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## Preliminary Investigation on Bamboo Management in the Socio-Economic Development of Ghana: Case of Ashanti and Brong Ahafo Regions

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### Abstract:

*Bamboo (Bambusoideae) in Ghana is naturally found in almost all the ten regions of Ghana specifically, Central, Ashanti, Eastern, Western, BrongAhafo, Volta and some parts of the Northern Region. This free gift of natural; renewable; and versatile resource characterized by high strength and low weight which is easily worked with simple tools has undergone an insignificant economic management over the years, based on our investigation. The study captures seven species belonging to the subfamily bambusoideae of the family poaceae. They are commonly found along the length and breadth of the forest soils of Ghana, which can be invigorated to develop the bamboo industry to earn foreign exchange, yet these are not given the needed attention. Subsequently, we conducted formal interviews to ascertain farming practices with regards to reservation of bamboo species on their farm lands. All participants interviewed declared openly the clearance of the bamboo stands through cutting or setting it ablaze to make way for their food crops. The results indicated again that, an insignificant number of farmers are into bamboo plantation. The forestry department has not distinguished itself in the field of bamboo plantation in Ghana, the effort made by Bamboo and Rattan Development Project (Baradep) in 2002 by the presidential initiative was a mirage while the wild species in our forest are at the mercy of bushfires and indiscriminate cutting habits of man. The results of the study also portray that, the socio-economic impact of Bamboo Industry of the economy of Ghana is insignificant due to poor management as compared to countries like China, India, Malaysia, Thailand, etc. that earn very high economic returns from bamboo due to effective and efficient bamboo management.*

**Keywords:** management, insignificant, invigorated, socio-economic, bamboo.

### 1. Study Areas

Ashanti Region is a city-state autonomous people of Ghana and is the homeland of the Ashanti ethnic group, occupying a total land surface of 24,389 km<sup>2</sup> (9,417 sq mi) and partially overlapping with the cultural extension of Ashanti land. Location of Ashanti within Ghana show co-ordinates of 6°45'N 1°30'W in the southern portion. The native indigenous people of Ashanti are colloquially known as Ashantis. Ashanti occupies 10.2% of the total land area of Ghana as the third largest of 10 administrative regions. Ashanti is centred on the Ashanti capital, megacity Kumasi- also known as Kumasi metropolis. The Brong-Ahafo Region is located in south Ghana. Brong-Ahafo is bordered to the north by the Black Volta River and to the east by the Lake Volta, and to the south by the Ashanti region, Eastern and Western regions, and to the west by the Ivory Coast south-eastern border. The capital of Brong-Ahafo is Sunyani. Brong-Ahafo was created in 1958 from Bono state and named after the dominant and native inhabitants, Akans Brong and Ahafo.



Figure 1: Ashanti on map of Ghana

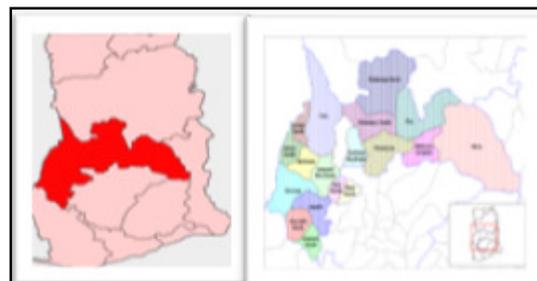


Figure 2: Brong Ahafo on map of Ghana

## 2. Introduction

Bamboos are fast-growing, versatile plant species with multiple end-uses. For centuries, bamboos have been closely related to agriculture, cottage industries, arts, culture and day-to-day life of more than half of the world's population. According to Mohanan (1997), recently, bamboos have also entered highly competitive markets in the form of pulp for paper and rayon, ply bamboo and as a canned vegetable. Till recently, bamboos were categorized as minor forest produce or even treated as weeds. With the alarming shrinkage of forest resources and the restrictions imposed on logging from natural stands, emphasis is being placed on raising fast-growing, multipurpose tree species to meet the ever increasing demand for wood.

