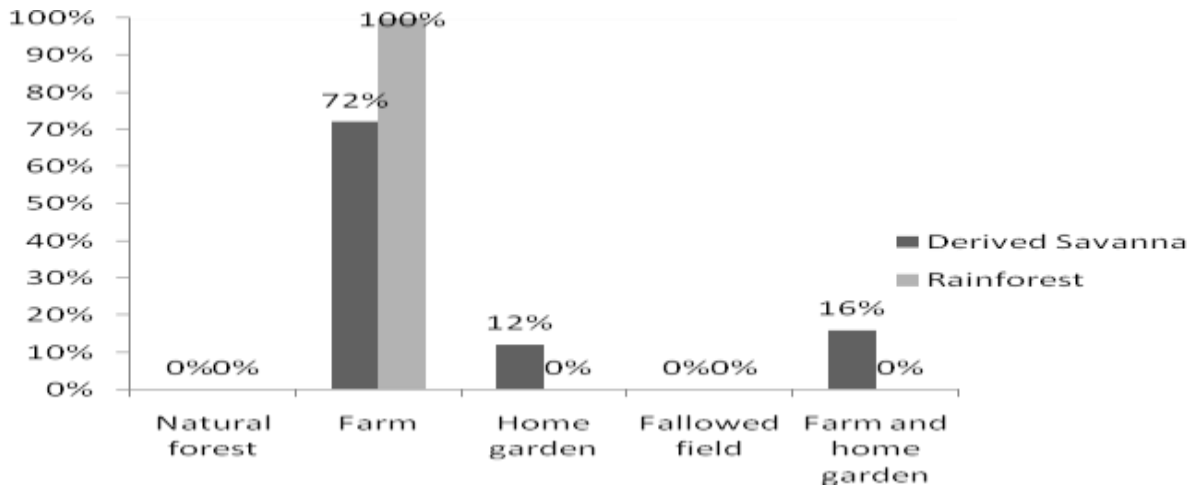


Figure 3: Locations of the *Chrysophyllum albidum* trees

Results revealed evidence of domestication activities for *C. albidum* trees in the two ecological zones investigated. There are indications of the participation of farmers in the domestication of *C. albidum* trees in the derived savanna ecosystem. For example, result (Figure 4) show that 48% of the respondents in the derived savanna ecosystem have planted *C. albidum*, which a sharp contrast to the situation in the rainforest ecosystem, where none of the respondent have participated in planting *C. albidum* trees. Dominant reason advanced by respondents for not planting *C. albidum* trees in the rainforest ecosystem is due to the belief that they are not supposed to plant the species. Some of the respondents in rainforest ecosystem opined that *C. albidum* grows by itself in the wild and does not need any form of domestication.

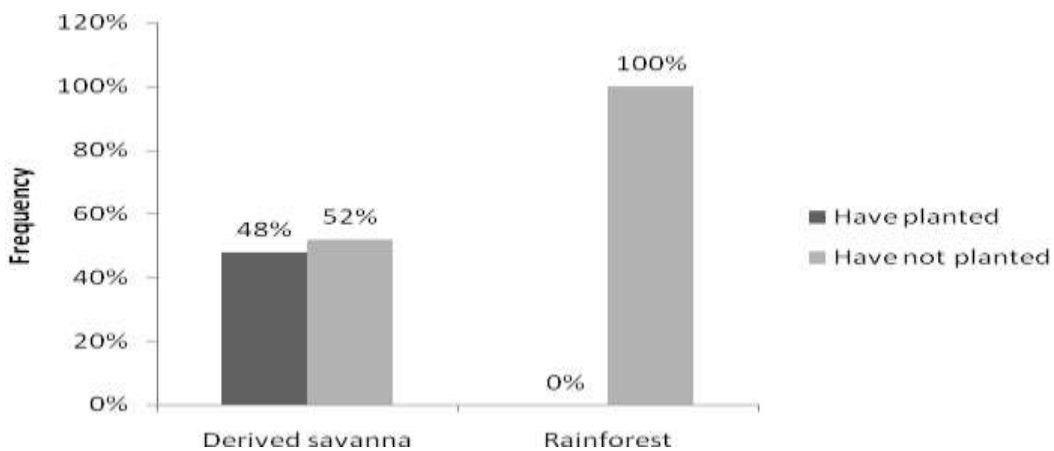


Figure 4: Participation of respondents in the domestication of *Chrysophyllum albidum* trees

There is a high demand for the fruits of *C. albidum* by people in derived savanna and rainforest ecosystems (Figure 5). This shows that the fruits are widely eaten by the people in both ecosystems. The high demand of the fruits of the species could also be attributed to other economic importance of *C. albidum* fruits in the study areas which includes: food, medicine, traditional use, cultural use (e.g. seed for counting), environmental use (e.g. wind break) and exudates for gum. According to Anazonwu (1981), the fruit pulp has been used on experimental basis for excellent jams, jellies with good appearance and flavour.

