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DISTRIBUTION AND SOCIO-ECONOMICS OF TWO LEGUMINOUS TREE SPECIES IN GUINEA AND SUDDAN SAVANNA AGRO-ECOLOGIES OF NIGERIA

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ABSTRACT

This study was carried out to obtain information on the distribution and socio-economics of *Parkia. biglobosa* and *Tamarindus indica*, as well as other constraints to their production in the Sudan and Guinea savanna agro ecologies of Nigeria, using structural questionnaires that were administered to farmers and herb sellers/herbalists who are not less than 40 years of age. The data generated showed that *P. biglobosa* and *T. indica* were commonly found in and around the house-hold compound (40%), while plantation of these tree species were rarely in existence within the agro ecologies (10%). It was gathered from the findings that these tree species play great role in socio-economic (100%) and trado-medical life (50%) of the rural people. Many of the respondents (40-90%) reported insect pests and diseases as major constraints to their cultivations, while some admitted that low seed germination greatly hindered the cultivation of the these trees within the agro ecologies.

INTRODUCTION

Non-wood products from forest, particularly the edible fruits represent an important part of the rural economy, which was hitherto under-estimated in many developing countries including Nigeria (Adebisi, 1997). For the rural people in Nigeria, particularly the poor ones, forest are vital source of food (Dalziel, 1937, FAO, 1990, Okafor 1993, Akindele, 1992, Okarfor and Lamb, 1994), medicine (Sofowora, 1993, Olapade, 1997, Ibironke *et al* .,1997), raw materials and income generations (Muhammed *et al.*, 2001). Apart from protecting the environment, tree-species play a vital role in the economy of a nation as sources of timber, wooden poles and in re-creational purposes (Abbiw, 1990). They constitute an economic asset and an invaluable cultural heritage in any country (Adebisi, 1997, Lenne, 1992).

Over the years, continuous deforestation has resulted in substantial loss of these trees species (Okafor, 1993). However, foresters have concentrated their attention mainly on management of tree for timber. They placed little emphasis on non-timber products, thus leaving their socio-economic benefits grossly untapped. Forests are rich in non-timber resources and offer great but under-developed potentials which could provide a firm base for rural economy. In vast savannah areas, gathering of minor forest produce constituted a major means of employment (RAPID, 1985).

Non-wood leguminous forest trees are subject to serious and potentially important diseases in both savannah and forest regions of Nigeria (Lenne, 1992). These diseases include leaf spots; rust, mildews, stem-canker and heart rot (Zakaria, M. 1990, Muhammed *et al.*, 2001). Some of these diseases have been reported to cause about between 30- 80% reduction in yield of forest trees (Lenne, 1992).

The neglect of the agricultural sector due to the oil-boom and rapid industrial development in the urban cities has led to continuous migration of youths and other able bodied individuals to these industrial cities. Consequently, an unquantifiable benefit that could be obtained from the forest trees has been disregarded. More over, most trees species are also prone to pest infestation and diseases attack in both savannah and forest ecologies (Amusa and Alabi, 1999). However, little efforts are being made by users to plant and manage these economic trees much so those populations of the trees are gradually on the decrease. The rural people in the savanna agroecologies of Nigeria; depend on forest resources for meeting their energy needs, forest products, and for employment. This study was therefore designed to investigate distribution and socio-economics of *P. biglobosa* and *T. indica* and other constraints to their production, in the Sudan and Guinea savanna agro ecologies of Nigeria.

MATERIALS AND METHODS

Survey area and sampling procedure

The study was carried out in Sudan and Guinea savanna region of Nigeria between years 1998-2001. The sample area consists of 16 local govt. area (Table 1). The major occupation of the people in that state is farming, though the populace is also made up of civil servants and traders. Data collection was through administering of structured questionnaire, to farmers and the herbsellers/herbalists that are between the age of 40 and 80 years of age (Sofowora, 1982). A total of 480 farmers and herbalists/herb sellers were randomly sampled from 48 villages and three villages/ local govt. area(48 villages comprising of 9 local govt. and 27 villages from Sudan savanna and 7 local govt. and 21 villages from guinea savanna) (Table.1).

