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POTENTIALS OF *Vitellaria paradoxa.* Gaert F. IN AGROFORESTY SYSTEMS IN BENUE STATE, NIGERIA.

Labode POPOOLA[1*] and Norbert T. TEE[2]

1. Department of Forest Reswources Management, University of Ibadan, Nigeria.
2. Department of Social and Environmental Forestry, University of Agriculture, Makurdi, Nigeria.
* Corresponding Author

ABSTRACT: This study was carried out to evaluate the potentials of *Vitellaria paradoxa* in agroforestry systems in Benue State. With the aid of structured and semi-structured questionnaires, 360 farm families from thirty six (36) extension cells randomly selected from the three Agricultural Development Programme (ADP) extension zones in the State were interviewed. The result showed that, taungya system (17%) Social forestry (16.4%) and improved fallow in shifting cultivation (13%) were the most widely practised farming system out of the eight different systems considered for the study. *Farmers in; improved fallow in shifting cultivation (28.4%) shelterbelt/windbreak (25.6%) and agrisilvopastoral system (15.5%) mainly incorporated V. paradoxa.* Reasons for incorporating the species in agroforestry systems were also identified. The relative abundance of *V. paradoxa* on farmlands in Otukpo, Adikpo and Gboko ADP extension zones was 105, 28 and 23 stands/hectare respectively. Analysis of Variance (ANOVA) showed a statistically significant difference in the distribution at 0.05 probability level. Socio-economic benefits of *V. paradoxa* include; medicines (33.8%), household energy (18.9%), and source of income (18.0%), food (16.8%) and raw materials for further production (12.4%). A one-way ANOVA showed no significant differences in these socio-economic benefits among farmers at 0.05 level of significance. The Mean wood/fruits and seed yields and financial returns accruing from these products to farmers from *V. paradoxa* and other forest fruit trees when compared using ANOVA at 0.05 probability level showed a statistically significant difference between the means of these respective benefits of the tree species. Even though the tree was reported by the farmers to compete with agronomic crops, the overriding economic benefits (≥60% of total farm income) derived from the species in the farm enterprise has made its integration in their farming system compelling. Intensified adoption of the species in agroforestry, research into possibilities of domesticating the tree, improved processing and marketing of its products and consolidation of forestry policy-research links are recommended to boost the efficiency of land management and optimum benefits from *V. paradoxa* through agroforestry in the study area.

Key words: Agroforestry systems, potentials; socio-economic benefits.

INTRODUCTION

Nigeria is endowed with large expanse of rich agricultural land and forest resources. These resources have the potentials to promote, and sustain socio-economic development, improved quality of life and welfare engineering efforts if efficiently harnessed. This is true because, records have shown that, over 70% of Nigerians are subsisting on these resources and specifically through agriculture, in the rural areas. It is essential therefore to develop and sustain these resources. The total land area of Nigeria is put at 923,768km^2 (Popoola, 1998). Out of this figure, only 40% is used for agriculture (Adeyoju, 1998), and 5.34% is reserved forest (FORMECU, 1999 in: Popoola, 2000). Thus, the ever-increasing population, conversion of forest lands to agriculture, faulty agricultural practices, logging and fuelwood extraction activities among others have continued to cause increased pressure on the land and forest resources. There have also been serious imbalances in the ecosystems and biodiversity conservation. The productivity of agriculture, which is the major occupation and means of sustenance for rural Nigerians is also unacceptably getting dismally low by the day. Many of the people are therefore becoming more and more hungry and prone to disease attack.

In fact pressure on land due to over-emphasis on food production and indiscriminate dichotomy between forestry and agriculture under the "modern" farming systems have created problems in land management. These have made fallow periods too short for land cleared of forest to recover naturally and perform its traditional role of resource resuscitation (Nair, 1993). Furthermore, modern farming methods do not adequately recognize the importance of the prevailing tropical ecology, which requires multistructural and multifunctional agro-ecosystems to sustain high plant productivity. Consequently, as more agricultural land becomes degraded and unproductive, through the adoption of inappropriate technologies, more forestland is cleared of trees and more unproductive land created (Verinumbe, 1996). The land resource

base on which the livelihood of a large proportion of the population depends has thus continued to decline and with it, food and wood production and other valuable services have also continued to decline.

