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SOCIO-ECONOMIC AND ENVIRONMENTAL IMPORTANCE OF *PAKIA BIGLOBOSA* (JACQ.) BENTH IN THE CONDITIONS OF NEW BUSSA, NIGER STATE, NIGERIA

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ABSTRACT

The socioeconomic significance of *Parkia biglobosa* in the New Bussa Area of Niger State was the main subject of this investigation. The aim of the studies was to assess the socioeconomic importance of *Parkia biglobosa* in the area under investigation as well as the part that rural residents played in the plant's harvest. Oral interviews and a structured questionnaire were used to gather information from a selection of the New Bussa communities in order to get details about the applications of *Parkia biglobosa* in the research region. Many rural households in New Bussa gain much socioeconomically from *Parkia biglobosa*, according to the study's findings. Plant parts used are the seeds, leaves, bark, and roots of *Parkia biglobosa*. While forty percent of the seed is used for food and sold to make money, the remaining twenty-three percent is used for medicinal purposes, primarily in conjunction with the root, which is the least gathered in the area. According to 43.33% of those surveyed, fewer trees are present now. It's evident that *Parkia biglobosa* faces significant challenges in the surrounding woodlands and forests, and if the plant's excessive use is not controlled, it may go extinct. In order to guide the collection of *Parkia biglobosa* without depleting resources, it is advised that the government endeavor to create sufficient laws to control the taking and removal of *Parkia biglobosa* plants in order to manage the plant's collection without exhausting available resources.

KEY WORDS

Socio-economic importance, *Parkia biglobosa*, rural communities, New Bussa.

Parkia biglobosa is a perennial deciduous tree with a height ranging from 7 to 20 m, although it can reach 30 m under exceptional conditions. Crown is large, spreads wide with branches low down on a stout bole; amber gum exudes from wounds; bark dark grey brown, thick, fissured. Occurs on a wide range of natural and semi-natural communities such as open savannah woodlands, but it is most conspicuous and abundant in anthropic communities, principally bush fallow and wooded farmland where cultivation is semi-permanent (Orwa *et al.*, 2009).

Parkia biglobosa species has important socio-economic and cultural values for local people. It is a food species whose importance is well recognized both regionally and internationally. Ecologically, the African locust bean tree plays a vital role in nutrients recycling and erosion control. The tree acts as a buffer against the effect of strong wind or water runoff that usually causes damage to crops and soil (Amusa and Jimoh, 2012).

An array of multipurpose uses has been reported, including food, medicine, manure, gum, tannin, shade, wind-break, bee food, stabilization of degraded environmental, livestock feed, fuel, fibre, fish poison and several other domestic uses. *Parkia biglobosa* popularly known as locust bean, dadawa, or dawa-dawa, belongs to the family, Fabaceae and the subfamily Mimosoideae (Orwa *et al.*, 2009). Some major synonyms for *P. biglobosa* are *P. oliveri*, J.F. Macbr, *P. clappertoniana* (Keay, 1989). The seeds called (kalwa- Hausa; Iyere-Yoruba) are traditionally used as food condiments (dawadawa- Hausa; Iru-Yoruba; soumbala in Burkina Faso, Mali, Cote d'Ivoire and Guinea, Ogiri in Eastern Nigeria) (Keay, 1989).

Parkia. biglobosa is found in nineteen African countries: Senegal, The Gambia, Guinea Bissau, Guinea, Sierra Leone, Mali, Côte d'Ivoire, Burkina Faso, Ghana, Togo, Benin, Niger, Nigeria, Cameroon, Chad, Central African Republic, Zaire, Sudan, and Uganda. The use of the fermented beans of African locust bean dates back many centuries and was already



described in the 14th Century (Sina and Traore, 2002). The tree of *Parkia* is normally found in the savannah region but not planted in most cases, rather spared during land preparation for farming. This means that the tree of *Parkia biglobosa* is widely distributed in the wild, fallow land, and agricultural land. People still regard *Parkia biglobosa* as an important natural local resource.

