

AWARENESS AND USAGE OF THE BAOBAB IN RURAL COMMUNITIES IN KWARA STATE, NIGERIA

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Abstract

The study investigated awareness and usage of the Baobab plant in rural communities in Kwara State, Nigeria. It examined the determinants of the plant's usage as well as constraints to its usage in the State. A three stage random sampling procedure produced the 200 respondents from which primary data used for the study was collected using a well structured questionnaire. Descriptive statistics including frequency counts, percentages and means was employed in presenting the findings of the study. The logit regression model was used in the determination of the factors of usage among the respondents. The study revealed that the level of awareness of the uses and benefits of the plant as well as its usage in the state is poor. Level of awareness at $p < 0.05$ and income at $p < 0.1$ were found to be the determinants of usage of the baobab in the State. The strong negative socio-cultural belief held about the plant, poor level of awareness about its benefits and the poor knowledge of its processing were the major constraints against its use in the State. The study recommends the need to increase awareness of the benefits of the plant and also to provide information on the processing methods applicable to the baobab. The various agricultural extension agencies in the State in collaboration with agricultural research institution in the State can go a long way in ensuring that the potentials of the baobab plant is optimized among rural communities in the State.

Keywords: Baobab (*Adansonia digitata* L.), Awareness, Usage, Logit Regression Model, Kwara State.

Introduction

The reliance of millions of the world's rural poor on forest products, particularly edible wild plants for their sustenance has been established (Smith *et al.*, 1996; Assogbadjo *et al.*, 2008). This is evidenced by the fact that such plants which may be trees, palms or shrub species have been known to provide shade, aesthetic sight, edible fruits, seeds, leaves, resins, tannins, gums, oils and pharmaceutical products (Muok *et al.*, 2001). Arid and semi-arid Africa is particularly blessed with several undomesticated plant species of which the baobab tree (*Adansonia digitata*) popularly referred to as the horseradish tree, the upside-down tree, and the tree of life is adjudged the most useful of them all (Phyto Trade Africa 2012). Though originally located in Botswana, Namibia, Zimbabwe, Mozambique and South Africa, it is now found throughout Africa so much so that it is fast becoming an icon, symbolic of the African continent (FAO 1988; Keith and palgrave, 2000; Gebauer *et al.*, 2002).

The Baobab, popularly called igi ose among the dominant Yoruba speaking populace of Kwara State is widely distributed and is found in all parts of the state. In spite of the prevalence of the plant in the state, there is dearth of literature

on the level of awareness of the immense potentials of this free gift of nature and its usage among the rural poor of the state. It is against this background that the study investigated the following;

the level of awareness about the Baobab plant;
their usage of the Baobab plant;
determinants of usage of the Baobab plant among the rural poor in Kwara State and
the constraints to the usage of Baobab in the State.

Literature Review

Scientific evidence abounds as to the nutritive and medicinal value of various parts of the Baobab tree. For instance, the Baobab fruit pulp contains ten times the Vitamin C of oranges, calcium, tartaric, malic and succinic acids, water soluble pectins, and a whole range of minerals and essential micro elements rarely found in regular foods (Nour *et al.*, 1980; Manfredini *et al.*, 2002; Bosch *et al.*, 2004). Its leaves have a protein content of 4%, and are rich in calcium, iron, potassium, magnesium, molybdenum, zinc, phosphorus and vitamins A and C (Yazzle *et al.* 1994; Diop *et al.*, 2005). The traditional use of various parts of the Baobab plant in the prevention and cure of ailments such as measles, small pox, dysentery, diarrhea, and

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in the management of the sickle cell anemia has been reported (Ramadan *et al.*, 1993; Tal-Dia *et al.*, 1997). Cool and hot drinks have been prepared from the fruit pulp of the Baobab; the fruit pulp is also locally processed into sweets. The leaves are a staple food source in some parts of the African continent while the flowers are consumed raw (Obizoba and Anyika, 1994; Nordeide *et al.*, 1996; Delisle *et al.*, 1997). In some parts of Sudan, the Baobab seeds are pounded and included in local dishes (Dirar 1993). The plant is popularly used as boundary markers to demarcate plots (Rocheleau *et al.*, 1988), the bark produces strong fibre used in the making of mats, bags, ropes etc (Igboeli *et al.*, 1997). The leaves, pods and seeds are eaten with relish by cattle in the savanna areas (Venter and Venter 1996). The highlighted uses of the plant across the globe and its contribution to rural incomes in some parts of Africa has created a case for its domestication and promoted the call for further research to ensure that its potentials are optimized.