Sampled areas

Sudan savanna		Guinea Savanna	
Local Govt. area	Villages	Local Govt. area	Villages
Aiolero	Ailero, K/zama, Sadam.	Maiyama	Karaye,Maiyama, Mungadi
Arewa	Bachaka, Kangiwa, Yeldu	Sakaba	Dirin-daji,Dan-kolo, Makuku
Argungu	Argungu, Gulma, Laitaba	Shanga	Dugu, Kebe, Shanga
Birnin-Kebbi	Ambursa, B/Kebbi, G/gwaji	Danko, Ribah, Wasagu	Danko, Ribah, Wasagu
Bunza	Bunza, Gwade, Zongirma	Fakai	Bajida, Gwandu, Marafa
Dandi	Dolekaina, Fingilla, Kamba	Yauri	Waje, Yauri, Yelwa
Gwandu	Dalijan, Gwandu, Malisa	Zuru	Dabai, Manga, Zuru.
Jega	J/dutse, Jega, Kimba		
Suru	Bakwuwai, Dakin-gari, Suru		

Ten people who had traded with or cultivated the tree species for over 10 years were interviewed from each of the 48 sampling points, making about 270 people from the Sudan savanna and 210 people from the Guinea savanna to give the sample size as 480 respondents. Information were collected on the distribution of the tree species within the agro ecologies, cultivation of the tree species by the farmers,

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availability of the tree species with in the agro-ecologies, the associated diseases and pest and the economic and medicinal importance of *P. biglobosa* and *T. indica* to the populaçe. The data generated from the questionnaires were analyzed using descriptive analysis.

Table 1. Distribution of respondent based on demographic characteristics

Sex	Percentage distribution
Male	70
Female	30
Total	100

Age (Years) distribution	Percentage
40	20
40-50	25
50-60	35
60-70	15
70-90	5
Total	100

Occupation/Vocation	Percentage distribution
Farmers	60
Herb sellers	10
Herbalists (only)	8
Farmers/Herbalists	20
Others	2
Total	100

Source: Survey data 2000 and 2001

RESULTS AND DISCUSSIONS

Table 1 shows that 70 % of the respondents were male and about 90 % of them were above 50 years of age. The implication of this is that most of the people interviewed had a good knowledge of the subject matter. Some of them probably would have seen the existence of these tree plantations in their life time. Result also revealed that 72% of the respondents were farmers, while the remaining 28% were either herb sellers or herbalists.

Figure 1. Dependency of the respondents on forest products

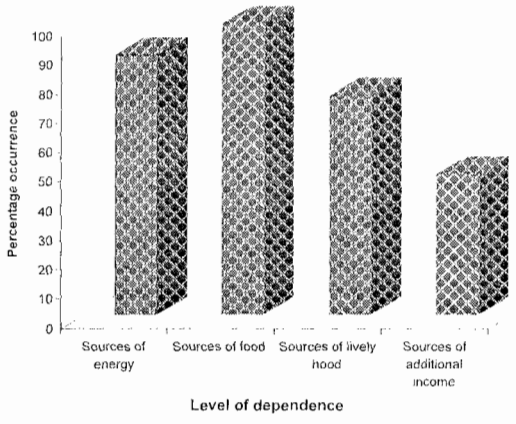


Figure 1. also showed that virtually all the respondents depend on forest products for their survival. Eighty nine percent (89%) of them used forestry product as source of energy, 75% also rely solely on forestry products for livelihood, while 48% of the respondents rely on forest products as sources of additional income. The implication of the above is that *T. indica* and *P. biglobosa* are the commonest forest trees in the savanna agro ecologies of Kebbi state (Muhammed *et*