Only under dire economic circumstances are farmers compelled to destroy the trees. *Parkia biglobosa* usually is protected on farmlands, though the present deteriorating economic situation and poverty force some farmers to sacrifice the tree for charcoal or firewood. The immediate and somewhat desperate needs outweigh the long term and diverse value of trees and *Parkia biglobosa* as a resource. The tree provides financial benefits, and the many diverse uses and traditional regard still have enormous value (Babalola 2012).

Adequate information and scientific data regarding the extent *Parkia biglobosa* is used by the local communities surrounding New Bussa is lacking. For proper management of these important economic species, there is need to understand how the rural people are putting *P. biglobosa* into use as well to what extent the whole plant is being utilized. Hence study on the socio-economic importance of "*Parkia biglobosa* by the local communities in the region is an attempt to address both the uses and problems facing *Parkia biglobosa* of the area. This study would be beneficial to *Parkia biglobosa* marketers, researchers and general public. It also reveals the potential of *Parkia biglobosa* in improving the livelihoods of rural communities and guarantees the conservation of biodiversity in the area. The objectives of the study are, to evaluate the socioeconomic significance of *P. biglobosa* in the study region as well as the role that rural people played in the harvesting of the plants.

METHODS OF RESEARCH

This study was conducted in New Bussa, the administrative headquarters of Borgu Local Government Area of Niger state, Nigeria (Ekeke and Stopfords, 1984). In this investigation, personal interview and direct observation was carried out. Data were collected using structured questionnaire and oral interviews to acquire information from sampled members of the New Bussa communities. A total of sixty (60) structured questionnaires were administered randomly to respondents in 4 selected villages identified as the leading producers and users of *P. biglobosa* in the area. The selected villages were Tamanai, Monai, Kurwasa and Karabonde, while 15 questionnaires were administered to families in each community and this was used to elicit information on the uses of *P. biglobosa* in the area. A period of three months was used for data collection. The study was conducted between January 2015 and July 2015. The data obtained were analyzed using descriptive statistics-tables, charts and percentages.

RESULTS AND DISCUSSION

Table 1 displays the respondents' socio-demographic characteristics. This particular issue involves sex, age, religion, level of education, and occupation. The data collected indicates more females than males, with the greatest percentage being 58.33%. A total of 41.67% of respondents are between the ages of 21 and 30. 15% of respondents did not attend any school, while only 10% of respondents attended school up to the postsecondary institution level. With 40% of replies, farming is the most common occupation of the respondents, followed by civil servants (26.67%), and trading/business (13.33%) is the least common. Farming was the most frequent occupation of the population, and just 10% of respondents said they had completed their education at a tertiary institution. Consequently, the incapacity of individuals to seek further education has an adverse impact on the resources of animals. Furthermore, Hamza *et al.* (2014) showed that the lifestyle choices made by people living in rural areas consistently affect the number of wild plants like *P. biglobosa* as well as the amount of forest cover.



Table 1 – Descriptive statistics of socio-demographic of the Respondents (%)

Variables	Categories	Frequency	Percentage (%)
Sex	Male	25	41.67
	Female	35	58.33
	Total	60	100
Age	15- 20	9	15
	21- 30	25	41.67
	35- 40	18	30
	41 above	8	13.33
	Total	60	100
Religion	Islamic	52	86.67
	Christianity	8	13.33
	Total	60	100
Marital status	Single	14	23.33
	Married	46	76.67
	Total	60	100
Level of education	No formal education	9	15
	Primary	30	50
	Secondary	15	25
	Tertiary institution	6	10
	Total	60	100
Occupation	Student	12	20
	Civil servant	16	26.67
	Trading/business	8	13.33
	Farming	24	40
	Total	60	100

Figure 1 depicts the locations where *Parkia biglobosa* are collected. The results indicate that, with the highest response rate of 56.67%, rural residents gather *Parkia biglobosa* in other forest bush lands close to their homes, while 13.33% of respondents gather the species in the forest inside government reserves.

