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Original Article

Ethnobotany and Conservation of Indigenous Fruit Tree Species in Akoko Division of Ondo State, Nigeria

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Abstract

A rapid appraisal method involving direct field observation and interviews was used to identify indigenous fruit trees species (IFTs) in Akoko division of Ondo State, Nigeria. 10 respondents were purposively selected from five rural communities in each of the four local government areas of the division. These respondents have maintained domicile in their respective community for at least 10 years. The respondents were interviewed with the aid of semi-structured questionnaire matrix. The interviews were focused, conversional and two-way in communication. The IFTs were identified; the respondents' indigenous knowledge on the IFTs and their ethnobotanical values were defined. Also, group interviews were conducted, during revisits to two of the selected communities in each of the Local Governments Areas of the study area. Key informants were identified in each local government area and interviewed on the identified IFTs. A total of 14 IFTs, belonging to 12 families were identified. Only one of the IFTs was being cultivated though wildlings of the IFTs are still being preserved in the study area. The constraints to their cultivations were established and benign strategies that could enhance their conservation were proposed.

INTRODUCTION

Indigenous fruit trees (IFTs) are fruit trees that are planted or originated from the local community. These fruit trees can contribute to cash economy of small-scale farmers (Okafor 1988, Akinnifesi *et al*., 2006). Quite often, in rural countryside of many developing nations, they are the only fruits consumed as people cannot afford exotic fruits such as apple, grapes and pomegranate (Ajayi *et. al*., 2012).These fruit trees are usually used medicinally to treat ailments like fever and malaria. They are also good source of antioxidant compounds (Odukoya *et al*., 2007). Antioxidants obtained from IFTs have become synonymous with good health in that they destroy free radicals thereby fighting cancer, heart disease, stroke and other immune compromising diseases. They are also good source of animal feed concentrates. With increased climatic instability causing frequent agricultural crop failures, the role of IFTs in providing nutritional supplements to mankind is gaining recognition (Maghembe 1995), as they stand in the gap by providing food and income to rural households (Eriksen and

Mutimba 1998, Muok *et al.*2001, Akinnifesi *et al.*, 2008). They provide dietary supplement and are often sold in local markets (Arum, 1989).

According to Cambell (1987), IFTs are not normally included in agricultural policies and have been neglected by research and extension programmes in many developing countries. They have faced a great danger in the recent past due to high population growth which exerted high pressure on forest resources (Ondachi, 1999). Thus reliance has been skewed to wild IFTs without putting in any effort to propagate them. This, coupled with the lack of *ex situ* conservation strategies, has led to drastic reduction in their numbers in the natural forests (Ondachi, 1999). The cultivation of IFTs on-farm therefore, not only has the potential of improving food security but also conserve them on-farm (Brownrigg, 1985).

Consequent on the above, the study being reported here aimed at identifying the IFTs in the study area, assess farmers' attitudes toward their cultivation and document their indigenous knowledge on the species.

MATERIALS AND METHODS

The Study Area

The study was conducted in Akoko division of Ondo State, Nigeria. The state is characterised by a mixture of lowland forest and savannah vegetation with an annual rainfall of 800 to1500mm and a mean temperature of 28^{O}c to 35^{O}c. The Akoko division covers four local government areas situated in the Northern senatorial zone of Ondo State, Nigeria. These are Akoko North West (ANW), Akoko North East (ANE), Akoko South West (ASW) and Akoko South East (ASE) local government areas (LGAs).

Methods

Five rural communities, that were still far from urban influence, were selected from each LGA. In each community, 10 farmers were selected from each LGA. These respondents were those that have maintained domicile in the LGA for at least 10 years. They were interviewed with the aid of semi-structured questionnaire matrix. The interviews were focused, conversional and two way communication.

The IFTs in the study area were identified; respondents' attitudes to their cultivation and their indigenous knowledge on the IFTs were documented. Sightseeing exercises were carried out to physical confirm the existence of the identified species in each LGA.

Also in each LGA, 2 of the communities where individual sampling were carried out were chosen randomly. These communities were revisited and group interviews were conducted in them. A total of three groups, each of which contained at least 5 individuals, were interviewed in order to determine group consensus on the response provided during the individual interviews. Key informants, consisting of forest and agriculture development officials, were also interviewed.

RESULTS

Table 1 shows the socio-economic classification of respondents in the study area. Most of the respondents were male (80%), adults (70%), illiterates (70%) and were adherents of the two religions, Muslim (30%) and Christian (40%). Field observation revealed that all respondents were familiar with ITFs. A total of 14 ITFs belonging to 12 families were identified. The families Annonaceae and Sapotaceae possessed two species each while other families possessed a species each (Table 2).