The situation can be improved through better management of natural forests, establishment of forest plantations and protection of trees on farms- (the concept of agroforestry). Berry and Phil (1995) defined agroforestry to include recognition that it:

* is a collective name for land use systems involving trees combined with crops or animals or both on the same unit of land;
* combines production of multiple outputs with protection of the resource base;
* places emphasis on the use of indigenous multipurpose trees and shrubs;
* is particularly suitable for low input conditions and fragile environments;
* is more concerned with socio cultural values than most other land use systems , and
* is structurally and functionally more complex than monoculture.

The International Centre for Research in Agroforestry (ICRAF) (1997) further defines agroforestry as a dynamic ecologically based natural resources management system, which through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. Thus, the system is known to be economically viable and can fit favourably in the already existing indigenous farming systems with appropriate modification. The system is therefore, useful and important especially in rural Nigeria where majority of the inhabitants is peasant farmers and land productivity is fast declining due to poor management and excessive use. Trees are often components of West African farming systems. It is also known that, in traditional farming, certain tree species are often left by farmers either as; source of wood for building, fruits, medicinal purposes, yam stakes and shade plants, among others.

Inspite of the fact that these trees are found on farmers' farmlands, their potentials in agroforestry are not fully known or recognised. Furthermore, most of these trees are neither domesticated nor established in plantations as their counterpart timber species, and efforts to maintain their abundance in the natural environment are not in place. They are therefore, endangered. *Vitellaria paradoxa* (the sheabutter tree) is one of such non-timber forest trees. It is of high socio-economic importance, but its potentials as an agroforestry tree are just recently being documented, particularly in Nigeria (Kater *et al, 1992* and Kessler, 1992):. The tree is not domesticated but grows naturally in the wild and on farmlands and around homes. It is common in the savanna zone of Nigeria (Keay, 1989). The tree, because of its resourcefulness in tropical Africa, was recommended among other trees like *Parkia biglobosa* as products priorities that need funding for development (Kio *et al.*, 1989, FAO, 1991). In addition to its prospects in maintaining soil fertility for agricultural purposes, *V. paradoxa* can also provide good fuelwood. The fruits are common food both for children and adults. The bark, leaves, and roots are used for curing varying illnesses among villagers. Many people have become self-employed as traditional medicine practioners, ornamental designers and craftsmen by making use of wood and other relevant parts of *V. paradoxa* (Boffa *et al;* 1996; Creevey, 1996; Force *et al;* 1994, and Keay, 1989).

The common agroforestry practices involving this species is that, it grows in mixed stands with other species in the drier margins of the savanna with pronounced dry season (FAO, 1989). The tree can also thrive well on poor soils (Keay, 1989). Thus it can help in ameliorating the environment and maintaining the moisture content of the soil thereby protecting other crops from excessive adverse environment for optimum growth. Many West African countries including Ghana, Mali, Senegal and Sierra-Leone have benefited greatly from *V. paradoxa* by incorporating it in plantation schemes and agroforestry practices.

In recognition of the aforementioned attributes of *Vitellaria paradoxa,* and the need to stem the process of its degradation as influenced by slash and burn agriculture and exploitative wood production, this study was carried out with a view to ascertaining how well the species can be integrated into agroforestry systems in Benue State.

METHODOLOGY

The Study Area

The study was conducted in Benue State (Lat. 6.5° and 8° N and Long.6.5° and 10° E). The State lies in, and thus classified as Middle-belt State in the savanna region of Nigeria. The state has three ecological zones namely: the derived savanna, the guinea savanna and the lowland rainforest (Keay, 1949). Rainfall ranges from 1250-1500mm annually. Open woodland with tall grasses (1-3m high) and trees (up to 15m high) characterize the vegetation usually with short boles and broad leaves. Common forest tree species include *Vitellaria paradoxa, Prosopis africana, Parkia biglobosa, Danielli olivera, Vitex doniana, Afzelia africana, Khaya senegalensis* among others (Keay, 1989).

Data Collection

With the aid of structured and semi-structured questionnaires, 360 farm families were randomly selected from 36 extension cells randomly selected from the three Agricultural Development Programme (ADP) extension zones in the state viz Gboko Oturkpo and Adikpo (Figure 1). They were interviewed to generate data for this study. Parameters such as abundance, distribution of the species, its adoption and socio-economic benefits were adopted in measuring the potentials of *Vitellaria paradoxa* in agroforestry systems in the state. *Vitellaria* stands on

36 selected farms were enumerated to determine stocking density. This was calculated using the relation;

Number of stands per hectare = $\frac{\text{Total Number of Stands}}{\text{Total number of hectares.}}$

Frequencies, means, tables, gross and net revenue analyses were adopted in analysing and interpreting the results. One-way analysis of variance (ANOVA) was carried out to ascertain statistical significance of the results of the study.