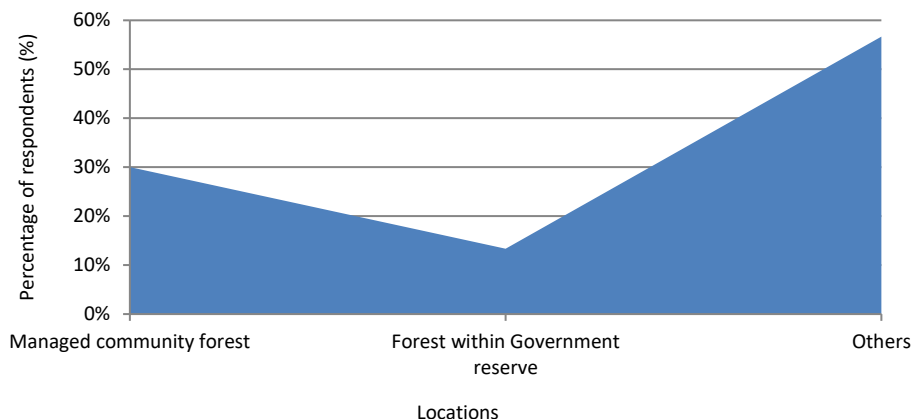


Figure 1 – Place where the *Parkia biglobosa* seeds and parts are collected (%)

The rate of *Parkia biglobosa* collection (%) in the region is displayed in Table 2. The biggest percentage of responders, 83.33%, is engaged in *Parkia biglobosa* collection, according to the results. With 35% saying they only collect *Parkia biglobosa* occasionally, this is the largest percentage. When they go to collect, the park does not see them, according to 76.67% of respondents, thus they are not arrested. According to the results regarding the current situation of *Parkia biglobosa* tree populations in the study area, 43.33% of respondents acknowledge that there are fewer trees than there were in previous years, while 18.33% said that trees are generally scarce and difficult to see unless one moves a significant distance into the bush. This supports the claim made by Hamza *et al.* (2014) that *P. biglobosa* is a significant component of the savanna vegetation, and that *P. biglobosa* is vulnerable while the tree populations of the species are in decline in their wild ranges. It is clear that *Parkia biglobosa* is under a lot of pressure in the nearby forests and woodlands, and the plant may become extinct if excessive use is not controlled.



Table 2 – Rate of collection and Present status of *Parkia biglobosa* (%)

Options	No of response	Percentage (%)
Involvement in collection of <i>Parkia biglobosa</i>		
YES	50	83.33
NO	10	16.66
Frequency of collection		
Full time	28	46.67
Part time	32	53.33
Arrest by Government Official		
YES	14	23.33
NO	46	76.67
Present status of <i>Parkia biglobosa</i>		
Still abundant	23	38.33
Reduced	26	43.33
Scarce	11	18.33

Table 3 presents the communities' engagement in seed preparation and collecting of *Parkia biglobosa*. According to the findings, Tamanai has 73.33% of respondents who are involved in collecting NTFPs, although Karabonde has a higher percentage of women involved (46.67%) than the other three villages. The findings of the chi-square test support Babalola's (2012) assertion that women and children handle the majority of *P. biglobosa* fruit and seed processing locally. There was no discernible variation in the participation and non-participation of men in *Parkia biglobosa* collection across the three communities. Everyone gathers it and utilizes it for various purposes.

Table 3 – Involvement in *Parkia biglobosa* Collection, %

Communities	Women only	Whole household	Total	χ^2	df	P
Tamanai	4(26.67%)	11(73.33%)	15	1.3396	3	N.S. (P>0.05)
Monai	6(40%)	9(60%)	15			
Kurwasa	6(40%)	9(60%)	15			
Karabonde	7(46.67%)	8(53.33%)	15			
Total	23(38.33%)	37(61.67%)	60			

Source: Field survey, 2015; χ^2 =chi square, df = degrees of freedom), [N = 60].