Table 2. Percentage distribution of the respondents based on the locations or the distributions of *T. indica* and *P. biglobosa* in both Sudan and guinea savanna agro ecologies of Nigeria

		Sampled local govt area /Percentage distributions of respondents															
Tree species	Location	Aliero	Arewa	Argungu	B/kebbi	Bunza	Dandi	D/wasagu	Fakai	Gwandu	Jega	Maiyama	Sakaba	Shaga	suru	Yauri	Zuru
P. bligl obosa	Around compound	10	10	20	10	20	10	30	40	10	10	10	30	30	10	40	20
	Outlying farm	30	30	30	20	30	30	40	50	20	30	20	50	50	30	50	50
	Plantation	0	0	0	0	0	0	20	20	0	0	0	20	10	0	20	20
T. indica	Around compound	40	30	50	40	40	50	50	40	40	40	40	60	30	40	60	20
	Outlying farm	30	10	30	20	20	20	30	50	20	30	10	40	50	30	40	30
	Plantation	0	0	0	0	0	0	20	20	0	20	0	20	0	0	30	20

Table 3.Percentage distribution of the respondents based on the availability of *T. indica* and *P. biglobosa* in both sudan and guinea savanna agro ecologies of Nigeria

		Sampled locations /Percentage distribution of respondents															
Tree species	Years	Aliero	Arewa	Argungu	B/kebbi	Bunza	Dandi	D/wasagu	Fakai	Gwandu	Jega	Maiyama	Sakaba	Shanga	Suru	Yauri	Zuru
P. bigl obosa	1998	5	10	10	5	20	10	10	10	5	5	10	5	5	20	5	10
P. bigl obosa	1999	20	24	24	15	30	30	15	10	15	20	15	5	15	20	15	10
P. bigl obosa	2000	25	36	36	25	30	40	25	20	25	25	15	10	20	30	20	10
P. bigl obosa	2001	30	60	60	40	40	50	30	25	40	30	20	15	25	35	25	20
T .indica	1998	45	20	20	50	45	55	30	30	50	45	20	20	30	35	30	30
T .indica	1999	50	45	45	55	45	65	30	30	55	50	25	25	40	40	40	40
T .indica	2000	60	55	55	60	50	70	40	40	60	60	30	30	45	45	45	40
T .indica	2001	60	70	70	60	60	80	40	40	60	60	30	30	50	50	50	40

Source: Survey data 2000 and 2001

Table 4. Percentage distribution of the respondents based on the economic and medicinal importance of *T. indica* and *P. biglobosa* in Sudan and guinea savanna regions of Nigeria

		Sampled location /Percentage distribution															
Tree specie	Plant parts	Aliero	Arewa	Argungu	B/kebbi	Bunza	Dandi	D/wasaqu	Fakai	Gwandu B/kebbi	Jega	Maiyama	Sakaba	Shanga	Suru	Yauri	Zuru
P. biglobosa	F	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
P. biglobosa	L	20	30	30	20	20	25	50	50	20	20	10	50	40	20	40	60
P. biglobosa	S	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
P. biglobosa	FL	30	50	50	35	20	30	40	30	35	30	20	40	40	15	40	40
P. biglobosa	R	15	10	10	10	30	5	50	30	10	15	20	40	30	10	30	50
T. indica	F	10	100	100	100	100	100	100	100	100	10	100	100	100	100	100	100
T. indica	L	60	50	50	60	20	50	70	60	60	60	20	30	60	10	60	50
T. indica	S	10	10	10	10	10	5	10	60	10	10	30	30	20	5	20	40
T. indica	FL	5	5	5	5	5	5	10	10	5	5	10	5	10	5	10	20
T. indica	R	5	5	5	2	5	5	5	10	2	5	5	10	10	5	10	20

F-Fruits, L-Leaves, S-Seeds, FL-Flowers, R-Roots

Source: Survey data 2000 and 2001

al., 2001).

