INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

FACTORS INFLUENCING THE UNDER-CULTIVATION OF LOCALLY AVAILABLE TREES IN OSUN STATE, NIGERIA

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ABSTRACT
The contribution of some under-cultivated locally available trees (LAT) such as Blighia sapinda, Garcinia cola and Treculia to food, drug and emancipation of poor rural farmers is of great importance. Several factors have been observed to contribute to the gradual disappearance of these economic plants making them to become threatened species. This study was carried out in three ecological zones of Osun State to determine the level and factors influencing the cultivation of the trees. 360 respondents were selected using multi-stage sampling techniques. Validated and pre-tested structured interview schedule was used to source the information. Data collected were analysed using descriptive and inferential statistics. The results showed that 44.2 percent of the respondents were currently at low level of cultivation of LAT. Eleven groups of crucial socio-cultural factors that had strong association with the level of cultivation of LAT were isolated. These included farmers' motivator (λ = 5.798), environmental friendliness (λ = 3.094), farmers' interaction (λ = 2.005), farmers' psychology (λ = 1.837), farmers' socio-economic attributes (λ = 1.645), farmers' exposure (λ = 1.487), social participation (λ = 1.278) and institutional influence (λ = 1.250). In conclusion, the identified LAT were found to be under-cultivated in the study area.

KEY WORDS: Factors, under-cultivated, locally, available tress.

INTRODUCTION

In order to preserve the wide diversity of the locally available trees in Nigeria, it will be necessary to take positive steps to remove those factors that are threatening their survival. Some of these were opined by Okafor (1993) as follows:

(a) Detailed survey should be carried out to determine the status of the different tree species concerning uses, distribution and the danger facing each of them, in the country's eco-systems. In this way, the crops can be categorized in order of priority for action that will ensure their survival and improvement. Such plant census should be undertaken at a time when the crops can be fully identified. Towards this end, it will be necessary to know the time of the year when the crop would be flowering and fruiting to allow for adequate identification.

(b) A few institutions of higher learning and research institutes have in the past undertaken germplasm collection and maintenance of tree genetic materials. It will be necessary to determine the state of the current collections in the institutions with a view to preventing duplication and occurrence of past errors made by such institution towards proper maintenance of the genetic materials.

(c) Germplasm collection of the locally available tree should be undertaken and maintained in suitable centers where they can regularly be multiplied and utilized for genetic improvement and breeding of new types. The conservation can be in-situ whereby the crops are maintained in their natural environments or ex-situ where the collection will be maintained outside the crops environments in specially prepared structures, for example cold rooms, refrigerators and collection blocks.

(d) It is important that immediate steps be taken to encourage in-depth studies on the mode of propagation of locally available crops in order to provide information that will encourage large-scale propagation and production of the crops.

(e) There are many government-reserved forests in the country. The regulations preventing the exploitation of crops in these zones are often abused and crops, which ought not to have been harvested from the zones, are regularly removed for various uses. Adequate steps should be taken to enforce these laws for the maintenance of the crop species.

(f) There is an urgent need for the citizens to be educated on the importance of locally available trees and spices as compared to the exotic ones. Such education will be required at all levels and it should start from the primary schools. The study on the advantages of plant conservation should be included in the curriculum of the higher institutions in the country. Deliberate effort should be made to popularize the locally available trees outside the localities where they are not commonly used. (Denton and Ojeifo, 1993).

(g) A secure future for locally available tree crop varieties depends on their continued use. This depends upon the recognition and affirmation of the crops nutritional, economic and cultural benefits. One essential component of revitalization is the promotion of their consumption and the development of a strategy that would support their cultivation. Education campaigns

strategy that will make urban and rural people aware of the importance of these locally available food products and the need to develop them (Denton and Ojeifo, 1993).

Changes are also necessary at policy level. The modification of national food policy in order to be more supportive of locally available crops is important. If government agencies guaranteed minimum prices to producers and regular price – controlled supplies to consumers, these would have a better market chance. In addition, international and nationally administered food aid programmes should base their activities on local food products and not on poor quality leftovers from developed countries. This would have a strengthening rather than a destabilizing effect on local production (Padulosi and Hoeschle–Zeledon, 2004).

Locally available crops have been declining in importance ever since the time of British colonization. Over the last 200 years, foreign crops have been introduced and plants that have been the staple food of the poor for centuries have suffered a serious decline in social status. Traditional food ingredients of high quality have been, and continue to be, replaced by low–cost products. At the same time, rural communities are marginalized and pressurized to grow other crops or so – called "improved" varieties. These negative impacts on the cultivation and consumption of locally available tree crops combine with socio–economic pressures such as urban migration; loss of local knowledge and the absence of a steady market have further weakened their position (Padulosi and Hoeschle–Zeledon, 2004).

Modern civilization has further pushed Nigeria into depending on imported food materials to the detriment of local food resources. In most cases, most food crops have been under-cultivated or totally forgotten. Many locally available tree species were disregarded during the colonial era when consumer demands for European food types were very high. This has largely determined the pattern of locally available food crops cultivation and direction of research priorities of tropical agriculture. After independence, this pattern did not change. In addition, indigenous scientists trained in temperate countries became more or less experts in temperate agriculture with little knowledge of tropical crops. The food preference was so influence by the European food to the extent that there is decline in demand for locally available food crops (Padulosi and Hoeschle–Zeledon, 2004).