Table 1: Socio-Economic classification of respondents in Akoko division, Ondo State, Nigeria

Feature	Description	ANE	ANW	ASW	ASE	Average
Sex	Male	80	70	90	100	85
	Female	20	30	10	0	15
Age	20 – 65	70	60	50	80	65
	> 65	30	40	50	20	35
Religion	Christian	40	30	40	50	40
	Muslim	30	50	40	50	43
	Others	30	20	20	0	18
Literacy status	Literate	30	20	30	20	25
	Illiterate	70	80	70	80	75

Table 2: Identified IFTs in Akoko division of Ondo State, Nigeria.

S/N	Scientific Name	Family Name	Vernacular Name
	Adansonia digitata L	Bombacaceae	Ose
	Annona senegalensis Pers	Annonaceae	Abo
	Artocarpus heterophyllus Lam	Moraceae	Berefutu
	Blighia sapida K.D Koenig	Sapindaceae	Ishin
	Borassus aethiopum Mart	Arecaceae	Agbon-Eye
	Chrysophyllum albidum G.Don	Sapotaceae	Agbalumo
	Dacryodes edulis (G. Don) H. J. Lam	Burseraceae	Elemi
	Dialium guineense Willd.	Caesalpiniaceae	Awin
	Irvingia gabonensis (Aubry. Lecomte ex o'Ronke) Baill.	Irvingiaceae	Oro
	Monodora myristica (Gaertin.) Dunal	Annonaceae	Ariwo
	Parkia biglobosa (Jacq.) R. Br. Ex G. Don	Mimosaceae	Iru
	Spondia mombin L.	Anacardiaceae	Iyeye
	Vitellaria paradoxa G.F. Gaetn.	Sapotaceae	Ori
	Vitex doniana Sweet	Verbenaceae	Oori nla

The results obtained revealed that the respondents were quite familiar with the ethnobotanical importance of the identified IFTs. Table 3 revealed that these IFTs have nutritional, medicinal and mechanical properties as planks and construction materials. Table 4 shows the pattern of existence of the identified IFTs in the LGAs of the study area. While *C. albidum, B. sapida* and *S. mombin* were sighted in 3 of the 4 LGAs, *A. senegalensis, A. heteropyllum, B. aethiopum, I. gabonensis, V. paradoxa* and *V. doniana* were sighted in 2 LGAs while *A. digitata, D. guineense, D. edulis, M. myristica* and *P. biglobosa* were sighted in only one LGAs.

The index of similarity in the identification of IFTs among the respondents in the different LGAs of the study area (Table 5) revealed that the highest similarity index of 63% was obtained in ANW-ASE and the least values (40%) were obtained in ANE-ASE and ANW-ASW. Field study revealed that most of the existing IFTs in the study area were products of wildling preservation.

Table 3: Ethnobotanical importance of the identified IFTs in Akoko division of Ondo State Nigeria

S/n	Species	Values (Both medicinal and otherwise)
1	*A, digitata*	1. Medicinal: use for treating fever 2. Good source of Vitamin C
2	*A. senegalensis*	1. Food: use to garnish meal
3	*A. heteropyllum*	1. Fruit serve as food 2. Seed: eat as snack 3. Use for furniture
4	*B. sapida*	1. Medicinal for curing stroke, fever and dizziness
5	*B. aethiopum*	1. Source of planks for roofing 2. Fruits are edible 3. Fibre can be obtained from its leaves
6	*C. albidium*	1. Medicinal: use for curing heart disease, tooth ache, constipation and diabetes
7	*D. edulis*	Medicinal: use for curing ringworm and for treatment of wounds
8	*D. guineense*	Medicinal: its bark and leaves have used for several diseases.
9	*I. gabonensis*	1. Fruits are eating by humans, 2. The pulp is used to prepare black dye 3. Seeds are used in soup and stew
10	*M. myristica*	1. Seeds are used as spices, 2. Medicinal: used for curing fever, headaches and also as stimulants
11	*P. biglobosa*	1. Seeds are used in soup and stew also good for proper eye sight. 2. The bark is used in treating wounds and burns 3. Leaves and pods are antidiarrheal agent.
12	*S. mombin*	1. Fruits eaten as food, 2. Use for fence and poles
13	*V. peradoxa*	1. Use for cosmetics as emollient 2. Food: use as a major source of dietary fat
14	*V. doniana*	1. Used as poles 2. The bark is used as dye 3. Fruits taken as food

Table 4: Pattern of existence of the identified IFTs in Akoko division of Ondo State, Nigeria

S/n	Species	No of LGAs where sighted	LGAs where sighted
	C. albidum	3	ANE, ANW, ASE
	B. sapida	3	ANE, ANW, ASW
	S. mombin	3	ANE, ASW, ASE
	A. senegalensis	2	ANW, ASE
	A. heterophyllus	2	ASW, ASE
	B. aethiopum	2	ANW, ASE
	I. gabonensis	2	ANW, ASE
	V. peradoxa	2	ANW, ASW
	V. doniana	2	ASW, ASE
	D. guineense	1	ASW
	A. digitata	1	ASW
	P. biglobosa	1	ANE
	M. myristica	1	ANE
	D. edulis	1	ASE