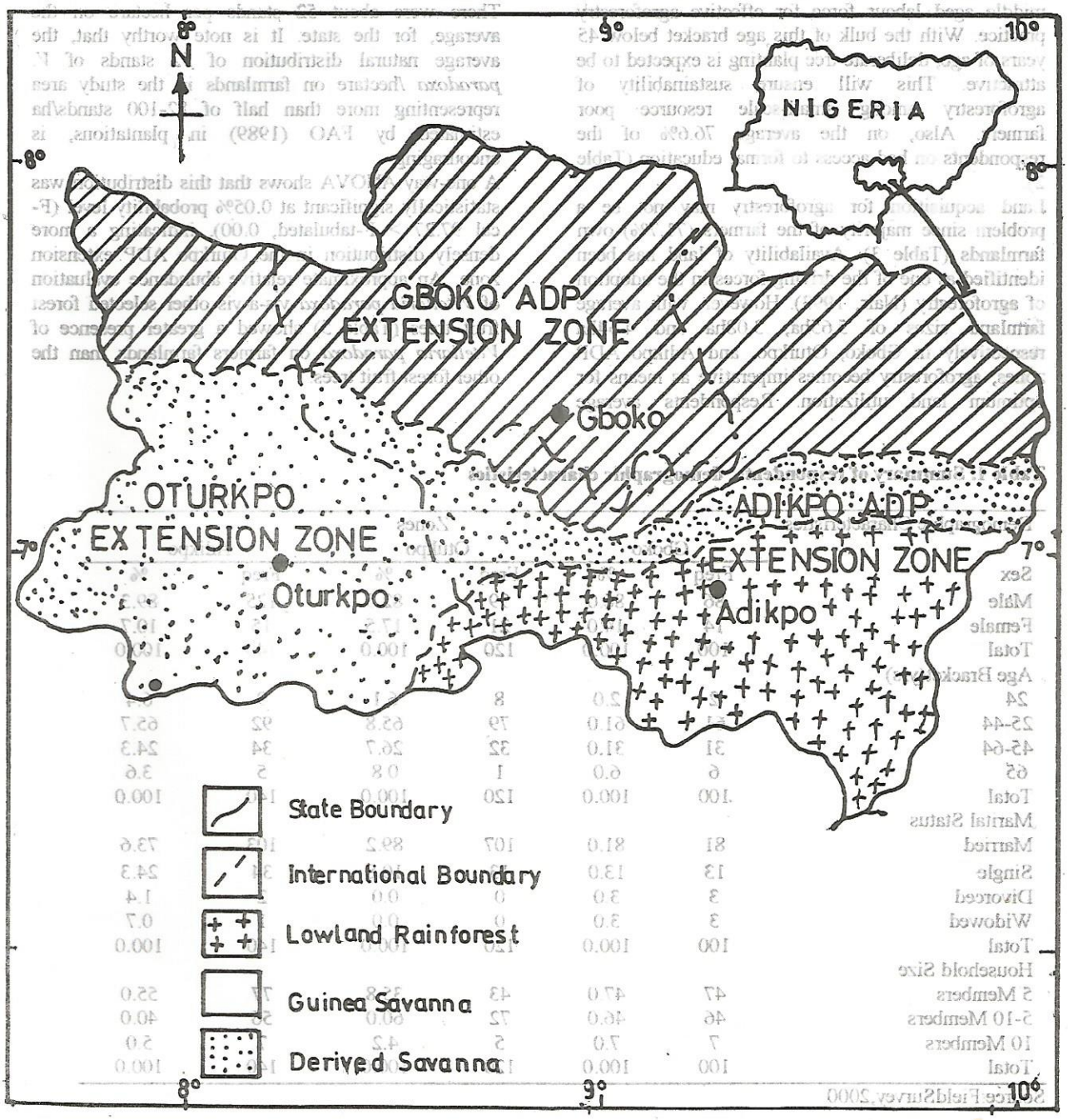

Fig 2: Map of Benue State showing the three ecological zones and the three ADP Extension zones

