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Socio-Economic Importance of Bamboo (*Bambusa Vulgaris*) in Borgu Local Government Area of Niger State, Nigeria

By

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ABSTRACT

Dearth of information on socio-economic importance of species has been implicated for non-sustainable utilization of many species. Socio-economic importance of Bambusa vulgaris was, therefore, studied in the Borgu Local government using structured questionnaires and reconnaissance survey. Data obtained were analyzed using frequency counts, percentages, and tables. Results showed that all the respondents (100.0%) were aware of the existence of Bambusa vulgaris in Borgu Local government. However, it was indicated to be more abundant in Doro (44.8%) than Leshigbe (32.2%) and Rafingora (23.0%). Among its uses Bamboo is put to, decoration took the lead with value of 16.9%, followed (in descending order) by local bed (15.8%), medicine (15.5%), roofing (15.1%), and fishing (13.3%). All parts of bamboo have medicinal value, even though 43.3% of the respondents indicated that the leaves are what is mostly utilized. Among the diseases treated with extracts from the species are dysentery (33.7%), diarrhea in babes (24.7%), pile (22.7%), and epilepsy (17.9%). In fishing, bamboo is used for testing the depth of rivers (26.5%), canoe paddling (26.5%), and as pegs to hold nets (24.8%). Even in building construction bamboo is used as a decking support pole (20.7%), ladder (20.4%), pillars support (20.1%), roofing, and to frame doors and windows (19.5%). Culturally, women and children are not allowed to harvest bamboo in Borgu Local Government to avoid being injured by the spines and thorns of bamboo. Bamboo is of multipurpose importance to the people of Borgu Local Government.

Keyword: Socio-economic, a species, importance, sustainable utilization, *Bambusa vulgaris*, Borgu Local Government.

INTRODUCTION

During the last century, forests were mainly assessed in terms of the commercial value of timber. Rarely was other forest components considered to be of major economic importance (Kigomo, 2007). In the 1900s, when vast areas of tropical forests were denuded of timber for local use and exportation, bamboos, and other non-wood products were usually discarded or destroyed during logging operations. In the 21st century, however, there is a growing consensus that non-wood forest products are not only crucial to ecosystems, but also invaluable to the livelihood of communities. Non-wood forest products are known to generate substantial foreign exchange and are increasingly being regarded as valuable commodities around the world. Our perception and evaluation of non-wood forest products is changing due to alarming rates of deforestation and decreased timber yields (Kigomo, 2007).

The earth is well endowed with biodiversity and varieties of ecosystems to sustain all lives therein if properly managed. However, ignorance of the potentials of many species is a great limitation to species utilization. Utilization of species, therefore, depends on indigenous knowledge. It was on this basis that some species are over utilized, while other potentially more useful species are neglected and allowed to waste – breadfruit (*Treculia africana*) commonly consumed as a delicacy by the Ibos of eastern Nigeria is allowed to waste in Guyaka community of Quaanpan Local Government Area of Plateau State, where it is not utilized in any form. It is also based on the same fact that rat (*Rattus rattus*), consumed as a delicacy by the Tivs of Benue State, is disregarded in other parts of Nigeria. The importance of species could be related to their roles in nutrient addition to the soil, tourism, food, building, and raw material provision. The presence of a species in a conspicuous manner could also act as an indicator to the kind of landscape, type of soil, and even the water table of the area, thereby supplying vital information to ecologists and ecotourists. In essence, there is no species or family without socio-economic importance, Bamboo inclusive.

By far the single-most important item of forest produce used by rural communities of the tropics, from the cradle to the coffin, is the bamboo (Balakrishnan Nair, 1990). Bamboo is the common term applied

to a broad group of large woody grasses, ranging from 10cm to 40m in height (Scurlock *et al.,* 2000). It is the name used for members of a particular taxonomic group in the subfamily *Bambusoideae* and family *Andropogoneae/Poaceae*, respectively, and it is one of the most relatively fast growing species, attaining stand maturity within five years, but flowering infrequently (Scurlock *et al.,* 2000). Bamboo originates from Southeast Asia, where it is a natural component of the forest ecosystem (Dannenmann *et al.,* 2007). As many as 1,500 bamboo species exist worldwide, most of which grow in Southeast Asia (Wong, 2004); the annual economic value of total bamboo consumption has been estimated to be $10 billion (Vaiphei, 2005). The species is distributed mostly in the tropics but occurs naturally in subtropical temperate zones of all continents, except Europe, at latitudes from 46^0 North and 47^0 South. *Bambusa vulgaris* is also found in the Savanna region of most parts of Africa. India has about 13% of its total forested area covered with bamboo (Shanmughavel and Francis, 1996) while in China, bamboo occupies a total land area of 33,000 Km^2, 3% of the country's total forest area (Qui *et al.,* 1992). With exception of Madagascar, there are few indigenous species of *Bamboo vulgaris* in Africa. However, indigenous and introduced species have been in existence in Nigeria, Kenya, and Tanzania. Studies on many traditional multipurpose woody species, such as bamboo and rattan, were neglected in the past as attention was focused on timber species (IFAR/INBAR, 1991).