Aron (1980) explains that, bamboo; the world's fastest growing and environmentally friendly giant grass, has now gained international recognition as an important non-timber woody resource. It is upon this background that the researchers seek to find out whether the afforestation and reforestation programmes of Ghana have seriously embraced bamboo plantation to assume considerable importance to meet industrial and rural requirements and also as a means of checking soil erosion and conserving soil.

Bamboo have made the backbone of rural economy of many countries due to its versatility, rapid growth and many end uses (Hidalgo, 2003). Bamboo as natural resource should be managed by the government equally as timber, cocoa, gold, oil, etc. Natural resources occur naturally within the environment that it exists relatively undisturbed by mankind in a natural form.

A natural resource is often characterized by amount of biodiversity and geo-diversity existent in various ecosystems. Natural resources are derived from the environment. Some of them are essential for our survival while most are used for satisfying our wants (UNESCO and UNEP, 2002). From the fore-going, Ghana has been blessed with a lot of bamboo species which occur naturally in greater quantities which must be essential for survival and also to satisfy our wants. Groom et al, (2006) explain that potential resources are those that exist in a region and may be used in the future, whereas actual resources are those that have been surveyed; their quantity and quality determined and are being used in present times. The development of an actual resource such as wood processing depends upon the technology available and the cost involved.

However, bamboo as a renewable resource should not be left to exist to be used in the future since it is renewable and tools and equipment needed for its processing can be locally manufactured. Resource extraction involves any activity that withdraws resources from nature. This can range in scale from the traditional use of preindustrial societies to global industry, where extraction produces raw material, which is then processed to add value (Van Dyke, Fred, 2008). This means that resource extraction should be done in the case of bamboo in Ghana due to the versatile nature of the plant. This can add substantially to Ghana's wealth.

Gaston & Spicer, (2004) indicate that natural resource management deals with managing the way in which people and natural landscape interact. It brings together land use planning, water management, biodiversity conservation and the future sustainability of industries like forestry, agriculture, mining and tourism.

It recognises that people and their livelihoods rely on the productivity of our resources and their actions as stewards of critical role in maintaining this productivity. (Gaston & Spicer, 2004)

Natural resource management is also congruent with the concept of sustainable development, a scientific principle that forms a basis for sustainable global land management and environmental governance to conserve and preserve natural resources. (Young, 1998). Young continues on a scientific and technical understanding of resources and ecology and the life-supporting capacity of those resources.

From the above explanations, it is obvious that the government of Ghana should endeavour to execute a firm policy on bamboo management for sustainable development since the livelihood of the people can rely on bamboo as a natural resource.

In Ghana Bamboo management has remained a problem. This has caused many people to develop negative impression of bamboo. It has also caused many frustrated land owners to feel that bamboo cannot be controlled.

The Bureau of Land Management in the United States manages America's public lands, totalling approximately 264 million acres (1,070,000 km<sup>2</sup>) or one-eighth of the landmass of the country. This implies that management of land or forest products is at its best. In 2005 the government of New South Wales, established a standard for Quality Natural Resource Management to improve the consistency of practice, based on an adaptive management approach. In the United States, the most active areas of natural resource management are wildlife management often associated with eco-tourism and range land (pastures) management. In Australia, water sharing such as the Murray Darling Basin Plan and catchment management are also significant (Spring, 2006).

Ghana can also enforce a body to oversee to management of bamboo for its sustainability.

Dandy, et al (2009) declare that natural resource management approaches can be categorised according to the kind and right of stakeholders, or ownership regimes of natural resources.