Study Area

The study Area is Kwara State Nigeria. Kwara State is located within the North Central zone of Nigeria, it lies between latitudes 7°45'N and 9°30'N and longitudes 2°30'E and 6°25'E. With 16 Local Government Areas, four main ethnic groups namely, Yoruba, Nupe, Fulani and Baruba characterize the state. The average daily temperature ranges between 21°C to 33°C. The state has two distinct seasons (the wet and dry seasons) and annual rainfall which ranges between 1,000 and 1,500mm. Kwara state has a total land area of 32,500 square kilometers, with a population of about 2.59 million people and population density of 42.5/ square kilometer. (Wikipedia, 2012). The state has an estimated figure of 203,833 farm families' majority of which live in the rural areas (KWADP, 1996). The state is primarily agrarian with great expanse of arable land and rich fertile soils. The major crops cultivated in the state include yam, cassava, rice, maize, sorghum, cowpeas, groundnut, melon, okra, pepper and some leafy vegetables (Wikipedia, 2012).

Methodology

Sampling Technique and Sample Size

A three stage random sampling procedure was employed in selecting the respondents for the study. The first stage involved a random selection of four Local Government Areas (Ilorin East, Asa, Moro and Patigi) out of the sixteen

LGAs in the State. This was followed by a random selection of five rural communities from each LGA following the list of communities obtained from the LGA offices. Ten respondents were randomly selected from each of the communities giving a total of 200 respondents. However, only 198 of the 200 responses were found analyzable for the purpose of the study. Data for the study was obtained using a well structured questionnaire. A combination of open and closed ended questions was used to elicit information covering the respondents' socio-economic characteristics, their levels of awareness and usage of the Baobab, and constraints to their usage of the plant.

Analytical Technique

Descriptive as well as inferential statistical tools were employed in the analysis and presentation of the findings of the study. The socio-economic characteristics of the respondents, their levels of awareness and usage of the Baobab plant as well as their perceived constraints to usage of Baobab was analyzed using descriptive tools such as frequency counts, percentages and means.

Two models frequently used in studies relating to determinants of usage are the logit and probit models. Usually a choice has to be made between logit and probit, but, as Amemiya (1981) has observed, the statistical similarities between the logit and probit models make such a choice difficult. Choice of model may be evaluated a posteriori on statistical grounds although, in practice, there will usually not be strong reasons to choose one model over the other. The logit model was selected for this study because it is computationally easier. In the Logit model the dependent variable is dichotomous in nature, taking the value 1 or 0. A household is assigned the value of 1 if they make use of the baobab seed and 0 if otherwise. A user is defined as those households that had at least made use of the baobab seed either as animal feed, cosmetics, food or extracted the oil for cooking. Following Gujarati (1988), the logit model is specified as:

$$\ln \left(\frac{P_i}{1-P_i} \right) = X_{it} \beta + e_i$$

Where X_t is the index reflecting the combined effect of independent X variables that prevent or promote usage of the baobab seed. The index level can be specified as:

$$X_t = \beta_0 + \beta_1 X_1 + \dots + \beta_6 X_6 + e_i$$

Where:

X_1 = Educational level of the household head (in years)

X_2 = Household size (in no)

X_3 = Age of the household head (in years)

X_4 = Household annual income (in naira)

X_5 = Awareness about baobab seed (dummy; Aware = 1; Not aware = 0)

X_6 = Gender of Household Head (dummy; Male= 1; Female = 0)

e = error term.