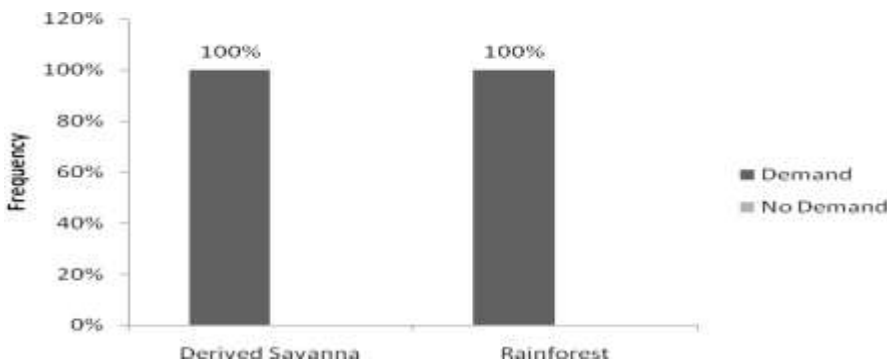


Figure 5: Demand for *Chrysophyllum albidum* Fruits

The result on table 1 shows the average annual income from *C. albidum* fruits sales in the two ecosystems. This shows that respondents in derived savanna and rainforest ecosystems make below ₦50,000.00 per annum.

Table 1: Annual Income from the Sales of *Chrysophyllum albidum* fruits

Amount (₦)	Derived savanna (%)	Rainforest (%)
Below 50,000	100	100
50,000 - 100,000	-	-
100,000 – 150,000	-	-
Over 200,000	-	-

This shows that *C. albidum* contribute financially to household income in both study ecosystem. This is in agreement with the findings of Ramadhani and Schmidt (2002) that in Zimbabwe, indigenous fruits contribute to household income, and that women and children are the major beneficiaries. Onyekwelu and Stimm (2011) also stated that the marketing of African star apple has the prospect of providing a considerable income generation opportunity for rural people. Given better fruit yield through tree selection programme and domestication, higher income will be obtained which will improve the living standard of rural people. Factors affecting the price of *Chrysophyllum albidum* fruits in the two ecosystems were found to be fruit taste and fruit size. Thus, any selection and management measure undertaken to improve fruit taste and increase fruit size will attract better price and inevitable higher income for the rural people.

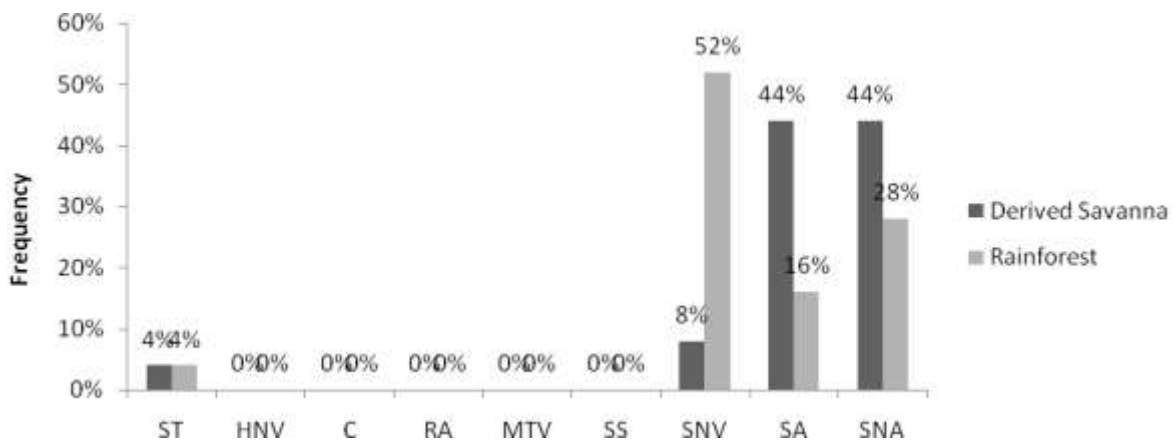


Figure 6: Reasons for consuming of *Chrysophyllum albidum* fruits

- ST: Sweet taste
- HNV: High nutritive value
- C: It's cheap
- RA: Relatively available