- (a) State property regimes: Ownership and control over the use of resources is in the hands of the state. Individuals or groups may be able to make use of the resources but only at a permission of the state. Natural forests, natural parks, etc. are some U.S examples.
- (b) Private property regime: Any property owned by a defined individual or corporate entity. Both the benefits and duties to the resources fall to the owner(s). Private land is the most common example.
- (c) Common property regime: it is a private property of a group. The group may vary in size, nature and internal structure e.g.: indigenous tribe, neighbours of village: some examples are community forest and water resources.
- (d) Non-property regimes(open access): Here there is no definite owner of these resources. Each potential user has equal ability to use it as they wish. These areas are the most exploited. It is said that everybody's property is nobody's property. An example is a lake fishery. The ownership regime is often linked to the tragedy of the commons.
- (e) Hybrid regime: many ownership regimes governing natural resources will contain parts of more than one of the regimes described above. So natural resources managers need to consider the impact of Hybrid regimes. An example of such a hybrid

is native vegetation management in NSW, Australia, where legislation recognises a public interest in the preservation of native vegetation, but where most native vegetation exist on private land.

From the lesson of the various regimes above, the government of Ghana should adopt the best of these regimes of natural resource management to ensure that bamboo as a natural resource does not fall on any wrong resource management like non-property regime so that bamboo resource can be controlled to be an economic viable raw material

### 3. Some Bamboo Species in Ghana

Ghana is endowed with about seven species of bamboo in seven out of the ten regions. These are *Bambusa bambos*, *Bambusa vulgaris*, *Bambusa arundinacea*, *Bambusa varvitata*, *Bambusa dendrocalamus strictus*, *Bambusa multiplex* and *Bambusa perviabilis*. (Baradej,2000). Yet, the management policy of that resource is economically undesired. This is one reason for which the researchers seek to bring to light for it to gain national recognition in the nation's natural resource management agenda.