Result of the survey showed that all the respondents reported to have observed the existence of the *P. biglobosa* in their area (Table 1). While, only 80 percent of the respondents reported to have observed the existence of *T. indica* in their locality. Keay *et al.* (1964) noted it to be the commonest tree of the savanna, although it is occasionally found in the moist forest area of West Africa.

About forty percent (40%) of respondent in Yauri and Fakai in the guinea savanna agro- ecology reported that *P. biglobosa* was commonly found around the house hold compound (Table 2). While more than 10% of the respondent in the other locations reported the existence of the tree species within the same environment. Over 40% of the respondents in both agro-ecologies reported existence of *T. indica* around the house hold compounds. Reasons for the above observation might not be unconnected with the fact that *P. biglobosa*, or the African locust bean played a significant role in the environmental protection. The wide spread canopy of the tree clearly shows its ability to provide protection from harsh whether, which is characteristics of the savanna agro- ecologies, as well as sheds for humans and livestock. More than 20% of the respondents in the two agro-ecologies submitted that the two tree species are found in their outlying farms. The plantations of the tree species under study were found not to exist in most of the study area except in Fakai, Zuru, Yauri, D/wasgu and Sakaba all in the guinea savanna agro ecology. As shown in table 3 in 1998, about 20% of the respondents reported the difficulty in getting the 2 tree species (non availability) within their domain. However, in 2001 up to 60 % of the respondents in some areas reported difficulties in getting *P. biglobosa*, with regards to *T. Indica*, within 20-45% of the respondents reported the non availability of the tree specie in 1998, while in 2001, up to 80% of the respondents in Dandi reported the non-availability of the crop especially the herb sellers and the herbalists.

Reasons for the dearth of this tree plantation in those localities could be due to the indiscriminate fetching of the trees by the populace without planting new once. These trees are use as fire woods and in charcoal production which are sources of livelihoods for the teaming populace. Some of the respondents who are about 70 years of age reported that in the colonial era, the plantations of the 2 tree species existed; however, these plantations have been depleted due to continuous exploitation, old age, natural causes like fire, and non replacement.

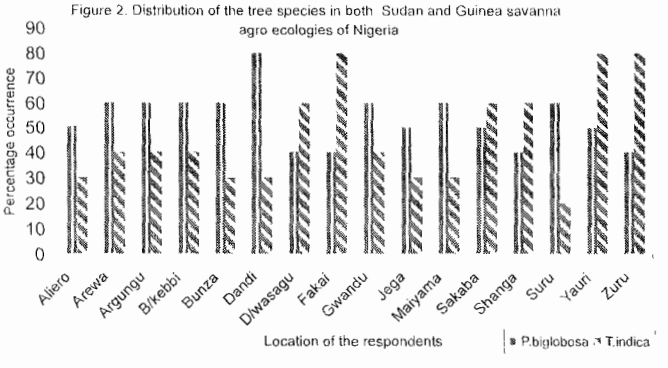
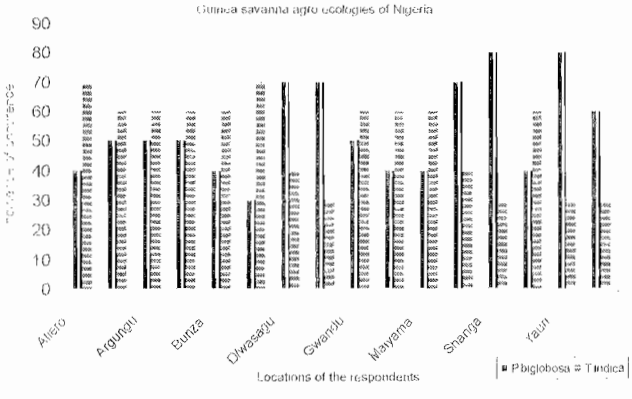


Figure 2. revealed that *P. biglobosa* was widely distributed in the Sudan and guinea savanna agro-ecologies, however, its distribution was found to be higher in Sudan savanna compared to the guinea savanna. *T. indica* was found widely distributed in both agro-ecology of Kebbi State, was however eighty percent (80%) propagation or distribution rate was recorded in Fakai, Zuru, and Yauri which are located in the guinea savanna agro-ecology. While between 20-40% production or distribution rate was recorded for *T. indica* in Sudan savanna agro-ecology L.G.A.