Constraints to cultivation of the locally available tree crops

Okafor (1975) identified the following constraints, which militate against the cultivation of the locally available tree crops:

a. the difficulty of collecting from the wild;
b. the long gestation periods before fruiting;
c. the rapid and widespread disappearance of natural forests containing these wild species;
d. lack of adequate knowledge of methods of propagation for most wild plants;
e. lack of knowledge on useful plants including range of uses;
f. lack of information on the resources base, and on sustained yield arising from lack of up-to-date resource inventory;
g. inefficient use and waste of materials due to lack of appropriate technology and knowledge for processing, preservation and storage;
h. difficulty of replacement or regeneration of certain plant resources, once harvested or exploited; and,
i. neglect of local food plants in favour of introduced species.

Apart from these constraints, annual forest fires create incalculable losses especially of those species with low degree of fire tolerance (NARESCON, 1991). The rate of forest destruction in Nigeria has been great even as far back as three decades ago. Ola-Adams and Iyamabo (1977) estimated that about 26,000 hectares were destroyed annually, in the forest zone alone, during conversion of natural forests to artificial plantations and other forms of land development. Recent estimates are that over 90 percent of the natural vegetation has already been cleared in Nigeria (WWF, 1989) and up to 350,000 hectares of forest and natural vegetation is still being lost annually, over the whole country (NEST, 1991).

According to Okafor (1993), the following factors have contributed to such an alarming rate of forest loss:

a. intensification of cultivation, employing extensive shifting cultivation system, usually described as slash-and-burn agriculture;
b. uncontrolled burning of natural vegetation;
c. lumbering and over exploitation of forest resources, involving extensive damage to vegetation and modification of habitats;
d. poorly planned and poorly implemented urban, industrial and infrastructure development often destroying food trees in villages;
e. ravages of civil disturbances and boundary disputes, among neghbouring/states and local government area; and,
f. rapid population growth averaging 3.1 percent annually, resulting in stretching the natural resources beyond their expected carrying capacities (Okafor, 1993).

Another contributory factor to the problem of locally-available tree crops in Nigeria is the issue of inadequate policy guidelines and lack of practicable conservation measures, regarding the research, development and utilization of locally available species. Thus, at present greater attention is paid to the development of exotic crops to the neglect of the locally available ones. This has led to under-utilization of the potential species.

Food and Agriculture Organsation (FAO,1998) has identified a singular cause of genetic erosion in crops as replacement of local varieties by improved or exotic varieties and species. As a result of the ever-increasing human population, greater competition for natural resources and some interplay of natural factors, some other reasons can be advanced as constraint of locally-available plant. These include:

a. Erosion of culture and breakdown of traditional system of plant resources management resulting in the loss of locally available varieties.
b. The world market has been tailored to focus on only a few crops to the extent that industrial growth globally is dependent on continued supply of those few elite crops at the expense of the locally available varieties.

c. Deforestation, Stalinization, desert encroachment and erosion lead to land degradation with concomitant loss of plant genetic resources that the land supports.

Natural disasters, including drought, floods, pests, and diseases, which have led to widespread losses of plant diversity from farmers field and natural habits (Kiambi and Atta-Krah, 2003).

d. Climate change- this poses a threat to diversity, as many plants are unable to cope or adapt to changing temperatures and moisture gradients caused by global warming and the associated climate change (Kiambi and Atta-Krah, 2003).

e. Political instability, civil unrest and insurgence that led to loss of genetic resources in fields as farmers flee from war torn areas and *ex-situ* conservation facilities are destroyed.

f. The research mandates of most institutions focus on the routinely cultivated at the expenses of the locally available species. This has resulted in the continued and ever-increasing relevance that the routinely cultivated species are enjoying.

g. Nigeria government is not making adequate investment in the area of conservation of their locally available plant heritage.

Locally available edible food and fruit tree species are being depleted owing to the continue disappearance of the Nigeria high forest through over-exploitation, urban and agricultural clearance for other developments. This resulted in the natural gene erosion of the natural gene pool of the important locally available food and fruit tree species (Adelaja and Ojeifo, 1993).

The factors influencing the under-cultivation of these crops have not been empirically investigated, most especially, the socio-cultural factors, which could serve as basis for understanding the societal values, belief, norms and economic perception of these locally-available trees by farmers. It is against this background that this study was designed to provide answers to the following research questions:

i. To what extent have the farmers cultivated the locally available trees crops in Osun state?

ii. What problem could be associated with the cultivation level of these crops?

The study therefore focused on the following objectives: to

1. investigate the personal and socio-economic characteristics of the farmers involved in the cultivation of the selected locally available trees and spices;
2. determine the level of cultivation of locally available trees; and
3. Identify the problems associated with their cultivation.

Statement of hypothesis

There is no significant relationship between farmers' level of cultivation of the selected locally-available trees and their personal and socio-economic characteristics.

METHODOLOGY

A multi-stage sampling procedure was used to select the local farmers for the data collection. *The* three ecological zones of Osun State Agricultural Development Programme (OSSADEP) were used. In the first stage, three LGAs were purposively selected from each ecological zone based on population, rurality and agricultural inclination, making a total of nine LGAs. In the second stage, random sampling method was used to select four communities with relatively higher population of locally available trees from each LGA, making a total of thirty-six communities. In the third stage, ten respondents consisting of both male and female were selected for interview using snowball technique of sampling in each of the community. A total of three hundred and sixty respondents were interviewed. The data collected was subjected to both descriptive and inferential statistical analysis.

RESULT

Personal characteristics of the respondents

Table 1 show that some (46.9%) of the respondents were old adults with an age range of 46 to 60 years and 43.3 percent were aged farmers of 61 years and above. However, few (9.4%) were young adults of age between 31 and 45 years and very few (0.3%) were youth of less than 30 years old. The youngest age of the farmers was 23 years while the oldest was 85 years. The mean age of the respondents was 58.5 with standard deviation of 9.7. The result shows that most (90.2%) of the respondents were old adults and aged farmers while few (9.7%) were youths and young adults.