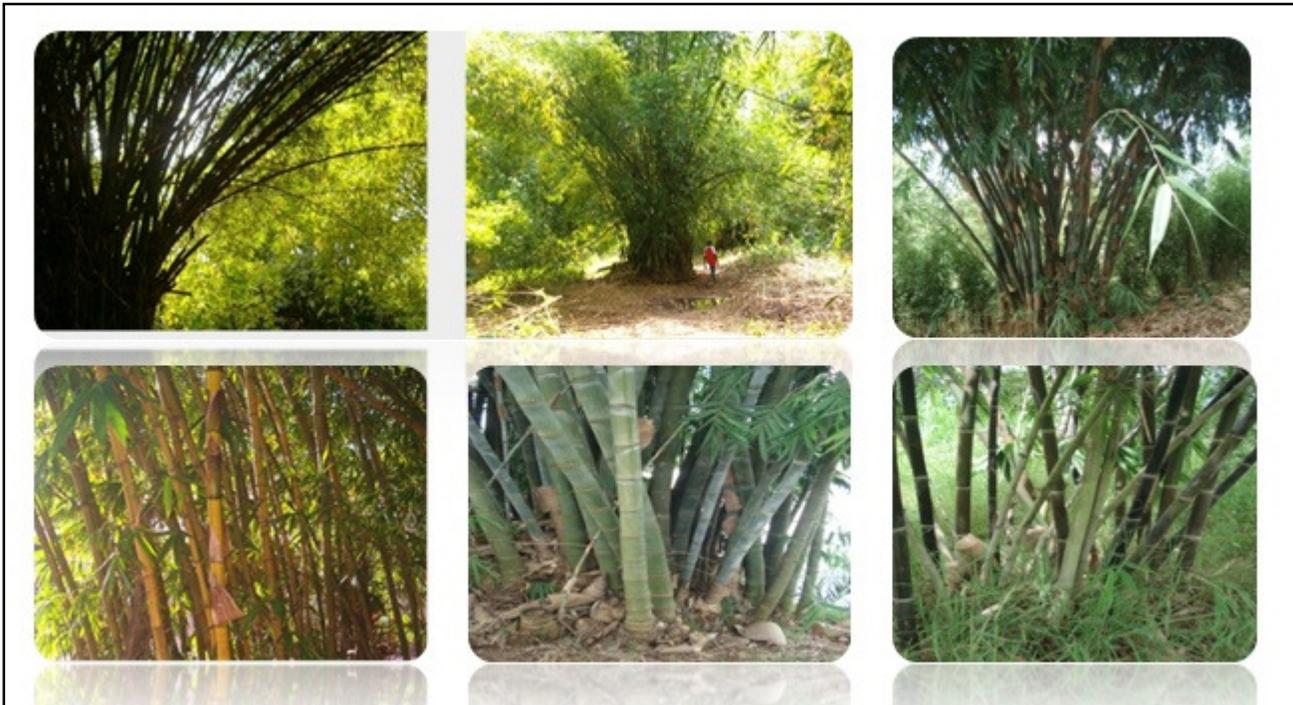


Figure 3: Some Bamboo Species in Ghana

Spring (2006) has it that, natural resource management issues are inherently complex as they involve the ecological circles, hydrological cycles, climate, plants and geography, etc. Yet the government of Ghana should endeavour to have a change of trend of bamboo resource management for the benefit of the people. The researchers want to draw the government attention to the United Nations Conference for the Environment and Development (UNCED) held in Rio de Janeiro in 1992, where most nations subscribed to new principles for the integrated management of land, water and forest. Although programme names vary from nation to nation, all express similar aims. The various approaches applied to natural resource management include:

- ❖ Top-down or command and control
- ❖ Bottom-up (regional or community based NRM)
- ❖ Adaptive management
- ❖ Precautionary approach
- ❖ Integrated approach (INRM) (Spring 2006)The implication here is that, aims and approaches did not sideline bamboo as a resource. We have come of age that technology has made countries like Malaysia, Sri Lanka, India, China and the rest to improve the socio-economic well-being of the people through the bamboo industry. How can't Ghana?

Harding (1998) explains that community based approach combines objectives with the generation of economic benefits for rural communities. The three key assumptions being that: locals are better placed to natural resources, people will conserve a resource only if benefits exceed the cost of conservation and people will conserve a resource that is linked directly to their quality of life. He continues that, when the local people's quality of life is enhanced, the efforts and commitment to ensure that future well-being of the resource are also enhanced. This buttresses the researchers' view that, there is a problem of community based bamboo resource management in Ghana and that is the difficulty of reconciling and harmonising the objectives of socio-economic development, biodiversity protection and sustainable resource utilisation.

Warner and Jones (1998) declare that, community based natural resource management is based particularly on advocacy by non-governmental organisations. Working with local groups and communities on the one hand and national and transnational on the other to build and extend new versions of environmental and social advocacy that link social justice and environmental management

agenda, with direct and indirect benefits observed including a share revenues, employment, diversification of livelihoods and increase pride and identity.

The foregoing explains the fact that bamboo resource management in Ghana could have been entrusted onto the hands of non-governmental organizations to work with the local groups and communities. This would have explored deep into the technology and how sustainable bamboo industry is for the local people and the nation as a whole.

Cooney (2004) elucidates that, threats wreaking biodiversity include; habitat fragmentation, putting a strain on the already stretched biological resources; forest deterioration and deforestation; the invasion of "alien species" and climate change. Since these threats have received increasing attention from environmentalists and the public, the precautionary management of biodiversity becomes an important part of natural resources management.

According to Cooney, there are material measures to carry out precautionary management of biodiversity in natural resource management. In relation to Cooney's assertion, stricter material measures to carry out bamboo management in Ghana have not attained its fullest capacity. Bamboo resource experiences threats of distraction, forest deterioration and deforestation strain on the material. It is about time Ghana appreciated the economic significance of bamboo. In order to have a sustainable environment, understanding and using appropriate management strategies to revamp the bamboo industry is dependent on the following:

- ❖ Comprehending the processes of the gift of God in relation to time, place, species and research.
- ❖ Using appropriate and adapting management system in local situation.
- ❖ Co-operation between technology and the local people who have knowledge and skills

#### 4. Unemployment Situation

Sayre & Morris (1996) have it that unemployment is a situation where some persons over the age of 15 and actively seeking work do not have employment. There are a chunk of graduates coming out of second cycle, tertiary or any other institutions who have the desire to work, but the unfortunate side is that they are not gainfully employed. This is an economic blow to Ghana vis-a-vis the underutilization of some resources in the country. Bamboo industry could have been made profitable to absorb especially the rural folks to relieve the government from unemployment problems. The bamboo industry can also curb seriously other types of unemployment: frictional, structural and clinical.