Virtually every respondent in both agro-ecologies submitted that fruits and seeds of *P. biglobosa* are of economic (as feeds for the animals) and medicinal importance (Table 4).

While the usefulness of the other parts were also acknowledged by between 10% and 50% of the respondents in the 2 agro-ecologies. All the respondents in 2 agro ecologies of Kebbi State also agreed that *T. indica* fruits are of both economic and medicinal values. The leaves of *T. indica* was how ever rated high by the respondents in both agro ecologies in terms of its importance than the other plant components (Table 4) More over, it has been reported that virtually every part of *P. bilgobosa* is utilized by man; both the sweet-tasting pulp and the embedded black seeds are eating by many communities in Nigeria (Muhammed *et al.*, 2001). F.A.O. (1990) reported that seeds of *P. biglobosa* which contained about 32.3% and 17% of protein and fat respectively are fermented and used as a condiment throughout West Africa. It has been reported that both the seeds and the leaves are used in the production of beverages, and the whole pods are fed to livestock's in northern Nigeria (Awodola, 1994)

Figure 3 Survey of the pest and diseases of T. indica and P. biglobosa in Sudan and Guinea savanna agro ecologies of Nigeria



All the respondents, who claimed to propagate the tree species from the seeds, sowed untreated seeds. This shows their ignorance on the pathology and the physiology of the seeds of the tree species. *P. biglobosa* seeds are known to undergo dormancy stage and hence take very long time to germinate and are therefore exposed to microbial infection right in the soil. About 70% of the respondents reported the incidence of diseases and pests on the two tree species in the 2 agro ecologies of Kebbi state (Figure 3) This may be reason why the tree crops are not easily cultivated by the rural populace and hence responsible for its dearth in savanna regions of northern Nigeria. Muhammed *et al* (2001) reported that germination of *P. biglobosa* seeds was highest when soaked in 98% sulphuric acid concentration for a period of 30mins, or soaking in 49% sulphuric acid concentration at for a period of 60mins. Soaking the *P. biglobosa* seeds in hot water was also reported to give higher percentage germination than planting without treatment (Muhammed *et al.*, 2001). *Parkia biglobosa* and *T. indica* are known to be susceptible to serious and potentially important diseases in both forest and savanna agro-ecologies of Nigeria (Lenne, 1992, Muhammed *et al.*, 2001, Muhammed *et al.*, 2002). While some fungal pathogens have been reported to cause about 30% reduction in seedling development in the (woody and none woody legumes) nursery (Zakaria, 1990).

In Nigeria, the growth and management of most leguminous trees is in the hand of local farmers whose lively hood is dependent on their production. Nursery phase is an important part of the operation in the cultivation of many tropical tree crops (Ayodele, 1997). Keeping the seedlings to grow in the nursery until they are larger, tougher and more vigorous makes it possible to give maximum are to seedlings, save seeds, space and water, reduces the risk of damage to, or loss of the plant (Ayodele, 1997). Hence, the government through the ministry of Agriculture at the local government level could make available seedlings to farmers, who will also be educated through the extension officers on the modern crop protection practices used in managing diseases of tree crops.

The forestry research institutes could also establish plantations of these economic trees in savanna agro ecologies considering its economic importance to the people and the nations at large.

REFERENCES

Abbiw, D.K., 1990. Useful plants of Ghana: Kew. West African uses of wild and cultivated plants. ITP/Kew 337P.

Adebisi, A. A., 1997. Preliminary survey of Post-harvest and marketing constraints of *Chrysophyllum albidum* (African Star Apple) In Proceedings of a national Workshop on the potentials of the Apple in Nigeria. (A.O. Denton *et al* eds) 84- 102pp.

