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AN ASSESSMENT OF MULTI-PURPOSE USE OF ADANSONIA DIGITATA (Baobab tree) FOR SUSTAINABLE DEVELOPMENT IN THE SEMI URBAN FRINGES OF DUTSINMA KATSINA STATE NIGERIA

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ABSTRACT

Savanna grassland of Northern Nigeria is blessed with ample tree resources that were of ample benefits to mankind most of which their multi-purpose uses have been exploited, but still there are potential uses on the pipeline. Baobab (Adansonia digitata) tree have been identified as tree of multi-purpose use for a long period of time by rural and urban dwellers. This has made Baobab among the most important economic tree that receives meaningful attention. Uses as human food, animal fodder, medicine were among the major ones identified with it in the study area. Access to this tree is generally private, because of its importance, the tree is highly managed through regular pruning, fencing and planting new seedlings. It was recommended that Governmental and nongovernmental organizations should improve the tree and make it available to rural dwellers and farmers.

Key words: Baobab (Adansonia digitata), Multi-purpose, Sustainable, Management

INTRODUCTION

Trees as part of vegetation resources play an integral part in human and economic development of any nation, for the simple reason that they (trees) provide many basic needs for life such as medicine, food, fodder, timber, environmental protection and sustainability etc, based on this therefore, it could be concluded that trees touches almost all aspect of life.

Trees of northern Nigeria, specifically, the semi-arid regions of the country were of great use especially to rural or peasant farmers whose life solely depends on agricultural productions. This is because most of the rural economy in the region is agricultural; this has contributed a lot in the discovery of so many potential uses of the trees and their products.

Dutsin-ma area is found within the transition zone between Guinea and Sudan Savanna vegetation zone of Katsina state Nigeria. These unique characteristics make the zone to possess combination of trees found in the two zones and consequently, the vegetation of the area tends to be different from the two vegetation types of the area.

Baobab (*Adansonia digitata*) tree is one of the typical trees of the Sahel that has been given attention by the people of the area due to ample benefits derived from it. More than thirty different uses were found from the tree (Von maydell, 1990). The plant has numerous medicinal and non-medicinal applications in Africa; every part of the baobab tree is reported to be useful (Owen, 1970 in Gebauer 2002).

The area (Dutsin-ma) is blessed with considerable vegetation resources, due to its unique nature of being a transition zone between two vegetation zones (Sudan and Sahel Savanna) of

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northern Nigeria. This is one of the factors that contributed to the development of fuel wood market in the area.

Indeed researches indicated that vegetation resources is playing vital role on socio-economic development of the people in the area, meaning that it is making a positive impact in rural economic development (Rabi'u 2010). Most researchers conducted in the area were on socio-economic contribution of vegetation resources, and degradation problems. Therefore, this research examined the multi-purpose uses of *Adansonia digitata* (Baobab tree) in the area.

Dutsin-ma local government is located in the Sudan savanna zone of central part of Katsina state. It is relatively bounded by Safana and Dan-musa local governments by the west, Kurfi and Charanchi local governments by the north, Kankia by the east, Matazu and Dan-musa local governments to the south. In absolute terms, Dutsin-ma town is found within latitude $12^{o}27'10''$N and $12^{o}27'16''$N and longitude $07^{o}29'56''$E and $07^{o}30'04''$E

Dutsin-ma local government is within the basement complex area of Katsina State. The area is predominantly underlained by crystalline rock of basement complex. Outcrop of basement complex rocks of different types are in the south and along streams and river valleys (Udoh, 1970).

The climate of the area is semi arid classified as tropical wet and dry climate (AW), as classified by W. Koppens. Maximum day temperature reaches about 38^{o}C in the month of March, April and May, and maximum temperature is about 22^{o}C in December and January (Isa Kaita College of Education, weather station 2007).

The vegetation of Dutsin-ma region combines a characteristic feature of Guinea and Sudan savannah vegetation zones of Northern Nigeria, because the area is found within the vegetation transition zone of Sudan and Sahel Savanna of Northern Nigeria.

AIM AND OBJECTIVES

The aim of the research is to assess the multi –purpose uses of *Adansonia digitata* (Baobab tree) in Dutsin-ma area. In achieving the aim, the following objectives were followed;

1. Assess the availability and specie density of the tree in the area.
2. Assess the multi-purpose uses of the tree among rural dwellers in the area.
3. Examine access right of the tree in the area.
4. To find out most suitable use of the tree in the area.
5. To find out management practices adopted by the people in the area.