The multifunctional range of bamboo uses has only lately received more attention. Experiences of Asian countries have shown that it may prove beneficial as a valuable and sustainable natural resource (Dannenmann *et al.,* 2007). Bamboo, regarded as 'The Green Gold' of the 21^{st} century and commonly known as 'poor man's timber', played a significant role in human society since time immemorial and today contributes to the subsistence needs of over a billion people worldwide (Salam, 2008); and plays a vital role in the socio-economics of the rural population (Prasad, 1990). It has been traditionally used as fuel, food, for rural housing, shelter, fencing, tools, and various other purposes. In modern days, it is being used as industrial raw material for pulp and paper, construction and engineering materials, panel products, etc. Also, present day industry uses one of the numerous species of bamboo-*Bambusa vulgaris* for more modern products, such as baskets, vases, pencil and pen holders, kitchen containers, wall plagues, table mats and lamp shades, all of which have a decorative-cum-utility value (Zoysa *et al.,* 1990). It has more than 1,500 documented applications, ranging from medicine to nutrition and from toys to aircraft (Salam, 2008). Many nutritious and active minerals, such as vitamins, amino acids, flavine, phenolic acid, polysaccharide, trace elements, and steroids can be extracted from bamboo culm,

shoot, and leaf, all having anti-oxidation, anti-aging, anti-bacterial, and anti-viral functions. These are valuable in health care and can be processed into beverage, medicines, pesticides, or other household items like toothpaste, soaps, etc. Bamboo leaf contains 2% to 5% flavine and phenolic compound that have the power to remove active oxy-free-radicals, stopping sub-nitrification and abating blood fat. Figures for the nutrient content of *Bambusa vulgaris* show that it contains crude protein (10.1g), crude fiber (21.7g), ether extract (2.5g), ash (21.3g), phosphorus (86mg), iron (13.4mg), vitamin B1 (0.1mg), vitamin B2 (2.54mg), and carotene 12.3 mg/100g, respectively (Paglione, 2003). Flavine beverage and beer have been widely accepted particularly in East Asian countries like China, Korea, and Japan mainly because of their value in health care. Some materials extracted from bamboo can be used in fresh flavor preservation or food storage application. Some additives obtained from bamboo are used in food, such as bamboo juice, beverage, bamboo flavored rice, etc. Bamboo shoot is one kind of ideal vegetable being free in pollution, low in fat, high in edible fiber, and rich in mineral. It is cold in properties, functions well in removing sputum, enhancing digestion, relieving toxicity, improving dieresis, and is often used for healing swollen tissues or edema and abdominal disease in which watery fluid collects in cavities or body tissues, called ascites. The shoot also contains saccharine, which can resist little white mouse tumor and also has anti-aging elements.

Due to all these chemical properties of bamboo, and its capacity to set right various global problems, such as the pollution of air and water resources, the aging of population, and increasing prevalence of old age diseases, unprecedented interest in bamboo has been aroused all over the world. Of late, research has shown that bamboo charcoal is one of the base materials for human health, from water treatment to its uses as shield from electro magnetic radiation. With the increasing demand for a return to nature, there is an increasing preference for products processed or extracted from plants. With its high growth rate, wide range of applications and high renewing ability, bamboo resources occupy a significant position in the 21st century (Salam, 2008). According to Scurlock *et al.* (2000), commercial bamboo utilization has been reported to be 20 million tons per annum. More than have of this amount is harvested and utilized by the poor in rural areas. Estimates of total revenue from bamboo and its products in 1980s stood at $4.5 billion (IFAR/INBAR, 1991).