The dependent variable is the natural log of the probability of using the baobab seed P divided by the probability of not adopting (1-P). The model was estimated using the maximum likelihood method of the Statistical Package for

the Social Sciences (SPSS) software, version 16.0

Results and Discussion

Socio-economic Characteristics of Respondents

The socio-economic characteristics of respondents are as presented in Table and it reveal that the respondents were predominantly male (64%) with a mean age of about 43 years. Majority of the respondents (69.7) had a form of formal education. The average household size of about 6 is suggestive of low expense profile for many of the respondents. Though the respondents have a mean income of N315, 065 about half of them earn below this average

Table 1 Socio- economic Characteristics of Respondents

Socio-economic Characteristics	Frequency	Percentages
Age		
≤ 30	50	25.3
31-50	100	50.5 (43)
>50	48	24.2
Total	198	100
Gender		
Male	126	63.6
Female	72	36.4
Total	198	100
Household Size		
≤ 6	66	33.3 (6)
>6	132	66.7
Total	198	100
Highest Educational Attainment		
No Formal Education	60	30.3
Qoranic Education	34	17.2
Primary Education	48	24.2
Secondary Education	34	17.2
Tertiary Education	22	11.1
Total	198	100
Annual Income		
≤ 200,000	76	38.4
201,000-400,000	68	34.3 (315,065)
401,000-600,000	36	18.2
601,000-800,000	14	7.1
801,000-1,000,000	4	2.0
Total	198	100

Means in parenthesis

Level of Awareness of the Baobab Plant

Table 2 presents the level of awareness of the Baobab plant among the respondents. Although about 80% of the respondents know and can identify the Baobab plant, only about half of them are aware that the parts of the plant are edible. The level of awareness about the

various uses of the plant is low as only 27.3% of the respondents are aware that it is used in animal nutrition, only 16.2% are aware of its usage in cosmetic, 5.6% are aware that it is a source of oil and 24.2% of the respondents are aware that it has medicinal properties.

Table 2 Level of Awareness of the Baobab Plant among Respondents

Various aspects of the Baobab Plant	Frequency	Percentage
Knowledge of, and identification of the Baobab Plant		
Yes	158	79.8
No	40	20.2
Total	198	100
Awareness of its edibility		
Yes	100	50.5
No	98	49.5
Total	198	100
Awareness of its usage in animal nutrition		
Yes	54	27.3
No	144	72.7
Total	198	100
Awareness of its usage in cosmetics		
Yes	32	16.2
No	166	83.8
Total	198	100
Awareness of its oil producing properties		
Yes	11	5.6
No	187	94.4
Total	198	100
Awareness of its medicinal properties		
Yes	48	24.2
No	150	75.8
Total	198	100

Usage of Baobab Plant among Respondents

The level of usage of the Baobab plant for various purposes among the respondents is as presented in Table 3. It shows that 32.3% of the respondents use the baobab as a source of food; however, for most of this group, it is only consumed occasionally. This may be due to poor knowledge of the different forms into which it can be processed as available in literature. While 19.2% of the respondents occasionally use the plant in animal nutrition, 12.1% and 11.1% occasionally use the baobab plant in cosmetics and for medicinal purposes respectively.

Determinants of Usage of Baobab Plant

As shown in table 4, the logistic model explained 80 percent of the total variation of the usage of baobab. The chi-square statistic ($\chi^2=38.19$; $p<0.01$) shows that the parameters included in the model were significantly

different from zero at the 1% level for usage of the baobab. The -2 Log Likelihood also showed the high predictive ability of the model. The variables that significantly affect the usage of baobab are awareness about the baobab and age of the household head (Table 4). Households that are aware of the benefits of the baobab are more likely to put it into use than those who are not aware. The odds in favour of using the baobab increases by 3.49 ($p< 0.05$) for those who are aware of the benefits of the baobab.

Also, households with higher income are less likely to make use of the baobab. The odds in favour of household with higher income making use of the baobab decreased by 0.998 ($p< 0.1$). This could be attributed to the fact that households with higher income are likely to see the baobab as an inferior product.