In addition, the data indicated that most of the respondents (86.7%) were male while very few (13.3%) were female. This indicates that majority of the locally available trees farmers were men and women in their old ages but they are still productive and contribute meaningfully to socio-economic well being of their community and the society at large. Having not many young farmers actively involved in the cultivation of locally available trees and spices could be dangerous for the future sustainability of these crops. This is an indication that most people no longer encourage their children to take up farming as major means of livelihood.

The result shows that men participated more in the cultivation of locally available crops than women. This may be as a result of land tenure system that allows men to inherit land from their parent than the women folk. This finding agreed with Eade and Williams (1995) that land titled programmes in Nigeria tend to ignore women's traditional right to land and thus restrict or remove their access to land by registering it in the name of men. This increases the vulnerability of women farmers to inadequate land to cultivate locally available crops and further establishes the fact that in the Yoruba culture, men are the breadwinners and heads of households. The implication of this is that very few women had the opportunity to own agricultural land in which they can plant any permanent crops like locally available trees.

Furthermore, 57.7 percent of the respondents were Christians, 40.8 percent Muslims, 0.8 percent Atheist and 0.3 percent practiced African traditional religions. The finding is an indication that Christianity and Islam were the most common religions practiced in the study area with Christians constituting the majority.

TABLE 1: Frequency distribution of the respondents' selected personal and demographic characteristics by zone N = 360.

Variables	Forest (N = 120)		Derived savannah (N = 120)		Savannah (N = 120)		Total (N = 360)	
	Fre.	%	Fre.	%	Fre.	%	Fre.	%
1. Age (years)								
Less than 30	0	0.0	0	0.0	1	0.8	1	0.3
30 – 45	10	8.3	12	10.0	12	10.0	34	9.4
46 – 60	56	46.7	55	45.8	58	48.3	169	46.9
61 and above	54	45.0	53	44.2	49	40.8	156	43.3
Mean	59.1		59.0		57.3		58.5	
Standard deviation	9.6		8.8		10.5		9.7	
2. Sex								
Male	100	88.3	105	87.5	107	89.2	312	86.7
Female	20	16.7	15	12.5	13	10.8	48	13.3
3. Religious affiliation								
Christianity	75	62.5	69	57.5	65	54.2	209	57.7
Islam	45	37.5	48	40.0	54	45.0	147	40.8
African traditional believers	0	0.0	0	0.0	1	0.8	1	0.3
Atheist	0	0.0	3	2.5	0	0.0	3	0.8

Source: Field survey, 2011

Farmers' level of cultivation of the selected locally available trees

To determine the level of cultivation of the locally available trees the following variables were analysed: the respondents' inheritance and planting of the crops, average land area (in hectares) cultivated of each crop, comparison of the land area cultivated before 2003 and between 2003 and 2008 of each crop and the level of the cultivation. The comparison of mean land area cultivated before 2003 (1.37 hectares) and between 2003 and 2008 (0.77 hectares) showed significant decrease in cultivation.

In effect, the study indicated that about twice the number of those who planted the crops inherited them from their parents. The zonal analysis followed the same trend with that of the state, thus inferred that in the state the number of people who inherited were more than those who planted them. However, *V. paradoxa* was more common in the savannah zone, *D. guineense* in forest zone while *C. arabica, R. hookeeri, S. dulcificum, A. altilis* and *A. communis* were more common in both the rain and savannah zones. This implies that most of the locally available trees are old and their production may be low, hence given little return on inputs to the respondents. The reduction in number of the respondents planting these selected locally available trees might be a signal for their extinction.

The general belief of the respondents was that locally available trees take longer period before fruiting compared to improved ones. Planting it entails some dangers and it does not yield enough income for the growers. In addition, the study shows that the following locally available trees: *G. cola (Orogbo), S. dulcificum (Agbayum), I. gaboneensis var. dulcis (*Oro*), T. conophora (Awusa), I. gaboneensis var exelsa (Apon), A. altlis (Gbere elepa), M. oleifera (Ewe-igbale), C. nucifera (Agbon), V. paradoxa (Emi), D. edulis (Pia) and T. africana (Afon)* were planted as mixed crops. However, few crops including *C. arabica (Kofi) and H. brasilensis (Roba)* were planted as mono crops *while B. sapida (Isin)* were planted around houses as shade or windbreakers.

Farmers' inheritance and planting of the locally available trees

Data in Table 2 show that some of the respondents planted these crops: *T. conophora* (*Awusa*) (33.6%), *C. nucifera* (*Agbon)* (35.3%), *I. gabonensis var. excelsa* (*Apon*) (35.6%), *C. acuminata* (*Obi abata)* (40.8%), *G. cola* (*Orogbo*) (37.5%), *A. communis* (*Gbere*) (37.5%), *C. nitida* (*Obi Gbanja*) (32%) and *M. oleifera* (*Ewe-igbale*) and *C. albidum* (*agbalumo*) (32.2%). Few (17.5%) of the respondents planted *I. gabonensis var. dulcis* (Oro), *C. arabica* (*Kofi)* (18.9%), *P. biglobosa* (28.9%), *D. edulis* (*Pia)* (18.9%), *T. africana* (*Afon)* (10.8%) and *A. altilis* (*Gbere elepa*) (12.8%). Very few (5.8%) of the respondents planted *B. sapida* (*Isin*), *R. hookeri* (*Pako oguro*) (7.5%), *S. dulcificum* (*Agbayum*) (9.4%), *V. paradoxa* (*Emi*) (2.2%), *H. brasliensis (*Roba) (4.4%) and *D. guineense* (*Awin*) (0.8%).