Bamboo is one of the oldest building materials used by mankind. Its utilization is not restricted to any geographical area or culture, hence bamboo has over the years been subjected to different degree of

local and scientific exploitations and quarry (Moody, 1999), both in urban and rural communities. Alenso *et al* (2001) estimated that about 4.5 billion people (40% of world population) still use bamboo as their primary source of roofing sheet. Bamboo has been used for handicrafts and building material in India, China, America, and Costa Rica for thousands of years, yet its potential contribution to sustainable natural resource management has only recently been recognized. Unfortunately, most bamboo is harvested from forest stands at a rate which exceeds natural growth, so current utilization is anything but sustainable (IFAR/INBAR, 1991; Tewari, 1992). According to Sastry and Webb (1990), over-exploitation associated with growing human populations, destruction of tropical forests and new demands on the resource for industrial uses, especially by the pulp and paper industry, has resulted in wide-scale decimation of bamboo stocks, from vast forests of bamboo in South and Southeast Asia at the beginning of 20th century. Many countries have been forced to severely restrict, and in some cases, even ban outright the harvesting and exporting of bamboos. For many developing countries, this translates into the loss of potentially great economic opportunities. The greatest losses though, are borne by the poor, especially the rural poor, as a once abundant and cheap material that provided sustenance, shelter, and income has become scarce and expensive. Truly, the present crisis in the availability of bamboo is testament to its remarkable utility.

Fibres from *Bamboo vulgaris* are relatively long (1.5-3.2mm), thus ideal for paper production (El Bassam, 1998). According to Scurlock *et al.,* (2000), Molini and Irizarry (1983) proposed the use of bamboo as a fuel for power generation in Puerto Rico in preference to sugar cane because of its lower moisture content at harvest which obviates the need for drying. On a regular basis, it is used in Kenya, and even Nigeria, for soil stabilization, construction, fuel, and for staking yam vines. There are no species that cannot be exhausted (irrespective of its abundance) if unsustainably is utilized. Various studies have shown that a sustainable utilization of resources has a big impact on the development of any community (Kwiyamba, 2005). This is because sustainable utilization of resources leads to sustainable development. On the other hand, deep-rooted poverty leading to a dependency on a single resource for livelihood undermines the capacity of the population to have sustainable resource management. This problem is more critical in developing countries where rapid population growth coupled with agricultural stagnation leads to invasion of marginal lands, environmental degradation, and poverty (Kwiyamba, 2005). Consistent increase in use pressure on *Bamboo vulgaris*, if unchecked could threaten the existence of the species. In essence it should be conserved. For a plant species to be

successfully conserved, sources of pressure on its population need be identified. It, therefore, becomes pertinent to identify the uses of bamboo, and which part of the plant that is utilized in Borgu Local Government, Niger State.

METHODOLOGY

Study Area

Borgu Local Government lies between latitude 9^0N and 11^0 N and longitude 2^0E and 4^0E. It is bounded to North by Kebbi State, to the South by Kaima and Baruten Local Government Areas of Kwara State, to the West by Benin Republic, and to the East by River Niger and Magama Local Government Area of Niger State. Analysis of the temperature values for the Local Government from 1986-2006 shows that the highest mean monthly temperature value was 41.1^0C, while the lowest mean monthly temperature was 34.9^0C and the mean humidity value was 74.8%, while the highest mean rainfall value was 201.2mm (Afor, 2007). The first rain normally comes in April, reaching peak in July and August, and stops in October. The rainy season is characterized by strong wind, torrential down pours, and violent thunderstorms. The long dry harmattan season begins in November and continues till early April. This is a period of dry chilly night winds, bright scorching sunshine, and a long day, but short occasionally. However, the cool, dry harmattan weather abruptly ends late February ushering in a period of uncomfortable and intense heat, accompanied by hot air.

Borgu Local Government is situated between the Southern fringes of Guinea savanna (northern Guinea savanna). The land lies predominantly in the Guinea savanna climatic zone, where all deciduous trees, associated with grasses, characterize the vegetation. According to Keay (1959), the vegetation type of Borgu is a mixture of Northern Guinea and sub-Sudan savanna, but the zonal classifications of plants are *Burkea africana, Detarium macrocarpum, Isoberlinia tomentosa, Diospyrus mespiliformis, Terminalia macroptera,* riparian forest, and woodland, each associated with grasses. The area is endowed with fertile clay soil with a particular hard stony texture at greater depth (ferruginous tropical on crystalline acid rocks). There are occasional rock outcrops and hills of granite (iselbergs). Although the topography is hilly, the area rest on both Precambrian basement and upper cretaceous geological formation.