LITERATURE REVIEW

Sustainable Development

The concept "sustainable development" is not at all new, only that it did not receive much attention until recently, when the world community discovered that our environmental resources were endangered as a result of indiscriminate human activities. It was only then that the world community, especially, environmentalists that put more emphasis on the aspect of sustainable development. More emphasis comes up after the world summit on Environment and Development in 1989. It was discovered that, when the then situation of environmental degradation continued the world community would be endangered. To overcome this problem the concept of sustainable development was emphasized in all aspect of human endeavor (Tukur, 2010).

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The concept is very broad and it includes political and economic progress. It requires political reforms; access to knowledge and resources and a more and just an equitable distribution of wealth (resources) both within and between the nations, this in turn will bring about economic and political stability (Asthana & Asthana, 2005).

The United Nations (UN) defines sustainable development as

> *The development which provides for the need of the present generation without compromising the ability of the future generations to meet their own needs (United Nations 1991)*

Since 1960th there were aims made to ensure sustainability in all spheres of development among nations and states. The most recent is the United Nations (UN) millennium development goals (UN 2000). This was aimed to combating poverty, hunger, diseases, illiteracy, environmental degradation and discrimination against women, all these are to be achieved by 2015 (Murtala& Rabi'u).

Baobab Tree (Adansonia Digitata)

Baobab tree happened to be an important plant in Sudan-Shelian region of Africa; the tree has so many uses among rural dwellers. Because of its' ample uses it attract people's attention to undertake researches on it, as a result, many uses were discovered and more potential uses were on the pipeline. This is in addition to locally or traditionally known uses such as use in preparation of soup, medicinal, animal fodder etc.

The leaves of *Adansonia digitata* are used in the preparation of soup. The flower is eaten raw, the seeds also provide flour, which is very rich in vitamin B and protein, and it is also used as baby food. In addition, the seeds are roasted and grounded and used to flavor soup in substitute of groundnut. The fruit pulp obtained from the seed provides a refreshing drink when dissolve in water or milk. The spongy and soft nature of the tree makes it to store water, often chewed by human and animals during extreme scarcity of water. The back of the young baobab tree is used in making fishing nets, baskets, mats and clothes (Von maydell, 1990; Mohammed, 1997; Gebauer et al., 2002; Tukur, 2010).

The leaves of the baobab tree are a staple food source for rural population in many parts of Africa especially the central part of the continent (Gebauer, et al., 2002; Tukur, 2010). Young leaves are widely used, cooked as spinach, and frequently dried, often powdered and used for sources over porridges, thick gruels of grains or boiled rice.

Several research findings show that a dried baobab leaves contains 13-15% protein, 60-70% carbohydrate, 4-10% fats, around 11% fiber, and 16 % ash. The energy value varies from 1180-1900kj/100g of which 80% is metabolisable energy (Gebauer et al., 2002). The fruit pulp of *Adansonia digitata* has very high vitamin C content; almost ten times that of oranges. In addition, the pulp is used in preparing cool and hot drinks in rural areas and has recently become a popular ingredient in ice products in urban areas (Sidibe et al., 1998; Gebauer et al., 2002; Tukur 2010). In addition, the pulp serves as a fermenting agent in local brewing or as a substitute for tartar in baking. The energy value is almost the same as that of baobab leaves (Becker, 1983). The seed kernels are widely used; they are eaten fresh, dried or ground and used in cooking. The kernel has an energy value of 1803kj/100g (Arnold et al., 1985, in Tukur, 2010), approximately 50% higher than leaves.

The baobab (*A. digitata*) tree, is not the only important tree in the Sahel, but is among the most useful trees. This is more so, because of the protection and consideration it receives from villagers. This has made people to call the tree "mother of the Sahel" (Von maydell, 1990).

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The spongy and very soft wood has limited uses. It is used in the manufacture of light canoes, trays and floats for fishing nets. The husk of the fruit is used in making dishes, vessels also as fuel. The roots also provide a very important ingredient for dyes, the ash obtained from burning the tree is used in soap making, and as fertilizer. When burning the fruit pulp the smoke produced serve as an insect repellent. Hollow trees of *A. digitata* provide reservoirs of fresh water, which are used by nomads, particularly in the western part of Sudan. Water storage capacities, range from 1000- 9000 liters per tree (Eraic, 1991; Gebauer et al., 2002; Tukur, 2010).