Furthermore, majority (62.5% and 53.3%) of the respondents inherited *G. cola* (*Orogbo*) and *C. albidum* (*Agbalumo*) locally available trees, respectively, on their farms. Some (32.2%) of the respondents inherited *C. acuminata* (*Obi Abata*), *P. biglobosa* (*Igba*) (45%), *A. commnis* (*Gbere*) (34.5%), *C. nitida* (*Obi Gbanja)* (48.9%) and *D. edulis* (*Pia*) (22.8%). Few (21.1%) of the respondents inherited *B. sapida* (*Isin)*, *S. dulcificum* (*Agbayum*) (23.3%), *I. gaboneensis var. dulcis* (Oro) (20.3%), *T. conophora* (*Awusa*) (12.5%), *I. gaboneensis var. exelsa* (*Apon)* (10.8%), *C. arabica* (*Kofi*) (14.2%), *A. altlis* (*Gbere elepa*) (15.8%), *M. oleifera* (*Ewe-igbale*) (15.0%), *T. africana* (*Afon)* (12.8%) and *R. hookeri* (*Pako oguro)* (11.7%). Only a very few (6.1%) of the respondents inherited *V. paradoxa* (*Emi)*, *H. brasilensis* (*Roba*) (5.3%) and *C. nucifera* (*Agbon*) (5.9%).

On the average, 78 of the respondents planted locally available trees while 134 of them inherited the various varieties of the crops.

TABLE 2: Distribution of respondents according to inheritance and planting of the locally available trees (N = 360)

Crop	Forest (N = 120)		Derived savannah (N = 120)		Savannah (N = 120)		Total (N = 360)	
	P %	In %	P %	In %	P %	In %	P %	In %
Vittellaria paradoxa (Shear butter/ Emi)	0.0	4.2	0.8	2.5	6.6	11.7	2.2	6.1
Tetracarpidium conphora (Walnut /Awusa)	35.0	18.3	34.2	8.3	31.7	10.8	33.6	12.5
Dialium guineense (Awin)	2.5	16.6	0.0	20.0	0.0	16.6	0.8	17.8
Hevea brasliensis (Rubber)	9.2	7.5	0.8	5.0	3.3	3.3	4.4	5.3
Cocos nucifera (Coconut/ Agbon)	33.3	10.8	39.2	2.5	33.3	4.2	35.3	5.9
Irvingia gabonensis var. Excelsa (Dikanut/Apon)	34.2	12.5	38.2	10.0	34.2	10.0	35.6	10.8
Irvingia gabonensis var. dulcis (Bush mango/Oro)	20.8	24.2	15.8	19.2	15.8	17.5	17.5	20.3
Coffea arabica (Kofi)	37.5	15.8	25.0	14.2	5.8	12.5	18.9	14.2
Cola acuminate (Kolanut/Obi Gbanja)	44.2	35.0	37.5	30.8	40.8	30.8	40.8	32.2
Garcinia cola (Bitter cola /Orogbo)	47.5	66.7	26.7	57.5	38.3	35.0	37.5	62.5
Parkia biglobosa (Igba)	20.0	30.8	31.7	40.8	35.0	65.0	28.9	45.0
Chrysophyllum albidum (Agbalumo)	35.0	48.3	32.5	49.2	29.2	35.8	32.2	53.3
Artocarpus commnis (Breadfruit/ Gbere oniyan)	44.2	42.5	37.5	32.5	30.8	28.3	37.5	34.5
Cola nitida (Kola/ abata)	28.3	64.2	44.2	50.0	23.3	32.5	32.0	48.9
Synsepalum d*ulcificum* (Agbayum)	10.8	29.2	10.8	19.2	6.7	34.2	9.4	23.3
Raphia hookeri (Raphia palm/ Pako oguro)	6.7	11.7	10.8	20.0	5.0	3.3	7.5	11.7
Dacryodes edulis (African pear/ Pia)	17.5	26.7	30.8	30.8	8.3	10.8	18.9	22.8
Moringa oleifera (Horse radish tree/ Ewe-igbale)	35.8	16.7	19.2	4.2	41.7	24.2	32.2	15.0
Treculia africana (Afon)	20.8	14.2	10.0	3.3	1.7	20.8	10.8	12.8
Artocarpus altilis (Breadfruit/ Gbere-elepa	20.0	20.0	13.3	15.0	17.5	14.2	12.8	15.8
Blighia sapinda (Isin)	8.3	30.8	5.0	17.5	4.2	15.0	5.8	21.1

P = Planted
In = Inherited
Source: Field survey, 2011

Comparison of land area cultivated to the selected locally available trees before 2003 and between 2003 and 2008

The results revealed that 8.1 percent of the respondents cultivated an average land area of 0.04 hectare of *V. paradoxa* (*Emi*) before 2003 but both the percentage of the respondents and mean area cultivated reduced between 2003 and 2008 to 5.6 percent and 0.005 hectare, respectively. *V. paradoxa* tree (*Emi)* was found cultivated mainly in the savanah area of Iwo zone.