Table 5: Index of similarities in the identification of IFTs among respondents in the different LGAs of Akoko division of Ondo State, Nigeria

LGAs	IS (%)
ANW-ASE	63%
ASW-ASE	47%
ANE-ANW	46%
ANE-ASW	43%
ANE-ASE	40%
ANW-ASW	40%

An array of disincentives to the cultivation of IFTs was identified (Table 6). Bush burning ranked highest among these factors (93%). Farmers viewed the time taken before obtaining returns on investment in IFTs as another major constraint. The existing land tenure system in the study area thwarts interest from practise. Even in situations where respondents wish to cultivate IFTs, the tenure rights militates against such interest as tenants on land were prevented from cultivating tree species. Preference for cultivation was skewed towards annual crops that bring in economic returns on short term basis hence financial supports were required to support long time investments in IFTs. Similarly, the long term diversion of interests from IFTs has led to a gross lack of silvicutural knowledge on the species.

Table 6: Disincentives to planting of IFTs in Akoko division of Ondo State, Nigeria

Rank	Disincentive	Proportion (%) percentage of respondents
1	Bush burning	93
2	Time taken to fruit	92
3	Land tenure system	91
4	Lack of financial support	91
5	Lack of silvicultural knowledge	90
	Lack of planting materials	90

DISCUSSION

The study revealed that though diverse respondents in terms of the socio-economy were used in this study yet familiarities abound between the respondents and the IFTs found in the study area. Previous contentions by CTA (2007), Fukushima *et. al.* (2010) and Bigirimana *et. al.* (2016) revealed that the long period of domiciliation of these species have evolved an excellent familiarity between the indigenes and the species. A study conducted by Kayode and Bamigboye (2016) in a neighbouring Yoruba-speaking state to the study area revealed that the socio-economy classification does not constituted a prerequisite to the consciousness on the ethno-botanical knowledge of the respondents.
Diverse IFTs were obtained in the study area. Study by Cemansky (2015) opined that Africa is blessed with a wide array of IFTs. The respondents were quite familiar with the ethno-botanical importance of the identified IFTs. Studies conducted in several parts of Africa have always shown that the indigenous groups in Africa were quite familiar with the ethno-botanical values of flora species in their environment. For examples, Cheikhyoussef and Embashu (2013) asserted that the indigenous communities in Namibia possessed a rich indigenous knowledge of their flora species. Also, Kayode *et. al.* (2017) made similar assertion.

The vegetation of most part of the study area is characterised by derived savannah vegetation (DCSPM 2014). Field observation and information derived from the respondents revealed that burning is now carried out indiscriminately in this vegetation. Burning has deleterious effects on the IFTs. During burning, wildlings of these species are burnt off while the survivals of older individuals are threatened. Recent assertion by Lincoln (2018) revealed that burning greatly alters the nutrient cycles as the high temperature burning can volatilize some nutrients and allow those nutrients to

leave the soil. Burning also affects the microbial communities in the soil (Kayode 2006).The regular disturbance of the vegetation affect the growth of the species and thus lengthened the time taken to fruits. Similarly, the land tenure arrangement in the study area hinders tree cultivation as farmers considered the elimination of trees as optimum means of land utilization. Previous study by Snelder *et. al.* (2007) observed that the adoption of fruit trees in farming systems has occurred at a relatively low pace. Similarly Fortmann (1985) asserted that the extent to which the farmer has the security of tenure is a prerequisite to invest in trees. Thus preference for cultivation was skewed towards annual crops that bring in economic returns on short term.

The present study has also revealed that lacks of financial support, silvicultural knowledge and seedlings of the IFTs hindered their cultivation. This observation tends to lend support to the previous assertion of German *et.al.* (2009) that a myriad of factors are responsible for the low levels of IFTs cultivation in the study locations. Ouya (2013) submitted that the IFTs were not easily understood, thus Chechina and Hamann (2015) asserted that the IFTSs are not an easily renewable resource. It is therefore expedient that there is an urgent need to gather high-quality data on a wider spectrum of components of the IFTs fruits in sub-Saharan Africa as their population and diversity is said to be dwindling in many parts of the continent, and researchers expect that this loss will probably be accelerated in the near future as a result of climate change (Ouya 2013). The IFTSs require to be conserved as most of them are now endangered. Okafor (1976–1977) suggested that interdisciplinary collaboration is required to ensure their continuous existence. Public enlightenment is required on this. The establishment of relevant cottage industries will encourage investment in IFTs. This, according to Okafor (1976–1977), will enhance the utilization and contribution of this presently underexploited food source.

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