RESULTS AND DISCUSSION

Basic Information about Farmers in the study area

The demographic characteristics of respondents were as shown in Table 1. These characteristics generally depict a good ground for agricultural development in Benue State and hence agroforestry. For instance, 90% of the respondents fall within the age bracket of 25-64years, thus indicating a virile and energetic middle aged labour force for effective agroforestry practice. With the bulk of this age bracket below 45 years of age, deliberate tree planting is expected to be attractive. This will ensure sustainability of agroforestry among small-scale resource poor farmers. Also, on the average 76.6% of the respondents on had access to formal education (Table 2).

Land acquisition for agroforestry may not be a problem since majority of the farmers (71.7%) own farmlands (Table 3). Availability of land has been identified as one of the driving forces in the adoption of agroforestry (Nair, 1993). However, with average farmland sizes of 5.65ha, 3.08ha and 4.54ha respectively in Gboko, Oturkpo, and Adikpo ADP zones, agroforestry becomes imperative as means for optimum land utilization. Respondents' average experience of 13 years in farming is likelihood for a higher productivity and efficiency in resource use.

Distribution of *Vitellaria paradoxa* in Benue State

Vitellaria paradoxa is found throughout the three extensions zones in the state.

On the average, its stocking density per hectare was 105, 28 and 23 stands respectively in Oturkpo, Adikpo and Gboko (Table 4).

There were about 52 stands per hectare on the average, for the state. It is note worthy that, the average natural distribution of 52 stands of *V. paradoxa* /hectare on farmlands in the study area representing more than half of 82-100 stands/ha estimated by FAO (1989) in plantations, is encouraging.

A one-way ANOVA shows that this distribution was statistically significant at 0.05% probability level (F-cal 97.27 > F-tabulated, 0.00), indicating a more densely distribution in the Oturkpo ADP extension zone. An approximate relative abundance evaluation of *Vitellaria paradoxa* vis-a-vis other selected forest fruit trees (Table 5) showed a greater presence of *Vitellaria paradoxa* on farmers farmlands than the other forest fruit trees.

Table 1. Summary of respondents' demographic characteristics

Demographic Characteristics	Zones					
	Gboko		Otukpo		Adikpo	
Sex	Freq	%	Freq	%	Freq	%
Male	86	86.0	99	82.5	125	89.3
Female	14	14.0	21	17.5	15	10.7
Total	100	100.0	120	100.0	140	100.0
Age Bracket(yrs)						
24	2	2.0	8	6.1	9	6.4
25-44	61	61.0	79	65.8	92	65.7
45-64	31	31.0	32	26.7	34	24.3
65	6	6.0	1	0.8	5	3.6
Total	100	100.0	120	100.0	140	100.0
Marital Status						
Married	81	81.0	107	89.2	103	73.6
Single	13	13.0	13	10.8	34	24.3
Divorced	3	3.0	0	0.0	2	1.4
Widowed	3	3.0	0	0.0	1	0.7
Total	100	100.0	120	100.0	140	100.0
Household Size						
5 Members	47	47.0	43	35.8	77	55.0
5-10 Members	46	46.0	72	60.0	56	40.0
10 Members	7	7.0	5	4.2	7	5.0
Total	100	100.0	120	100.0	140	100.0

Source:FieldSurvey,2000

Table 2. Distribution of respondents by educational background, occupation, and land ownership types.

Basic Characteristics	Zones					
	Gboko		Otukpo		Adikpo	
Occupation	Freq	%	Freq	%	Freq	%
Farming	80	80.0	72	60	109	77.9
Trading	8	8.0	20	16.7	9	6.4
Civil Service	8	8.0	24	20.0	17	12.1
Business Man	4	4.0	4	3.3	5	3.6
Total	100	100.0	120	100.0	140	100.0
Land Ownership Type						
Family Land	84	84.0	58	48.3	116	82.9
Hired/Rented	10	10.0	39	32.5	12	8.6
Gift	0	0.0	0	0.0	4	2.8
Purchase	3	3.0	23	19.2	5	3.6
Mortgage	1	1.0	0	0.0	1	0.7
Sharecropping	2	2.0	0	0.0	2	1.4
Total	100	100.0	120	100.0	140	100.0
Educational Background						
No Formal Education	31	31.0	18	15.0	34	24.3
Adult Literacy	8	8.0	19	15.8	11	7.9
Primary Education	15	15.0	14	11.7	25	17.9
Secondary Education	36	36.0	42	35.0	50	35.7
Tertiary Education	10	10.0	27	22.5	20	14.2
Others	0	0.0	0	0.0	0	0.0
Total	100	100.0	120	100.0	140	100.0