MTV: Medicinal and traditional value  
 SS: Sweetness and seasonal  
 SNV: Sweetness and nutritive value  
 SA: Sweetness and availability  
 SNA: Sweetness, nutritive and readily available

The result (Figure 6) reveals that *C. albidum* fruits are mainly consumed in the derived savanna because of its sweetness, nutritive value and availability while it is majorly consumed in the rainforest zone because of its sweetness and nutritive value. The fruit serves as a cheap source of protein, minerals, oils and vitamin C., thus increased fruit production would significantly improve the nutritional status of the people (Nwadinigwe, 1982). In the derived savanna ecosystem, the current fruit yield of the species meets the demand of the people. However, in the in the rainforest ecosystem, current fruit production of the species meets only about 28% of the demand of the people (Figure 7). There are fewer *C. albidum* trees in the rainforest zone than in the savanna ecosystem, the yield of the few trees in the rainforest ecosystem was not sufficient to meet current demand. The lower than demand fruit production of *C. albidum* in the rainforest ecosystem might be due to low or lack of domestication activity of the species in this ecosystem on the one hand or high demand of its fruits on the other. Wild harvesting and over extraction have led to market expansion and supply shortages in many cases (Simons and Leakey, 2004).

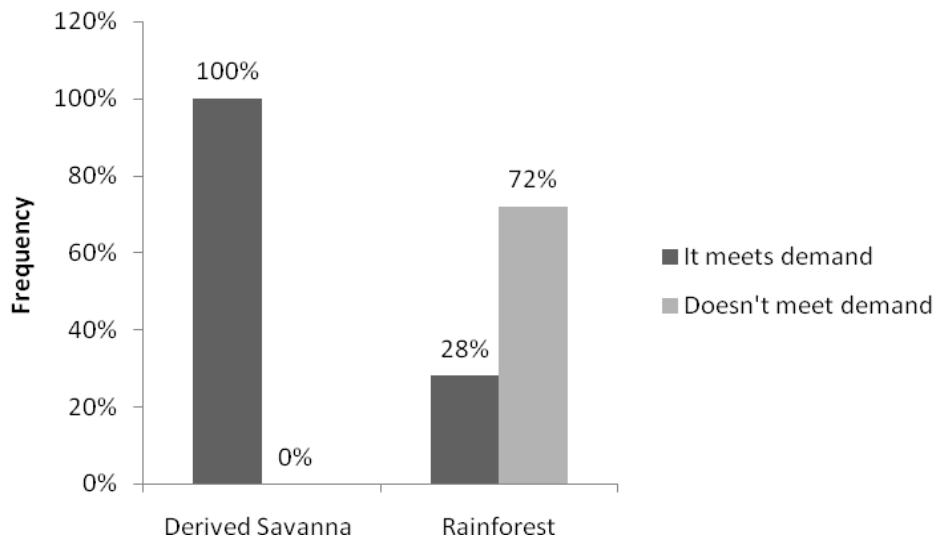


Figure 7: Ability of current *Chrysophyllum albidum* fruit yield to meet demand

## CONCLUSION AND RECOMMENDATION

*Chrysophyllum albidum* fruit is economically important in the two ecosystems and thus contributes immensely to the socio-economic life of the people through the sale of the fruits. . Currently, there is high demand for the fruits. However, the demand will improve if sweeter and

bigger sized fruits are produced through domestication programme. Consequently, there is need for domestication of *C. albidum* in the study area.

The study identified evidence of *Chrysophyllum albidum* domestication in derived savanna and rainforest ecosystems. However, there is higher level of domestication for the species in the derived savanna ecosystem than in the rainforest ecosystem. Domestication programme should be established for *C. albidum* as a companion fruit for perennial crops in Agroforestry system which could have significant effects on food security and income generation by small scale farmers in Nigeria.

Since there is high demand for *C. albidum* fruit by rural and urban people, government should assist in the provision of incentives for the farmers to plant *C. albidum* trees as this would increase carbon sequestration which will mitigate global warming and avoid dangerous climate change and would also help in reducing rural poverty.

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