Amusa, N. A and Alabi, A., 1996. Host rage of *Colletotrichum* isolates from *Gliricidia sepium* and its implications in crop production. Crop Research 11: 359-363.

Ayodele, V. I., 1997 Substrate for production of ornamental in Nigeria. In Proceedings 15th Hortson Conference, Ago-Iwoye, Nigeria 112pp.

Akindele, S.O., 1992. A survey of non-wood forest products in Ondo State Nigeria. In Akinsanmi, F.A.(ed.): Our forest environment and heritage: Challenges for our people. FAN 3-7P.

Dalziel, 1937. The useful plants of west Tropical Africa. Crown Agents 27pp.

F A O, 1990. Provision indicative world plan for Agricultural development. Vol. 2. F. A. O. of the United Nations Rome 672pp.

Hawthorne, W. D., 1995. Ecological Profiles of Ghanaian Forest Trees. TFP 29. OFI 245P.

Ibironke G. G., Olaleye, S. B., Balogun, O. and Aremu, D., 1997. Effects of diets containing seeds of *Garcinia kola* (Hercket on gastric acidity and experimental ulceration in rats. Phytotheraphy Research, Vol. 11, 312-313.

Keay, R. W. J., Onochie, C.F.A. and Stanfield, D. P., 1964. Nigerian Trees Vol. 11 Department of forest Research Ibadan, Nigeria 180pp.

Lenne, J. M., 1992. Diseases of Multipurpose woody legumes in the tropics. A. review. Nitrogen Fixing Tree Report Vol. 10: 13-29.

Muhammed ,S. Amusa, N. A., Suberu, H. A., Abubakar, A. and Magaji, M. D., 2001. The effects of soil amendments with sawdust and rice-husks on the incidence on the incidence of seedling blight caused by *Fusarium solani* and *Rhizoctonia solani* and the growth of *Parkia biglobosa*. Moor Journal of Agricultural Research 2: 40-47.

Muhammad, S. and Amusa, N. A., 2001. The effects of soil amendments with Sawdust and Rice-husks on the growth and incidence of seedling blight of *Tamarindus indica* Linn. caused by *Macrophomina phaseona* and *Rhizoctonia solani* J of Sust. Agric. and Environ. 3. 34-39.

NEST, 1991. Nigeria's Threatened Environment A National Profile, Nigerian Environmental Study/Action Team (NEST), Ibadan, Nigeria, PP.288.

Okafor, J. C., 1993. Lost crop of Nigeria: An overview. In: Julius A. Okoju and D U U. Okali (eds) Lost crops of Nigeria, Implication for food security, UNAB Conference Proceedings Series No.3. 2-32pp.

Okarfor, J. C. and A. Lamb (1994). Fruit trees diversity and conservation strategies. In Leakey, R.R.B. and A.C. Newton (eds): Tropical trees: the potential for domestication and rebuilding of forest resources. 34-41P.

Olapade, E. O., 1977. Sustainable Productivity and Utilization of *Pausinystalia Johimble* Pierre ex beille in HIV Control. Paper presented at the IUFRO meeting Washington State University Pullman, Washington, USA July 12-17, 1997.

RAPID, 1985. The effects of population factors on social and economic development.Federal Ministry of Health and National Population Bureau. P.11.

Sofowora, A., 1993. Medicinal Plants and Traditional medicine in Africa , Spectrum Books Limited. Ibadan. (285).

Sofowora, A., 1982. Medicinal plants and Traditional Medicine in Africa. John Wiley and Sons Ltd. P.256.

Zakaria, M., 1990. Diseases of forest plantation speies in Penisular Malaysia. In Hitacharen, C. MacDIKEN, k. g., Ivory, M.H. and Nair, K. S. S (eds), Proceedings of the IUFRO workshop- pests and diseases of forest plantation regional office for Asia and the pacific, FAO, Bangkok 94-99pp.