By frictional unemployment- It refers to that part of total unemployment caused by the fact that it takes time for people to find their first job or move between jobs. It also refers structural unemployment as continuous structural changes in the economy that leads to a certain amount of unemployment. Whereas cyclical unemployment is that which occurs as a result of the recessionary phase of the business cycle (Sayre, Morris, 1996).

Let us try to explain these types of unemployment graphically in figure 4.

##### 4.1. The Natural Rate of Unemployment

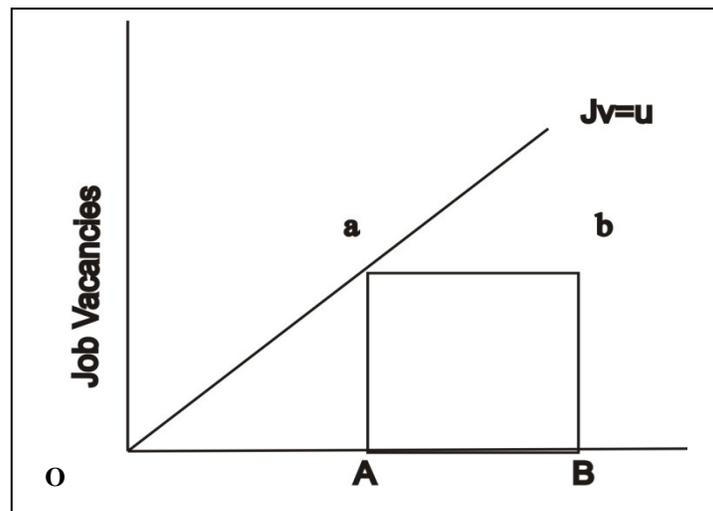


Figure 4: Number of people unemployed  
Source: Principle of Macro Economics, 1<sup>st</sup> Edition 1998.

Point 'a' represents a situation of no cyclical unemployment in that the number of job vacancies and the number of unemployed are equal. This is our definition of full unemployment where the level of unemployment, 'OA', would be the natural rate of unemployment.

Point 'b', on the other hand, illustrates a situation where unemployment exceeds the number of job vacancies and the distance AB represents the level of cyclical unemployment. At point 'a', there are enough jobs available, but either the jobs are not suitable for the job seekers, or the job seekers are not suitable for the jobs.

At point 'b', on the other hand, there is not only this mismatch, but also the situation of insufficient jobs to go around.

Here, the researchers are pointing to the fact that, the challenge of government policy, therefore, is to both ensure that the labour force has the right type of skills and also to help create sufficient jobs for a growing work force. The availability of bamboo on our land can create a bulk of foreign exchange through the exportation of thousands of bamboo art pieces by the use of the labour of the rural folks who migrate into the cities for non-existence job opportunities and its attendant social vices. There are some obvious personal economic costs associated with unemployment, which are unbearable to the state. There are also serious social costs, which can affect all of us. There is an empirical relationship in economics known as Okun's Law, which observes that for every 1% of cyclical unemployment, the economy's level of GDP falls 2.5% short of its potential (Sayre & Morris 1996).

As a result of this cyclical unemployment to the state, there is bound to be a social cost to the individual and to the society. And the percentage of the affected would find a lot of feelings of bitterness, disappointment, anger, loss of self-esteem and sense of failure. Such feelings are not a recipe for social harmony. Therefore, alcoholism, accidents, claims on the health care system, violence and crime will all rise.

Lack of confidence is a strong crippling effect that blocks our success (The State Auditor, Issue № 019-July-September 2012). Confidence tends to focus on two related ideas:

1. Confidence as about being certain of our abilities.
2. Confidence as about having trust in people, plans or the future.