Data Collection and Analysis

Information for this study was obtained through reconnaissance survey and use of structured questionnaire. Reconnaissance survey was conducted in Borgu Local Government area to identify the areas where *Bambusa vulgaris* exists. Leshigbe, Doro, and Rafingora villages in Wawa, Malale, and Rafi districts, respectively, were selected for the study as the three places where *Bambusa vulgaris* exists. A set of structured questionnaires were randomly distributed to 100 people living in these villages. However, only 87 questionnaires were retrieved. Data collected were subjected to descriptive statistical analysis using tables, percentages, and charts.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

Analysis of demographic characteristics of respondents with regard to age, gender, and educational background are presented in Table 1. Results show that age groups of 20-30 years and 31-40 years had the highest number of respondents (48.3%) each. This was followed by the age group of 41-50 years (28.7%). This shows that majority of the respondents are in their active periods and should be able to know what happen within their communities. The majority of the respondents (71.3%) were males while 28.7% were females, which means that the respondents should be knowledgeable and able to give reliable information, as males are more involved in harvesting of bamboo in Borgu Local government. This might also be due to restriction placed on entering the residence of a female due to religious factors because the study area is made up of predominantly Islamic religious adherents (Ogunjinmi *et al*., 2008). Most of the respondents (56.3%) completed primary school education, 25.3% had no formal education, while secondary school certificate holders recorded the least value of 18.4% (Table 1). This depicts that the educational level of the people is low, implying that the respondents should be very knowledgeable about culture of the area, including the local uses common environmental resources are put to. All of the respondents interviewed were Muslims, which shows that there is strong relationship among the people as all of them have things in common. This can also be attributed to the fact that Borgu Local Government is in Northern Nigeria, with greater percentage of Muslims in the country. It also shows that the study site is in a rural community with less foreigners, hence, new religion has not been introduced.

Table 1: Demographic Characteristics of Respondents (n=87)

Variables	Frequency	Percentage
Age (years)		
<20	0	0
20-30	30	34.5
31-40	30	34.5
41-50	17	19.5
>51	10	11.5
Gender		
Male	62	71.3
Female	25	28.7
Religion		
Islam	87	100
Christianity	0	0

Awareness of *Bambusa vulgaris*

Table 2 shows that all the respondents (100%) had knowledge of existence of bamboo in the locality, which means that he species may be conspicuous in the study areas. According to Table 2, 44.8% of the respondents indicated that bamboo exists in Doro, while Leshigbe and Rafingora recorded 32.2% and 23.0%, respectively. This cannot be unconnected with the fact that bamboo is abundant in Doro. This may be the probable reason why 56.3% of the respondents indicated that bamboo occurs in large quantity in the study areas.

Table 2: Respondents' Dnowledge of *Bambusa vulgaris* in Borgu Local Government (n=87)

Variable	Frequency	Percentage
Awareness of existence of bamboo		
Yes	87	100
Location		
Doro	39	44.8
Leshigbe	28	32.2
Rafingora	20	23.0
Quantity		
Large	49	56.3
Small	38	49.7

Uses of *Bambusa vulgaris*

As presented in Table 3, bamboo is used for various purposes in Borgu Local government' its no wonder all of the respondents are aware of *Bambusa vulgaris*. Among the uses bamboo is used for, decoration (87.4%) took the lead, while local beds (82.8%), medicine (80.5%), roofing (78.2%), and fishing (69.0%) ranked second, third, fourth, and fifth, respectively. This shows that it is very good for decoration, thereby, agrees with the report of Ijeomah (2007) that some British tourists to Pandam game reserve in Plateau State requested that one of the tourist lodges to be permanently reserved for them should be roofed and decorated with chairs and beds made with only bamboo. The fact that medicinal purpose and fishing recorded high values show that the study areas are rural and agrarian communities, which also agrees with the report of World Health Organisation cited by Ijeomah and Ogara (2006) that about 80.0% of the world population depend on use of medicinal plants for primary health care requirements.

Table 3a: Uses of *Bambusa vulgaris* in Borgu Local Government (n=87)

Variable	Frequency	Percentage
Walking stick	51	58.6
Fishing	60	69.0
Decoration	76	87.4
Local beds	72	82.8
Chairs	54	62.1
Roofing	68	78.2
Medicinal	70	80.5

Multiple responses recorded

Table 3b reveals that all parts of bamboo have medicinal value even though the leaves are most (93.1%) utilized. Among the diseases treated with extracts from bamboo in the study area, as indicated by respondents, are dysentery (100%), diarrhea in babies (71.3%), pile (65.5%), and epilepsy (51.7%), which are common diseases in rural agrarian communities. Local people in East Africa use bamboo for medicine (Kigomo, 2007).