Source: Field Survey, 2000

Table 3, Respondents' distribution by farmland size and farm sizes under cultivation

Zone/Farmland Category		Farm Size Brackets (hectares)				
	X^1	0-5 2.5	6-10 7.5	11-15 12.5	16 17.5	Total 40
Farmland Sizes						
Gboko Zone	Freq	40	57	3	0.	100
	%	40.0	57.0	3.0	0.0	100.0
	Fx	100	427.5	37.5	0.0	565
Otukpo Zone	Freq	106	14	0	0	120
	%	88.3	11.7	0.0	0.0	100.0
	Fx	265	105	00	00	370
Adikpo Zone	Freq	90	44	5	1	140
	%	64.3	31.4	3.6	0.7	100.0
Farmland Size Under Cultivation						
Gboko Zone	Freq	74	21	5	0	100
	%	74.0	21.0	5.0	0.0	100.0
	Fx	185	157.5	62.5	00	405.0
Otukpo Zone	Freq	106	14	0	0	120
	%	88.3	11.7	0.0	0.0	100.0
	Fx	265	105	00.0	00	370.0
Adikpo Zone	Freq	122	15	2	1	140
	%	87.2	10.7	1.4	0.7	100.0
	Fx	305	112.5	25	17.5	460.0

Source: Field Survey, 2000

X^1 = Class midpoint or farm size boundaries (ha)

Fx= Product of frequency and Farm size class mid-point which is equivalent to number of hectares

Table 4. Distribution of *Vitellaria paradoxa* on farmlands in the three ADP extension zones

Farmland Size Bracket (ha)	X	GBOKO				OTUKPO				ADIKPO			
		RF	ANSV	RFX	TNSV	RF	ANSV	RFX	TNSV	RF	ANSV	RFX	TNSV
0 - 5	2.5	23	19	57.5	1093	58	93.0	145	13485	35	24	87.5	2100
6 - 10	7.5	55	22	412.5	9075	9	1320	67.5	8910	28	26	210	5460
11 - 16	12.5	0	0	0	0	0	0	0	0	3	48	37.5	1800
16 and above	17.5	2	45	35	1575	0	0	0	0	0	0	0	0
Total		80	86	505	11743	67	225	212.5	22395	66	108	335	9360

Source: Field Survey, 2000

KEY

X = Class midpoint of Farm sizes
RF = Respondents Frequency
ANSV = Average Number of Stands of *Vitellaria paradoxa* per hectare for each farm size class
RFX = Total Number of hectares for each class size
TNSV = Total Number of Stands of *Vitellaria paradoxa* on farmers field/class size

***Vitellaria paradoxa* and agroforestry in Benue State**

The result of the survey of agroforestry systems in Benue State is as shown in Table 6. Although, all the systems and practices listed for the study were in place, *taungya* system (17%); social forestry (16.4%) and improved fallow in shifting cultivation (13%) were the most prominent and well-known practices among respondents across the three ADP extension zones. *Taungya* system was the most adopted AF system, and silvopastoral system the least adopted. *V. paradoxa* was found in five out of the eight agroforestry systems listed in Table 6 in the following order; improved fallow in shifting cultivation (28.4%), shelter-belt/windbreaks (16.6%) agrosilvopastoral system (15.5%) silvopastoral system (2.1%) while other systems viz: agrisilviculture, homestead woodlots, fringe plantings comprised 27.3%. It should be noted however that the observed stands of the plants were not domesticated. They had grown from wildlings and left to survive in the farm landscape. On the average, 65.1% of the respondents who could not adopt *Vitellaria paradoxa* in their farming system did so because it was not available on their farmlands. Other reasons were: difficulty in maintaining the wildlings of the species to maturity (19.9%), lack of interest in the tree (8%), competition of the tree with other crops (2.9%) and land tenure problems (0.1%) (Table 7). Other respondents however, indicated interest to plant the species on their farmlands if seedlings are provided. Farmers generally, complained about the poor performance of agronomic crops under *V. paradoxa*. Reasons advanced included competition for light, water and the limited nutrients in the soil. The relatively dense crown of the species was also reported to encourage breeding of fungi and insect pest which attack and reduce yield of the agronomic crops. Kessler and Boni (1991) in Burkina Faso had reported similar occurrence. Interestingly however, the respondents that had the species naturally occurring on their farmland believed that these negative impacts were by far outweighed by the total farm productivity of their farm enterprise. This they claim was attributable to the high return from *Vitellaria* (often estimated to be as high as 60% of the total farm income. Several socio-economic benefits of the species were listed as can be seen below.