Furthermore, *T. conophora* (*Awusa*) was cultivated by 38.6 percent of the respondents on an average land area of 0.01 hectare before 2003, the percentage of respondents reduced to 35.3 percent while the mean land area cultivated increased to 0.02 hectare between 2003 and 2008. The increase in area cultivated could be adduced to the improved economic importance attached to this plant. 20.0 percent of the respondents cultivated an average land area of 0.008 hectare of *D. guineense* (*Awin*) before 2003 but reduced to 19.4 percent on a mean area of 0.007 between 2003 and 2008. Before 2003, 9.7 percent of the respondents cultivated an average land area of 0.09 hectare of *H. brasliensis* (*Roba*) but reduced to 9.2 percent of the respondents and 0.007 hectare between 2003 and 2008. The reason adduced for the reduction was the drastic reduction in economic value of the produce and market availability. Some of the trees are now being cut down into planks and firewood without any replacement.

C. nucifera (*Agbon*) was cultivated by 31.7 percent of the respondents on an average land area of 0.009 hectare before 2003 but increased to 35.8 percent of the respondents on 0.01 hectare between 2003 and 2008.

Only 34.7 percent of the respondents planted *I. gaboneensis var. excelsa* (*Apon*) on land area of 0.01 hectare before 2003 but both the percentage of the respondents and the mean land area cultivated increased to 40.3 percent and 0.02 hectare between 2003 and 2008. The reason adduced for the increase was the drastic improvement in economic value of the produce and market availability. Few (22.8%) of the respondents cultivated *I. gaboneensis var. dulcis* (*Oro*) on 0.007 hectare of land area before 2003 but the percentage of the respondents reduced between 2003 and 2008 to 21.7 percent while the mean land area cultivated increased to 0.009 hectare, respectively. The same reasons were given for under-cultivation of *I. gaboneensis var. excelsa* (*apon).*

Few (27.8%) of the respondents planted *C. arabica (spp)* on an average land area of 0.17 hectare before 2003 but both the percentage of respondents and mean land area

cultivated were reduced between 2003 and 2008 to 25.6 percent and 0.02 hectare, respectively.

In addition, a little above average (58.3%) of the respondents cultivated *C. acuminata* (*Obi abata*) on a mean land area of 0.37 hectare before 2003 but slightly reduced to 57.2 percent of the respondents on a mean land area of 0.17 hectare between 2003 and 2008. This was adduced to old age of the plants, pest infestation (stem borer) and low market value of the produce. Hence, some of the plants are being cut into planks and firewood.

Majority (74.4%) of the respondents cultivated *G. cola* (*Orogbo*) on an average area of 0.03 hectare before 2003 but reduced to 72.5 percent of the respondents on a mean land area of 0.03 hectare between 2003 and 2008. This was adduced to the fact that no one plants the crop and eats from its fruit during his/her lifetime. More so, the plants are being destroyed during clearing of new farm by burning or cutting down. It was confirmed that some of the trees are cut into planks in the absence of hardwoods.

Furthermore, few (15.6%) of the respondents cultivated *P. biglobosa* (*Igba)* on a mean land area of 0.01 hectare before 2003 but reduced to 15.0 percent on 0.005 hectare between 2003 and 2008. This was adduced to the fact that no one cares for replacement when they are used for charcoal, firewood, staking, and planks. In addition, some are burnt or cut down during land preparation of new farms. Most of these plants were inherited through growing naturally in the wild.

Majority (55.6%) of the respondents cultivated *C. albidum* (*Agbalumo*) on a mean land area of 0.02 hectare of land before 2003 but the percentage of the respondents reduced between 2003 and 2008 to 55.0 percent while the land area cultivated did not change. The reasons adduced for maintaining the area cultivated despite the reduction in the number of the respondents cultivating the plant, was that of an improvement in demand for the fruits as well as the income generated from the crop. Civilization and faith-based organisations, also has reduced the cutting of the trees for being harbouring evil spirits.

In addition, majority (65.0%) of the respondents cultivated *A. commnis* (*Gbere*) on 0.1 hectare of land area before 2003 but reduced to 63.3 percent on 0.08 hectare between 2003 and 2008. The reasons given were that the plants were old and too tall to climb hence, some of them were cut into planks. This feature was very common in Ifewara and environs in Atakumosa west and east local government areas. Majority (69.4%) of the respondents cultivated *C. nitida* (*Obi Gbanja*) on 0.46 hectare of land area before 2003 but the percentage of the respondents' remains the same while the land area cultivated reduced to 0.24 hectare between 2003 and 2008. The same reasons were given for the reduction of *C. accuminata* (*Obi abata)*. The results show that few (6.1%) of the respondents cultivated *S. dulcificum* (*Agbayum*) on land area of 0.0008 hectare before 2003 but the land area cultivated did not change while the percentage of the respondents reduced to 5.0 percent between 2003 and 2008. In addition, few (28.1%) of the respondents cultivated *R. hookeri* (*Pako Oguro*) on *a* mean land area of 0.15 hectare before 2003 but both the percentage of the respondents and land area cultivated were reduced between 2003 and 2008 to 26.7 percent of the respondents and 0.06 hectare of land area, respectively.

Some (37.8%) of the respondents cultivated *D. edulis (Pia)* on 0.02 hectare of land before 2003 but the percentage of the respondents increased to 39.2 percent while area cultivated reduced between 2003 and 2008 to 0.01 hectare, respectively. 16.9 percent of the respondents cultivated *M. oleifera* (*Ewe-Igbale*) on 0.05 hectare of land area before 2003 but increased to 23.3 percent respondents cultivating 0.004 hectare between 2003 and 2008. In addition, few (16.1%) of the respondents cultivated *T. africana* (*Afon*) on 0.01 percent before 2003 but both the percentage of respondents and the mean area cultivated reduced to 14.2 percent and 0.007 hectare, respectively, between 2003 and 2008. This may be due to improved awareness in the medicinal values and other uses of the tree.