Table 4 lists the parts of *Parkia biglobosa* plants that are collected in the research area along with their respective uses. According to the findings, the parts harvested include seeds, leaves, bark, and roots. Of the seeds, 40% are used as food spices, and the remaining portion is sold for a profit. Along with the bark, which accounts for 23.33% of its use, the root—which is the least harvested in the area and only 5% of it is collected for medicinal use—is also used. Throughout the dry season, *P. biglobosa* green foliage remains on the tree and provides a significant amount of animal feed. This is consistent with the report (Babalola 2012) that states *Parkia* leaves are used as green manure, husks and roots' fibers are used as sponges, musical instrument strings, and to make small baskets, and the fruit's mealy pulp is consumed or combined with water to create a sweet, carbohydrate-rich drink. Deadwood is sold and used for making firewood. The lowest branches of the tree will be pruned by farmers and fed to their cattle. This suggests that *Parkia biglobosa* is under a lot of pressure in the nearby forests and woodlands, and if overharvesting is not managed, the plant may go extinct.

Table 4 – Parts of *Parkia biglobosa* plants utilized and the purpose it is used for, %

Parts	Food spice	Medicine	Sold	No of response	Percentage (%)
Seed	X	-	X	24	40
Leaves	-	X	X	6	10
Bark	-	X	X	14	23.33
Deadwood	-	-	X	13	21.67
Root	-	X	X	3	5
Total				60	100

Note: X= Used, - = Not used.



The Figure 2 shows the major uses of *Parkia biglobosa* in the study area. The findings demonstrate that the primary application of *Parkia biglobosa* in the study area is as a food spice with 50% being the highest, while 20% is collected and marketed. This supported Sina and Traore, (2002) claim, that the fermented seeds of *pakia* ('dawadawa') serve primarily as a condiment for seasoning sauces and soups, while medicines derived from *P. biglobosa* are of value to a rural community that cannot afford nor has access to “modern medicine”.

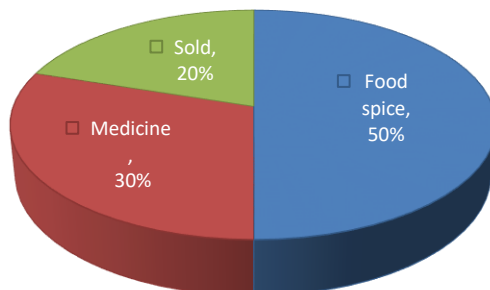


Figure 2 – Primary Uses of *Parkia biglobosa*, %

The monthly percentage income from *Parkia biglobosa* sales is displayed in Figure 3. The findings indicate that 40% of respondents make between ₦3,000 and 4,000 per month, which is the highest income range, while 30% make between ₦2,000 and 3,000 per month. This supports Babalola's (2012) claim that the *pakia* tree has economic benefits and that its tremendous value is still derived from its many diversified applications and traditional esteem. *Parkia biglobosa* is one of the several NTFPs that the rural populations rely heavily on for their subsistence needs; these NTFPs also significantly increase the overall annual family income of these communities (Pyakurel and Baniya 2011).

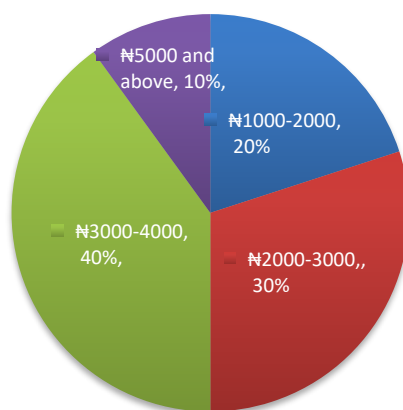


Figure 3 – Income generated from the sale of *Parkia biglobosa* per month, %

The techniques used to prepare and apply *Parkia biglobosa* are displayed in Table 5, and the outcome demonstrates that this traditional family craft is carried out using equipment created locally. Adedokun (2006) also notes that *Parkia* bean seed preparation is a customary family craft carried out with crude tools. The seed is boiled, allowed to dry for seven days, mashed, and then formed to fit the mold before being utilized. As further mentioned by Sabbiti & Cobbina (1992), this yields the processed beans needed to make iru or dawadawa, which are then progressively added to meals as a spice while cooking. Furthermore, the root is usually washed, pounded into a powder, and then blended with purified water to create a drink that is taken to alleviate ailments such as upset stomachs and malarial infections. The bark, roots, leaves, flowers, fruits, and seeds are commonly used in