Socio-economic benefits of V. *paradoxa* in the study area

Tables 8 and 9 respectively present the products and socio-economic benefits of *Vitellaria paradoxa* in the study area. These socio-economic uses are in the following order; medicines (33.9%), household energy (18.9%) sources of income (18.0%) food (16.8%) and raw materials for further production (12.4%). In-depth discussions and personal observations revealed the following facts concerning the socio-economic benefits of V. *paradoxa:*

Medicinal: Leaves, bark and roots of *V. paradoxa* combined with other relevant plants are used in curing diseases like malaria, typhoid fever, tuberculosis etc. Ground pastes from bark and leaves and sheabutter oil are used as anesthesia for sprains and fractures.

Household energy: Fuelwood, charcoal and twigs from *V. paradoxa* are utilized as energy for heating and cooking, commonly among producers of "Burukutuu" or "Ayashi" (African beer).

Source of income: Fuelwood, charcoal, sheabutter oil, caterpillar, wooden sculptures, mortars/pestles are sold to generate income.

Table 5. Distribution of respondents by number of forest fruit tree crops on farmlands

Tree Species	Number of Stands Brackets										Total	
	1 -40		41-80		81 -120		121-160		161-200			
	F	%	F	%	F	%	F	%	F	%	F	%
Parkia biglobosa	109	23.5	15	25.9	17	18.5	1	5.3	2	33.3	144	22.5
Prosopis africana	93	20.1	13	22.4	24	26.1	7	36.8	4	66.7	141	22.1
Vitex doniana	7	1.5	6	10.4	5	5.4	1	5.3	-	-	19	3.0
Vitellaria paradoxa	137	29.5	22	37.9	44	47.8	10	52.6	-	-	213	33.3
Irvingia gabonensis	97	20.9	1	1.7	-	-	-	-	-	-	98	15.3
Afzelia africana	21	4.5	1	1.7	2	2.2	-	-	-	-	24	3.8
Total	464	100.0	58	100.0	92	100.0	19	100.0	6	100.0	639	100.0

Source: Field Survey, 2000

* Aggregate total number of respondents for each tree species per number of stands bracket.

Table 6. Distribution of respondents by common agroforestry systems/practices they have heard of, adopted and practices/systems *in which Vitellaria paradoxa* is incorporated

Common Agroforestry Systems And Practices	Systems/Practices Heard of.						Systems/Practices Adopted						Systems/Practices Vitellaria paradoxa Is Incorporated					
	Gboko Ext Zone		Otukpo Ext Zone		Adikpo Ext Zone		Gboko Ext Zone		Otukpo Ext Zone		Adikpo Ext Zone		Gboko Ext Zone		Otukpo Ext Zone		Adikpo Ext Zone	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
a. Alley Cropping/ Alley Farming	17	17.0	13	10.8	21	15	18	18.0	6	5.0	23	16.4	0	0.0	0	0.0	0	0.0
b. Taungya systems	17	17.0	22	18.3	21	15	26	26.0	32	26.7	36	25.7	0	0.0	0	0.0	0	0.0
c. Shelter-Belts/Wind breaks	14	14.0	11	9.2	18	12.9	20	20.0	4	3.3	27	19.3	31	36.9	5	7.5	22	35.5
d. Silvo pastoral	6	6.0	3	2.5	15	10.7	2	2.0	0	0.0	1	0.7	4	4.8	0	0.0	1	1.6
e. Agrosilvopastoral	11	11.0	4	3.3	15	10.7	15	15.0	1	0.8	21	15.0	23	27.4	1	1.5	11	17.7
f. Social Forestry	16	16.0	21	17.5	22	15.7	6	6.0	12	10.0	11	7.9	0	0.0	0	0.0	0	0.0
g. Improved Fallow in Shifting Cultivation	13	13.0	23	19.2	20	14.3	5	5.0	30	25.0	11	7.9	14	16.6	32	47.7	13	21.0
Other practices/Systems	6	6.0	23	19.2	8	5.7	8	8.0	35	29.2	10	7.1	12	14.3	29	43.3	15	24.2
Total	100	100	120	100.0	140	100	100	100	120	100	140	100	84	100	67	100	62	100

Source: Field Survey, 2000

Food: The fruits from this tree are common as food both for children and adults, fruits are collected from the floor of the forest and eaten fresh.