Few (5.6%) of the respondents cultivated *A. altilis* (*Gbere*) on 0.002 hectare of land before 2003 while the percentage of respondents remained unchanged but area of land cultivated increased to 0.003 percent between 2003 and 2008. Furthermore, Few (11.7%) of the respondents cultivated *B. sapinda (Isin)* on 0.008 hectare of land before 2003 but reduced to 0.005 hectare with the same percentage of respondents between 2003 and 2008.

These finding calls for urgent attention of the agricultural policy makers, research institutions, government and private (NGOs) extension agents to see to the improvement and revitalization of these locally available trees, that have economic, medicinal and food benefits before its final extinction. If these trends continue, some of the trees might go into extinction. It was discovered during the course of this research that the following locally available trees: *B. sapida, Cola spp, A. commnis, G. cola, H. brasiliensis, I. garboneensis, P. biglobosa* are being cut into planks, without any replacement, due to shortage of hardwood like *Nauclea latifolia, Triplochiton scleroxylon, Canarium schweinfurthii, Milicia exelsa, Coria millenii, Diallium spp*. This might be a clear indication that these useful locally available trees are going into extinction in Osun state and Nigeria in general.

Data in Table 3 show the mean of the land area cultivated to the locally available trees by the respondents before 2003 and between 2003 and 2008. The t-values obtained were significant for majority of the selected locally available trees at 0.05 level of significance.

Listing the locally available trees in descending order of reduction in the land area cultivated between the two periods reveals that *C. arabica* (*Kofi*), with t-value of 8.746, was the highest, followed by: *C. acuminata (Obi Abata)* (t = 5.954), *C. nitida* (*Obi Gbanja*) (t = 5.448), *H. brasliensis* (*Roba)* (t = 4.904), *C. albidum* (*Agbalumo)* (t = 4.422), *I. gabonensis var. dulcis* (*Oro*) (t = 4.287), *A. communis* (*Gbere*) (t = 3.929), *P. biglobosa* (*Igba)* (t = 3.398), *T.conophora* (*Awusa*) (t = 3.368), *C. nucifera (t = -2.817), M. oleifera* (*Ewe-Igbale*) (t = -2.798), *T. africana* (*Afon)* (t = -2.347), *A. altlis (Gbere)* (t = 2.260), *R. hookeri* (*Pako Oguro)* (t = 2.185), *D. guineense* (*Awin*) (t = 1.655), *V. paradoxa* (*Emi)* (t = 1.340) and *B. sapinda* (*Isin*) (t = 1.176) *I. gabonensis var. excelsa* (*Apon*) (t = 1.016), *D. edulis* (*Pia) (t = 0.394) S. dulcificum* (*Agbayum*) *(t = -0.370)* and *G. cola* (*Orogbo*) (t = -0.312).

The results also show that despite the under-cultivation of these selected locally available trees, there was significant increase in the cultivation of a few of them in the recent years (between 2003 and 2008). These crops were *C. nucifera* (*Agbon*) *(t = -2.817), M. oleifera* (Ewe-igbale*)* (t = -2.798) and *T. africana* (Afon) (t = -2.347), while the increase in the cultivation *S. dulcificum* (*Agbayum) (t = -0.370)* and *G. cola* (*Orogbo)* (t = -0.312) were not significant. The improvement in the cultivation of these crops may be due to the farmers' awareness of their food, nutritional, medicinal and income generating benefits.

In addition, it was noticed for example, that *coffea spp* that was under-cultivated in Osun State was being planted and flourishing in Plateau state, Benin Republic, Kenya, Uganda, Tanzania, Rwanda, Cameroon and other parts of the World (Pochet and Flemal, 2001). The policy makers for agriculture in the LGAs, States and the Nation in general should look inward in regenerating these locally available trees to cushion the effect of global economic crisis. Since these trees have adapted to the local environments.

The implication of this finding is that the selected locally available trees are under-cultivated to the extent of going gradually into extinction.

TABLE 3: Ranking of respondents according to level of cultivation of locally available trees N =360

Tree	Mean scores		Difference	t-values	Raking
	Before 2003	2003-2008			
Coffea arabica (Kofi)	0.1708	0.0174	0.1533	8.746	1st
Cola acuminata (Kolanut/Obiabata)	0.3666	0.1748	0.1918	5.954	2nd
Cola nitida (Kola nut/Gbanja)	0.2772	0.2364	0.0408	5.448	3rd
Hevea brasliensis (Rubber)	0.0947	0.0069	0.0878	4. 904	4th
Chrysophyllum albidum (Agbalumo)	0.0193	0.0157	0.0036	4.422	5th
Irvingia gabonensis var. *dulcis* (Bush mango / Oro)	0.0085	0.0062	0.0023	4.287	6th
Artocarpus commnis (Breadfruit/ Gbere Oniyan)	0.1006	0.0812	0.0194	3.929	7th
Parkia biglobosa (Igba)	0.0112	0.0054	0.0058	3.398	8th
Tetracarpidium conphora (Walnut /Awusa)	0.0210	0.0146	0.0064	3.368	9th
Cocos nucifera (Coconut/ Agbon)	0.0092	0.0146	-0.0054	-2.817	10th
Moringa oleifera (Horse radish tree/ Ewe-igbale)	0.0029	0.0039	-0.0011	-2.798	11th
Treculia African (Afon)	0.0016	0.0031	-0.0015	-2.347	12th
Artocarpus altilis (Bread fruit /Gbere elepa)	0.0079	0.0049	0.0031	2.260	13th
Raphia hookeri (Raphia palm/ Pako oguro)	0.1015	0.0636	0.0379	2.185	14th
Dialium guineense (Awin)	0.0081	0.0072	0.0009	1.655	15th
Vittellaria paradoxa (Shea butter/ Emi)	0.035	0.0051	0.0299	1.340	16th
Blighia sapinda (Isin)	0.0103	0.0066	0.0037	1.176	17th
Irvingia gabonensis var. excelsa (Dika nut / Apon)	0.0204	0.0148	0.0056	1.016	18th
Dacryodes edulis (African pear/ Pia)	0.0131	0.0126	0.0005	0.394	19th
Synsepalum dulcificum (Agbayum)	0.0008	0.0008	0.0003	-0.370	20th
Garcinia cola (Bitter cola/ Orogbo)	0.0329	0.0344	-0.0016	-0.312	21st