West African traditional medicine to treat a variety of ailments, both topically and internally, and sometimes in combination with other therapeutic approaches, according to reports by Hunn *et al.* (1998) and Andre *et al.* (2006). Therefore, increasing awareness of the need to conserve *Parkia biglobosa* populations throughout their whole distribution area is necessary in order to create sustainable management techniques that concurrently meet product demand.

Table 5 – Methods use in preparing and applying *Parkia biglobosa*

Option	Mode of preparation	Mode of application	Uses
Seed	See is boiled, dried for 7days then pound and mold to size.	Add small bit while cooking food.	Food spice
Leaves	Dried for few days and then pound	A potion soaked in water and drink to cure malaria.	Medicine
Bark	Dried at room temperature	soaked in soft drink and drink to cure malaria.	Medicine
Root	Pound to powder	A potion soaked in water and drink to cure malaria.	Medicine

Table 6 – Problems affecting *Parkia biglobosa* utilization and Solutions proffered

S/No	Problems	Solutions
1	Lack of strict laws guiding the production and processing of <i>Parkia biglobosa</i> seed in a sustainable way.	Government should make adequate laws to guide the production and processing of <i>Parkia biglobosa</i> seed without depleting the resources
2	The processing of <i>Parkia biglobosa</i> seeds is done in an unhygienic environment.	The people should be made to keep their environment and utensils clean at all time
3	The mode of processing is tedious and takes a long time.	A better technology that will facilitate good hygiene practices should be developed for the processing and packaging of the seeds.
4	Lack of standard market where <i>Parkia biglobosa</i> could be sold.	Government should provide a standard market where <i>Parkia biglobosa</i> could be sold.
5	Deforestation/Tree lopping by man	Government should stop humans from cutting <i>Parkia biglobosa</i> trees indiscriminately.



Image 1 – Seeds of *Pakia biglobosa* ready for use in the study area

Table 6 lists the issues influencing the use of *Parkia biglobosa* along with suggested fixes. The results show that there are neither standard markets where *Parkia biglobosa* could be sold nor tight regulations governing the sustainable production and processing of the plant's seeds.

CONCLUSION

The study revealed that the seed of *Parkia* has very high socio-economic importance to the communities. *P. biglobosa* utilization in the study area has been going on for a very long time. No one can say exactly when man started using the plant or its seed. *P. biglobosa* is used for charcoal production and firewood, although the fruits and seeds are considered more economically important than this. It is occasionally also used for house building, mainly for indoor construction. Presently collection of this useful plant from the wild is proving very difficult due to the problem of habitat destruction and lack of strict laws guiding the production and processing of *Parkia biglobosa* seed in a sustainable way. The study also showed that



the utilization of *Parkia* also boost the use of herbal medication among humans both in the local communities and urban areas. Generally high demands are being placed on *Parkia biglobosa* in the forest/ woodlands around and the over exploitation of the plant could lead to it going into extinction if not controlled. In a nut shell government should try and make adequate laws to guide the harvesting, production and processing of *Parkia biglobosa* seed without depleting the resources.

Based on the findings, the following recommendations are made:

- Well-equipped hospitals should be built in these towns to provide better medical care for the local population and lessen the over-exploitation of *Parkia*;
- Better technology for the processing and packaging of the seeds should be developed in order to support hygienic practices;
- The government needs to discourage people from indiscriminately felling *Parkia biglobosa* trees.

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