Raw materials for further Production: Wood of the species is used in producing mortars, pestles, wooden bowls and other ornamentals, the seeds for producing sheabutter oil, charcoal for heating, particularly blacksmithing and brewing., roots, leaves, and bark among others are used by traditional doctors in producing local herbal medicines.

A one-way ANOVA carried out shows no significant difference between these socio-economic benefits among farmers in Benue State (F-calculated 3.52 < F-tabulated 3.7), implying a fair utilization of *V. paradoxa* by the farmers for various purposes.

Table 7. Respondents' reasons for non-incorporation of *V. paradoxa* in farming Systems

Reasons	Gboko		Otukpo		Adikpo	
	Freq	%	Freq	%	Freq	%
The Tree not Available on my land	17	60.7	37	68.5	43	66.2
Difficult to raise and Maintain	6	21.4	9	16.7	14	21.5
Not aware of the species	1	3.6	1	1.9	2	3.1
Not Interested in it	2	7.1	5	9.2	5	7.7
Land tenure problems	1	3.6	0	0.0	0	0.0
Its Shade affects Crops negatively	1	3.6	2	3.7	1	1.5
Other reasons	0	0.0	0	0.0	0	0.0
Total	28	100.0	54	100.0	65	100.0

Source: Field Survey, 2000

Table 8. Pattern of socio-economic utilization of V. paradoxa.

Socio Economic Uses	GBOKO		OTUKPO		ADIKPO	
	Freq	%	Freq	%	Freq	%
Sources of Income	12	16.0	22	20.7	23	17.4
Medicines	25	33.3	36	33.5	46	34.9
Raw Material for further Production	15	20.0	7	6.53	14	10.6
Household Energy	5	6.7	34	31.8	24	18.2
Food	18	24.0	8	7.5	25	18.9
Total	75	100.0	107	100.0	132	100.0

Source: Field Survey, 2000

Table 9. Pattern of utilization of *V. paradoxa* component parts

Products: of *Vitellaria paradoxa* Used	GBOKO		OTUKPO		ADIKPO	
	Freq	%	Freq	%	Freq	%
Fruit /Seeds	18	19.4	17	17.7	31	22.5
Wood	19	20.4	31	32.3	31	22.5
Leaves	6	6.4	17	17.3	4	2.9
Bark	24	25.8	15	15.6	36	26.0
Roots	4	4.3	8	8.3	7	5.1
Latex	1	1.1	-	-	4	2.9
Twigs/ Branches	9	9.7	4	4.2	9	6.5
Other Products	12	12.9	4	4.2	16	11.6
Total	93	100.0	96	100.0	138	100.0

Source: Field Survey, 2000

SUMMARY AND CONCLUSION

The outcome of the study shows that *V. paradoxa* has a good potential in agroforestry systems in Benue State. This is so because of its extensive presence and adoption in agroforestry systems in the study area coupled with the favourable demographic and other socio-economic characteristics of the species. Also, the distribution of 52 stands of *V. paradoxa* per hectare on the average on farmers' farmlands across the state, a figure more than half of the recommended

density of 82-100 stands/hectare estimated by FAO (1989) is encouraging.

Furthermore, *Vitellaria paradoxa* is a forest fruit tree that has significantly influenced the socio-economic lives of farm families in Benue State. The tree may therefore be considered as a tree, which should be vigorously utilized in agroforestry systems in Benue State. In this regard, the development of research into the possibilities of domesticating the tree, particularly in commercial plantations will enhance both *ex situ* and *in situ* conservation of the species. Establishment of cottage industries and development of more scientific ways of processing and marketing of the products of the species will further add value to it. There is the need to strengthen the forest policy-research linkages to sustain these potentials and also improve land management capabilities in the State.

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