Table 3 Usage of Baobab Plant among Respondents

Various Uses	Frequency	Percentage
Human Nutrition		
Never	134	67.7
Occasionally	58	29.3
Regularly	6	3.0
Total	198	100
Animal Nutrition		
Never	158	79.8
Occasionally	38	19.2
Regularly	2	1.0
Total	198	100
As Cosmetics		
Never	172	86.9
Occasionally	24	12.1
Regularly	2	1.0
Total	198	100
Medicinal		
Never	164	82.8
Occasionally	22	11.1
Regularly	12	6.1
Total	198	100

Table 4 Parameter Estimates for Factors Affecting Usage of the Baobab

Variable	β	Wald statistic	Exp (β)
Education of Household Head	-0.013	0.004	0.987
Household Size	0.196	2.090	1.216
Age of Household Head	0.024	0.824	1.025
Household Annual Income	-0.02*	1.341	0.998
Gender of Household Head	0.033	0.002	1.034
Awareness	1.249**	4.657	3.485
Constant	-3.598	8.690	0.027
-2 Log likelihood			95.01
Model chi square			38.19***
Overall cases correctly predicted			79.8%

Note: * = significant at 10% level, ** = significant at 5% level, *** = significant at 1% level

Constraints to the Usage of the Baobab Plant

Table 5 presents the constraints experienced by respondents in the usage of the Baobab plant. The negative socio-cultural belief held among members of the communities about the plant present the strongest constraints to the usage of the baobab in Kwara State as indicated by majority (75.3%) of the respondents. About 71% of the respondents are constrained by inadequate

knowledge of methods of processing the baobab into various useful forms. Poor levels of awareness also present constraints to 68.2%. Other constraints as shown in table 5 personal dislike and availability/access to the plant. About 12% of the respondents indicated religious belief as their constraints to the usage of the baobab.

Table 5 Constraints to the Usage of the Baobab Plant

Constraints	Not a Constraint	A Minor Constraints	A Major Constraint	Total
Religious belief	174 (87.9)	8 (4.0)	16 (8.1)	198
Socio-cultural belief	49 (24.7)	19 (9.6)	130 (65.7)	198
Poor level of awareness	63 (31.8)	45 (22.7)	90 (45.5)	198
Personal dislike	148 (74.7)	15 (7.6)	35 (17.7)	198
Availability/ Access	111 (56.1)	19 (9.6)	68 (34.3)	198
Poor Knowledge of Processing	56 (28.3)	24 (12.1)	118 (59.6)	198

Percentages in parenthesis

Conclusion and Recommendation

The study investigated the awareness and usage of the baobab plant in rural communities in Kwara State, Nigeria. The study concluded that although the plant is well known to the people, the levels of awareness and usage of the plant is observed to be rather low compared to the potentials of the plant. Level of awareness of the uses of the plant and income were the identified determinants of usage of the baobab in the State. The strong negative socio-cultural belief held about the plant, poor level of awareness of its multiple uses and inadequate knowledge of the different processing methods are the major constraints to the usage of the plant in the State.

The study therefore recommends as follows;

- awareness should be further created on the various uses and benefits of the baobab plant through the various agricultural extension agencies in the State;
- religious as well as socio-cultural groups within the State should be involved in demystifying the plant so that the general erroneous belief held about the plant can be corrected
- more research into various processing methods to which the plant can be subjected is recommended, with the outcome of such research adequately communicated through the agricultural extension agencies in the State.

References

Amemiya, T. (1981), Qualitative Response Models. *A Survey Journal of Economic Literature* 19:1483-1536

Assogbadjo, A.E., Glele Kakai, R., Chadare, F.J., Thomson, L., Kyndt, T., Sinsin, B. and Van Damme, P. (2008), Folk Classification, Perception, and Preference of Baobab Products in West Africa: Consequences for Species Conservation and Improvement. *Economic Botany*, 62(1), 74-84

Bosch, C., Sie, K. and Asafa B., (2004), *Adansonia digitata* L. PROTA (Plant Resources of Tropical Africa)

Delisle, H., Bakari, S., Gevry, G., Picard, C. and Ferland, G. (1997), Provitamin A Content of Traditional Green Leaves from Niger. *Cahiers Agricultures* 6(6), 553-560. NUT

Diop, A.G., Sakho, M., Dornier, M., Cissé, M. and Reynes, M. (2005), The African Baobab Tree (*Adansonia digitata* L.): Principal Characteristics and Uses, *Fruits* 61, 55-69

Dirar HA (1993). The indigenous fermented foods of the Sudan. A study in African Food and Nutrition. CABS International Wallingford.