The Centre for Confidence and well being ([www.centreforconfidence.co.uk](http://www.centreforconfidence.co.uk)) use the following formula for confidence: Confidence = Self-efficacy + Optimism. Simply put confidence is an individual's belief that he/she cannot reach his specific goals plus the general belief that the future is bright. The State Auditor explains that, self-confidence emanates from the following attributes:

- a) Direction and Values: - We know what we want, where we want to go and what's really important.
- b) Motivation: - We are motivated by and enjoy what we do. In fact, we are likely to get so engrossed in what we are doing that nothing distracts us.
- c) A positive mindset: - We have the ability to stay optimistic and see the bright side even when we encounter setbacks. We hold a positive regard ourselves as well as other people.
- d) Flexibility in behaviour: - We adapt our behaviour according to circumstances. We can see the big picture as well as paying attention to details. We take to other people's views on board in making decisions.
- e) Eagerness to develop: - We enjoy stretching ourselves, treating each day as a learning experience rather than acting as if we are already an expert with nothing new to find out. We take our discoveries to new experiences.

A willingness to take risks: - We have the ability to act in the face of uncertainty and will put ourselves on the line even when we don't have the answers or all the skills to get things right.

- f) A sense of purpose: - We have an increasing sense of the coherence of the different part of life. The lack of confidence is the primary factor that limits a person's success, happiness and life satisfaction.

As inferred from the foregoing, the researchers maintain the view that, the bamboo resource in Ghana could receive a national attention as other resources like gold, diamond, cocoa and oil so as to increase the relevance in wealth creation, poverty alleviation and sustainable development of the country. It is to be established that bamboo and its multiple uses can contribute greatly to the gross domestic product of Ghana.

## 5. Methods and Procedures

A descriptive survey and case study methods were employed for this study. The objectives of the researchers were to find out first hand information about recognised Bamboo developers and how effective the forestry services division, The Bamboo and Rattan Development Programme, The Ministry of Environment and Natural Resources and other agencies are helping in the management and development of Bamboo in these areas of Ghana. The paper again examined and analysed some studies that have been done on bamboo management. The researchers also sought essential information from the sampled population, individuals and experts who have unearthed some concepts on the study. In order to ascertain accurate information on the objectives, the researchers administered questionnaires, interviews and observations. Data on farmer's perceptions were collected with structured questionnaires, consisting of 30 items designed to investigate how farmers manage their farms. The questionnaire concerned itself with topics such as financial support, education and training, market availability, inputs (exotic seeds), government policy and Bamboo type and uses. Data were also collected from available relevant or related literature based on the topic, in the form of textbooks, magazines, newspapers, internet and related sources. The stratified and simple random sampling, focused group discussion, snowballing and purposive sampling were used to sample actual bamboo developers, general crop farmers, Government agencies responsible for natural resources development. In sum, 90 respondents were realised of which only 15 were actual bamboo farmers, which constitutes about 16.7% of the population as shown in table 1. These scattered respondents were found within the forest areas of both Ashanti and Brong Ahafo Regions such as two (2) from Akomadan, two (2) from Jinijini, one (1) from Prang, two (2) from Nsemme, one (1) from Bauku all in the Brong Ahafo region and two (2) from Mesewam, one (1) from Boanim-Mampong, two (2) from Afram plains and one (1) from Yonso, one (1) from Asamang also in the moist semi deciduous forest of the Ashanti region. This paper utilised (descriptive survey and case study) to quantify data in tables, graphs and percentages. The researchers however, thematically analysed the data by using the SPSS data analysis programme. Frequencies, percentages and cumulative percentages were recorded for demographic data.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<b>Actual Bamboo Farmers</b>	<b>15</b>	<b>16.7</b>	<b>16.7</b>	<b>16.7</b>
	General Farmers	63	70.0	70.0	86.7
	Gov"t Agencies (FSD, MOFA, BARADEP, CSD) etc.	6	6.7	6.7	93.3
	Others	6	6.7	6.7	100.0
	Total	90	100.0	100.0	

Table 1: Occupation of respondents in both Brong Ahafo and Ashanti Regions  
Source: Researchers' Field Study 2014

Fig 3, shows the background of the respondents' researchers ascertained information of how bamboo is managed in the country.