Table 3b: Utilization of Bamboo for Medicinal Purpose (n=87)

Variable	Frequency	Percentage
Parts utilized		
Roots	47	54.0
Leaves	81	93.1
Epiphyte	59	67.8
Diseases cured		
Epilepsy	45	51.7
Pile	57	65.5
Diarrhea in babies	62	71.3
Dysentery	87	100

Multiple responses recorded

With regard to uses in fishing, as presented in Table 3c, respondents indicated that bamboo is used for testing the depth of river (89.7%), canoe paddling (89.7%), pegs to hold nets (82.8%), and as ash when stem is burnt (75.9%). This means that bamboo is very essential in fishing operations, which is a common profession for the local people.

Table 3c: Uses of *Bambusa vulgaris* in Fishing (n=87)

Variable	Frequency	Percentage
Test the depth of river	78	89.7
Canoe paddling	78	89.7
Pegs to hold nets	72	82.8
Ash as chemical to kill fish	66	75.9

Multiple responses recorded

Even in building construction, *Bambusa vulgaris* is put to several uses. The straight and long stem, high tensile strength, and branching pattern of bamboo could be the plausible explanation why the respondents used it for decking support pole (79.3%), ladders (78.2%), pillars support (77.0%), roofing (74.7%), and to frame doors and windows (74.7%), as presented in Table 3d.

Table 3d: Uses of *Bambusa vulgaris* for Building Construction (n=87)

Variable	Frequency	Percentage
Decking support pole	69	79.3
Ladder	68	78.2
Pillars' support	67	77.0
Roofing	65	74.7
Frame for doors and windows	65	74.7

Multiple responses recorded

Cultural control of bamboo utilization

There are cultural taboos in most rural communities of Africa, which were meant to either protect the people or conserve plant and animal species. Table 4 presents the taboos associated with the use of bamboo in Borgu Local Government Area. Women are not allowed to harvest bamboo. This could be attributed to the fact that harvesting of bamboo is quite tedious and requires a lot of physical strength, which men typically have more than women. This taboo saves women from injuries. Similarly, women are culturally disallowed to eat Hyaena (*Hyaena hyaena*) in some communities, in Ibo speaking areas of Nigeria, mainly to discourage them from attempting to hunt the ferocious carnivore, which may hurt them in the process. Also, women are not allowed to climb trees in Ibo speaking communities, purposely to avoid them being injured.

The stem of bamboo is not cooked, probably due to the way in which bamboo burns when dry, and partly to discourage women and children from harvesting it. Children are not allowed to harvest bamboo due to the strength required in doing so, coupled with the fact that the leaves and buds are studded with spines and thorns, which irritates the skin and can easily cause other skin injures, such as cuts. This may be the plausible explanation why it is not allowed to be used for beating. Moreover, the roofing pattern (rhizome) of bamboo makes it easy to spread very fast, thereby, making the stand become very conspicuous which could harbor wildlife species, particularly snakes and rodents.

Table 4: Cultural Taboos Associated with the Use of Bamboo in Borgu Local Government Area (n=87)

Variable	Frequency	Percentage
Not allow for beating	55	63.2
Children not allow to harvest	72	82.8
Women not allowed to harvest	80	92.0
Stem not allowed for cooking	79	90.8

Multiple responses recorded

CONCLUSION AND RECOMMENDATIONS

Bambusa vulgaris has significant socio-economic impact on the lives of people living in Borgu Local Government Area of Niger State. The lives of the respondents revolve around the use of *Bambusa vulgaris* for one purpose or the other, some being medicine, shelter, fishing (all basic necessities of life). Thus, if *Bambusa vulgaris* becomes extinct, the livelihood of the rural dwellers that depend on this multipurpose species will seriously be affected. Sustainable use of existing bamboo stands, education, and the creation of national bamboo policy are the surest way to combat the growing trend of deforestation and social inequality. Thus, there should be regular inventory of natural bamboo stands for the resource to be managed on sustainable basis. Efforts should also be geared towards the protection and conservation of rich biodiversity associated with bamboo forests and bamboo growth areas, sustainable development, and utilization of bamboo resources through scientific management, promotion of local traditional bamboo craft, and art with value-addition for local and export market, promotion of awareness, and understanding of bamboo with a view of utilizing its full potential to galvanize the rural and national economy. Sustainable utilization of *Bambusa vulgaris* should, therefore, be encouraged in the study area.

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