FAO (1988), Indigenous Multipurpose Trees of Tanzania: Uses and Economic Benefits for People

Gebauer, J., El-Siddig, K. and Ebert, G. (2002), Baobab (*Adansonia digitata* L.): A Review on a Multipurpose Tree with Promising Future in the Sudan. *Gartenbauwissenschaft*, 67, 155-160.

Gujarati, D.N. (1988), *Basic Econometrics*, 2nd edition, New York, New York: McGraw-Hill

Igboeli, L.C., Addy, E.O.H. and Salami, L.I. (1997), Effects of Some Processing Techniques on the Antinutrient Contents of Baobab Seeds (*Adansonia digitata*). *Biores. Technol.*, 59, 29-31.

Keith, P. and Palgrave, M.C. (2000), Everyone's Guide to Trees of South Africa, 4th Edition

Kwara State Agricultural Development Project (KWADP), Agronomic Survey Report for the Year 2006

Manfredini, S., Vertuani, S., Braccioli, E. and Buzzoni, V. (2002), Antioxidant capacity of *Adansonia Digitata* fruit pulp and leaves, *Acta Phytotherapeutica* 2, 2-7

Muok, B.O., Owuor, B. Dawson, I. and Were J., (2001), The Potential of Indigenous Fruit Trees: Result of a Study in Kitui District, Kenya. *Agro Forestry Today*, 12, 13-15.

Nordeide, M. B., Hatlog, A., Folling, M., Lied, E. and Oshang, A. (1996), Nutrient Composition and Nutritional Importance of Green Leaves and

- Wild Food Resources in an Agricultural District, Koutiala, in Southern Mali, *International Journal of Food Science and Nutrition*, 47(6), 455 - 468.
- Nour, A. A., Magboul, B. I. and Kheiri, N. H. (1980), Chemical composition of baobab fruit (*Adansonia digitata* L.). *Tropical Science*, 22, 383 – 388.
- Obizoba, I. C. and Anyika, J. U. (1994), Nutritive Value of Baobab Milk (gubdi) and Mixtures of Baobab (*Adansonia digitata* L.) and Hungry Rice acha (*Digerati exilis*) Flours. *Plant Foods for Human Nutrition*, 46, 157 – 165.
- Phyto Trade Africa (2012), Baobab Trees: Sustainable Development and Environmental Awareness
- Ramadan, A., Harraz, F.M. and El-Mougy, S.A. (1993), Anti-inflammatory, Analgesic and Antipyretic Effects of the Fruit Pulp of *Adansonia digitata*. *Fitoterapia*, 65, 418-422.
- Rocheleau, D., Weber, W. and Field Juma, A. (1988), *Agroforestry in Dryland*. English Press, UK. 88-98
- Smith, G. C., Clegg, M. S., Keen, C. L. and Grivett, L. E. (1996), Mineral Values of Selected Plant Foods Common to Burkina Faso and to Niamev, Niger, West Africa. *International Journal of Food Science and Nutrition*, 47, 41-53.
- Tal-Dia, A., Toure, K., Sarr, O., Sarr, M., Cisse, M.F., Garnier. P. and Wone, I. (1997), A Baobab Solution for the Prevention and Treatment of Acute Dehydration in Infantile Diarrhoea. *Dakar Med.*, 42, 68-73.
- Venter, F. and Venter, J. (1996), Baobab In Making the Most of Indigenous Trees. *Briza publications*, Pretoria, South Africa, 26-27.
- Wikipedia, Retrieved 20th January, 2012
- Yazzie, D., VanderJagt, D. J., Pastuszyn, A., Okolo, A., and Glew, R. H. (1994), The Amino acid and Mineral Content of Baobab (*Adansonia digitata* L.) leaves. *J. Food Comp. Anal.* 7, 189-193.