df = 359
Level of significance = 0.05
Source: Field survey, 2011

Comparison of farmers' level of cultivation of locally available trees before 2003 and between 2003 and 2008

Detailed analysis of data in Table 4 show that 44.2 percent of the respondents were at low level of cultivation of the selected locally available trees, cultivating total land area of less than 0.19 hectare between 2003 and 2008 while (41.9%) of the respondents were at low level of cultivation of these crops before 2003, cultivating land area of less than 0.05 hectare. Some (40.8%) and few (15.0%) of the respondents were at medium and high levels of cultivation of the locally available trees, cultivating between 0.2 and 1.34, and above 1.34 hectares, respectively, between 2003 and 2008 while 40.6 percent and 17.5 percent of the respondents were at medium and high levels of cultivation of the crops cultivating land area between 0.06 and 2.68, and above 2.68 hectares, respectively, before 2003.

It could be deduced from the above analysis that twice the land area (2.68 hectares) cultivated before 2003 as high level were cultivated (1.34 hectare) as high level between 2003 and 2008. 85.0 percent of the respondents were currently cultivating less than 1.35 hectares of land. Many of the respondents fell from high and medium levels before 2003 to low level between 2003 and 2008. The sharp reduction in the mean land area cultivated from 1.37 hectare before 2003 to 0.77 hectare between 2003 and 2008 is a clear indication of under-cultivation and gradual extinction of the crops. Based on Olayide (1980) categorisation of farmers into small (having holding less than 6ha), medium (6-9.99ha) and large (10ha and above) all the respondents are at small scale before 2003 to date.

TABLE 4: Distribution of the respondents according to comparison of their level of cultivation of locally available trees before 2003 and between 2003 and 2008 (N=360)

Level of cultivation in hectare	Frequency	Percentages
i. Before 2003		
Less than 0.05 (Low)	151	41.9
Between 0.06 – 2.68 (Medium)	146	40.6
Above 2.68 (High)	63	17.5
ii. Between 2003 and 2008		
Less than 0.19 (Low)	159	44.2
Between 0.20 – 1.34 (Medium)	147	40.8
Above 1.34 (High)	54	15.0

i. Mean = 1.37 Standard deviation = 1.32
ii. Mean = 0.77Standard deviation = 0.58
Source: Field survey, 2011

Problems associated with cultivation of the selected locally available trees

The results show that the respondents ranked first the problem of inadequate storage facilities of the selected locally available trees. All (100%) the respondents perceived this problem in *R. hookeri* (*Pako oguro*), 77.2 percent in *I. gaboneensis var. dulcis* (Bush mango /*Oro*), 71.7 percent in *C. acuminata* (*Obi abata*) and *G. cola* (*Orogbo*), 70 percent in *Artocarpus spp*. (*Gbere)*, and very few (6.9%) in *P. biglobosa* (*Igba*). Inadequate processing techniques and unavailability of market for the produce and products of the selected locally available trees ranked second. Most (99.4%) of the respondents had the problem of inadequate processing technique with *S. dulcificum (Agbayum)*, 77.2 percent with *I. gaboneensis var. dulcis* (Oro), 70.8 percent with *Cola spp. (*Obi*),* and 64.4 percent with *T.m conophora* (Asala). Some (48.9%) of the respondents had problems of marketing their produce such as *G. cola* (*Orogbo), Cola spp. (*Obi) *and I. gaboneensis var. dulcis (Oro)*, while 41.0 percent of the respondents had the marketing problem with *Artocarpus Spp.* (*Gbere*). This finding corroborates Okafor's (1975) report that inefficient use and waste of materials due to lack of appropriate technology and processing knowledge, preservation and storage as constraints to cultivation of the locally available trees.

Furthermore, problem of inadequate knowledge of the associated benefits ranked third with 54.2 percent of the respondents had this problem with *I. gaboneensis var. dulcis (Oro)*, 58.6 percent with *P. biglobosa* (*Igba)*, 44.7 percent with *G. cola (*Orogbo*)* and 38.1 percent with *T. conophora* (*Awusa)*. Reduction in production of the trees due to old age of the selected locally available trees ranked fourth. Many (58.6%, 54.4%, 54.2% and 40.0%) respondents had this problem with *G. cola (*Orogbo*), C. nitida (Obi Gbanja), I.gaboneensis var. dulcis* (*Oro) and T. conophora (Awusa*), respectively. Mystery associated with the locally available trees ranked sixth by the respondents. Some (49.2%, 41.7% and 36.4%) of the respondents had this problem with *I. gaboneensis var. dulcis (Oro), C. nitida (Obi Gbanja*) and *G. cola (Orogbo)*, and Artocarpus *Spp. (Gbere),* respectively. This finding corroborates that of Okafor (1975) which reported that lack of knowledge on the useful plants including range of uses, lack of information on the resources base and sustained yields arising from lack of up-to-date resourses inventory are constraints to cultivation of the locally available trees.