Various medicinal uses were discovered from the Baobab tree. The back of the tree is used in the treatment of fever; infections; wound disinfections; toothache etc. The leaves also are used in the treatment of guinea worm sores, insect's bites, kidney and bladder disorders, diarrhea, ulcers, fatigue, cough, asthma etc. The fruit pulp also provide good medicine for malaria, small fox, dysentery and general fatigue for children while the seeds are use in curing diseases like dental disorders. The roots of the tree (*A. digitata*) are used in the treatment of malaria as well (Von maydell, 1990).

Leaves of Baobab tree are also known to have significant content of minerals especially magnesium as manganese. The table below shows the mineral content of Baobab leaves.

Table 1. Mineral Content of Baobab Leaves (µg/100g dry weight)

Minerals	*A*	*B*	*C*	*D*
Aluminum	-	1230	228	2870
Barium	-	187	183	454
Calcium	20000	26400	3070	3150
Copper	11.6	1	-	-
Magnesium	5490	3120	4360	5350
Manganese	31	43.8	79.5	89.3
Molybdenum	-	9.1	19.8	17.6
Phosphorous	3020	1480	2880	1200
Potassium	-	10800	5400	3210
Sodium	1630	-	-	-

Source: Glew et al (1997) and Yazzie et al (1994) adopted from Rabi'u 2010)

Baobab leaves has been found to have high content of iron as compared to numerous other wild-gathered foods and are rich source of calcium (Glew *et al* 1997; Tukur, 2010). Nordeide *et al.,* (1997) recorded that the level of vitamin A was about one-third the content in *Amaranthus* dried leaves.

Indeed, the fruit pulp of *Adansonia digitata* (baobab tree) is the most important food stuff among all other parts of the tree. It is dry and mealy it is use in cool and hot drinks. The pulp can be dissolved in water or milk and the liquid is used as drink, as a source for food, as a

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fermenting agent in local brewing or as a substitute for cream of tartar in baking. The energy value of the pulp is similar to that of baobab leaves (Becker, 1983; Tukur, 2010).

Various minerals were discovered in baobab pulp which is of great use to human body, for example the fruit pulp of baobab tree in Nigeria recorded about 337mg ascorbic acid/100g (Ighadalo et al., 1991; Tukur, 2010). The Baobab Fruit Company (2002) recorded about 34-200mg/100g.

RESEARCH MATERIALS AND METHODLOGY

The aim of the research is to assess the multi-purpose use of Baobab tree (*Adansonia digitata*) in Dutsin-ma area. To achieve this aim formal interview with the indigenous people was adopted. This gives first hand information (primary data) for the research. Samples were collected from the field and identified by their physical characteristics using researchers' experience of plants.

There are many settlements around urban Dutsin-ma, but only five (5) were selected for the research. This is because of their proximity to Dutsin-ma town and contains large population of mainly peasants. These villages include Kagara, Darawa, Gago, Ruwan Dorawa and Gizawa. A total of two hundred (200) samples (respondants) were used for the research, fourty (40) for each village. Interview and observation techniques were used in the conduct of the research. The data collected was analyzed using parametric system of data analysis. Tables and charts were also used in illustrating the data obtained.

FINDINGS AND DISCUSSION

Multi-purpose Use of Baobab Tree

Baobab tree has been recognized as one of the most important tree in the Savanna. Various parts (leaves, fruits, seeds, roots, flower etc) were of great use. This made the tree be used multi-purposely by the inhabitant of Dutsin-ma fringing settlements.

Use as source of food is the major among all uses identified with the tree, for example one major well known use is the leaves of the tree is generally used for the preparation of soup used for eating locally made food of maize, corn and millet. The following table indicates the multi-purpose uses of Baobab tree identified in the area.

Table 2. Multi-purpose Uses of Baobab Tree in the Area

Identified use	*Responses*	*%*
Human food	200	100
Animal feed (fodder)	20	10
Medicinal	180	90
Fuelwood	100	50

Source: field work 2012

Wild food use is one of the most significant sources of food in the villages under study as the area is blessed with abundant verities of wild food such as *Leptadania lancifolia, Cassia hirtusa, Moringa oleifera* etc. as indicated in the table above usage as food is the major and most important of the tree. All the people interviewed indicated that three major parts of the

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tree (leaves, seed and fruit pulp) are often used in food preparations. The leaves and the seeds are use in the preparation of soup and stew respectively. The fruit pulp is use in the preparation of gruel, soft drinks and local brewing.