In addition, some of the selected locally available trees that were not perceived as economic crops ranked seventh. Some of the respondents (39.7%) had this problem with *G. cola (orogbo)*, 40.3 percent with *I. gaboneensis var. dulcis* (*Oro*), *I. gaboneensis var. excelsa* (*Apon*). Inadequate availability of planting materials ranked eighth. Also, inadequate information on production process and inadequate land for cultivation ranked ninth and tenth, respectively. Furthermore, low yield of the selected locally available trees ranked eleventh, bad weather ranked twelfth, poor soil fertility ranked thirteenth, poor farming practices ranked fourteenth and inadequate labour ranked fifteenth. High cost of production ranked sixteenth; reduction in production due to old age of the farmers ranked seventeenth while, land tenure system ranked eighteenth. This finding corroborates Okafor (1975) and Okafor (1993) that long gestation period before fruiting, lack of adequate knowledge of methods of propagation for most wild plants, and inefficient use and waste of materials due to lack of appropriate technology for processing, preservation and storage. Adequate attention that is needed to solve these problems must be put in place by government agricultural policy makers, research institutions and change agents, if locally available trees are to play any tangible role in the sustainable food security and economic growth of the rural farmers in Osun State and Nigeria in general.

Factor analysis

Table 5 shows that eleven factors were identified as those factors contributive to the level of cultivation of the locally available trees and spices. These factors are farmers' motivator (5.798), environmental friendliness (3.094), farmers' interaction (2.005), farmers' psychology (1.837), farmers' socio-economic attributes (1.645), farmers' exposure (1.487), social participation (1.278), institutional influence (1.250), community influence (1,119), farming experience (1.043) and access-to-land (1.011).

TABLE 5: Principal component anaylsis of independent variable (farmers, perceived benefits, perception, community and institutional factors) associated with the level of cultivation of locally available trees and spices

Factor label names	Eigenvalue Variance	% of variance	% of cumulative
1 Farmers' motivator	5.798	18.704	18.704
2 Environmental friendliness	3.094	9.980	28.685
3 Farmers' interaction	2.005	6.467	35.152
4 Farmers' psychology	1.837	5.927	41.078
5 Farmers' socio-economic attributes	1.645	5.307	46.386
6 Farmers' exposure	1.487	4.797	51.183
7 Social prticipation	1.278	4.121	55.304
8 Institutional influence	1.250	4.033	59.337
9 Community influence	1.119	3.610	62.948
10 Farming experience	1.043	3.365	66.313
11 Access to land	1.011	3.261	69.574
12 Other unknown factors	-	30.426	100.00

Source: Field survey, 2011

Hypothesis testing

Data in Table 6 show that two socio-economic characteristics of the farmers had positive and significant relationship with their level of cultivation of the locally available trees and spices at both $P \leq 0.01$ and $P \leq 0.05$. The values of the identified factors were farm size (r = 0.140) and years of education (r = 0.131) of the respondents. The positive correlation of farmers' farm size and years of education with cultivation level indicated that the more the magnitude of variation in these factors, the higher the level of cultivation of locally available trees and spices.

TABLE 6: Correlation and multiple regression analyses showing linear relationship between level of cultivation of locally available trees and spices and personal socio-economic characteristics of respondents (N = 360).

Characteristic (X-variable)	Correlation Coefficient (r)	Coefficient of Determination (r^2)	Regression Coefficient (b)	t-value for Ho
i. Age (Year)	-0.019	0.0004	-0.038	0. 721
ii. Household size (No)	-0.016	0.0003	-0.044	-0.833
iii. Years of schooling	0.131*	0.017	0.117	2.220*
iv. Farm size (Ha)	0.140**	0.020	0.124	2.292*
v. Animal size (No)	0.064	0.0041	0.039	0.732
vi. Farming experience (year)	0.097	0.0094	0.102	1.9*
vii. Participation in social organizations	0.099	0.0098	0.098	1.868*
viii. Income	0.045	0.0020	-0.002	-0.046

* = correlation is significant at the 0.01 level (2 tailed)
** = correlation is significant at the 0.05 level (2 tailed)
R = 0.237, R square = 0.56, Adjusted R square = 0.034
Source: Field survey, 2011

CONCLUSION & RECOMMEDATIONS

Virtually all the respondents cultivating locally available trees and spices were old adult and aged farmers of between 46 and 75 years with large household size. Therefore, large proportion of the income accrued from the farm produce and products may be used to cater for the large household size. The average farm size (5.4 hectares) of the respondents in the study area was generally small while only an average of 0.77 hectare of it was currently cultivated to locally available trees and spices. A large proportion of farmland was acquired through the inheritance pattern. This may affect the extent of farmers' involvement in the use of modern technology.

Based on the major findings of this paper, it is recommended that the Government, Non-Governmental Organisations and all stakeholders in agricultural development should motivate the youths and young adult farmers to cultivate the locally available trees and spices by giving them loan either in cash or in kind. Availability of planting materials and storage facilities at subsidized rates, adequate information on production and processing techniques should be provided in order to tackle with utmost urgency needed effort to salvage the crops from extinction. In addition, change agents and media houses especially radio should be encouraged to educate the farmers on the importance of the locally available trees and spices that are highly adapted to agro-ecological niches and marginal areas. Change agents should make use of farmers' friends, family members, neighbours and local formal organizations as locality source of information and radio as cosmopolitan source of information to reach the rural farmers. Information bulletins may also be distributed to get the farmers informed

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