Because of its high economic values, baobab tree has not been used as animal feed unless on occasions, where a tree is identified with low quality and taste on its leaves or fruit pulp, then the leaves will be used to feed livestock.

Medicinally, the tree has been identified with so many uses. This was testified by 80% of the respondents, for example the back is used in the treatment of fever, infections, toothache while the leaves is used in the treatment of diarrhea, cough, guinea worm sores etc.

Fuelwood use is also identified with the tree but in low demand because of its low quality, it is only use when there is shortage of fuelwood. But in the extreme northern part of Katsina state like Dankama, Birnin kuka, Maibara, Bumbum, etc, as a result of acute fuel wood scarcity in the area. The tree has been recognized as one of the sources of fuel wood and mostly small branches are used.

Availability and Management.

Because of its high economic value in the area *Adansonia digitata* receives intensive management practices by the owners of the tree, couple with its high resistance to drought made it possible for the tree to live long for hundreds of years. The economic values attached to the tree attributes to its access on private basis, this is when the tree is found on residential areas (individual houses) or farmlands. At the same time the tree is owned communally when it is found on grazing lands and cattle tracks. Baobab tree is found on farmlands, settlements and cattle tracks, it is found in singles and clusters of three (3) and above. In some areas like Kagara and Gizawa 5-10 trees may be found in a hecter.

Baobab tree receives high management strategy due to its high economic importance/value, pruning, fencing and planting of new seedlings were the major management practices adopted by people the people of the area. Pruning is mostly done twice in a year; this depends on the quality of leaves of a tree. At the onset of rainy season first pruning exercise takes place, then the second one is done when rainfall recedes. Fencing is mostly done on new seedlings so as to protect it from disturbance by roaming livestock (field work 2011).

The table 3 shows the distribution of Baobab (*Adansonia digitata*) tree in Dutsin-ma area.

Table 3. Distribution of Baobab Tree in the Area

Name of Settlement (Village)	*No of Baobab tree found*
Ruwan Dorowa	555
Darawa	610
Kagara	532
Gago	452
Gizawa	691
Total	2840

Source: Field work 2012

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Baobab tree (*A. digitata*) in the area is found in abundance about 2,840 trees of baobab trees were found in the six areas under study which were scattered mostly on farmlands, around settlements and grazing lands, very few were on cattle tracks. In some cases the tree is found in cluster and these signifiers that the area is an old settlement.

Table three above indicated that there is fair distribution of the tree in the area, this further indicates how available the tree is and the level of care it is receiving from the inhabitant of the area which made it possible for the tree to survive longer life. The figure below shows a typical Baobab tree in the area.

Fig 1: Adansonia digitata trees on farmland

Fig 2: Leaves of Adansonia digitata

Figure 3: Flower of A. digitata

Figure 4: Fruit pulp of Adansonia digitata

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SUMMARY AND CONCLUSION

Indeed Baobab tree contributed immensely to the economic development of Dutsin-ma fringing settlements through the provision of wild food, medicine and fuelwood. Wild food and medicinal were the major uses identified with baobab tree in the area. The economic importance attached to the tree has paved way for intensive care and management for the tree in the area. Tree resources, particularly the native (indigenous) were of great importance/value on the economic development of the savanna region of northern Nigeria. Therefore, they need to be given special attention so as to maintain their diversity and productivity. To maintain and maximize use of various parts of baobab tree it is recommended thus;

1. Indiscriminate felling that will lead to perishing of the tree particularly on the onset of dry season should be stopped.
2. Though the tree was found to live for longer years, considering its economic importance new seedlings should be made available and planted where there were none.
3. Considering its availability in the area baobab fruit processing company may be established in the area, this will made people to understand and value the tree more than they do before.
4. Though the tree is poor in fuelwood use, but people should be encourage to use it, because, it will reduce pressure on fuelwood producing trees consequently bring to their sustainability.
5. Fencing the trees especially young growing ones will also protect it from livestock disturbance. Therefore, it should be encouraged.

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