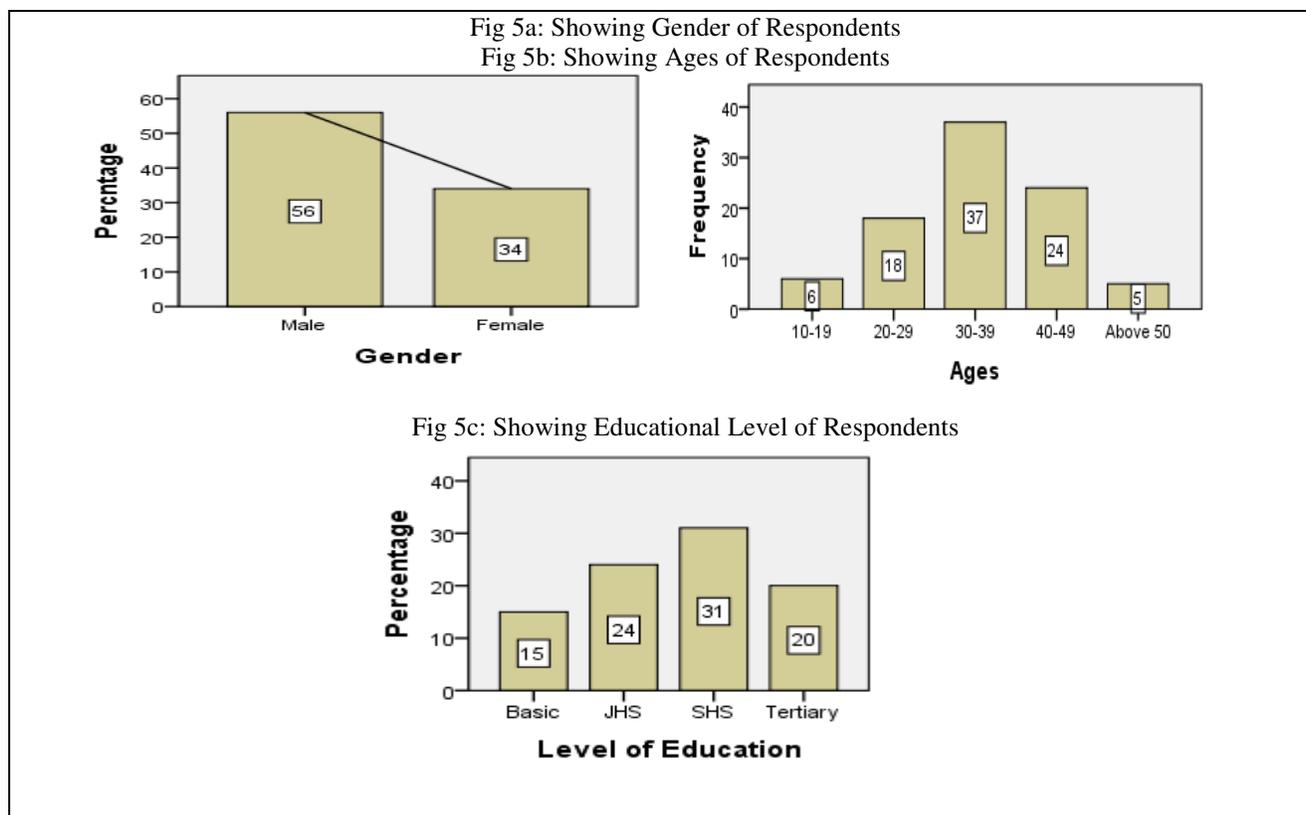


Figure 5

Source: Researchers' Field Study 2014

## 6. Results and Discussion

Out of 100 copies of questionnaire distributed to farmers and other stakeholders, 90 copies were retrieved, representing 90% response rate. This is significant and compares with the success rate considered by Oppenheim (1992), which states that, self-administered questionnaire distributed and completed must assure high return. However, 15 out of the 90 copies retrieved questionnaire were actual Bamboo developers from the two regions. In many of their responses, farmers shared similar views on several aspects of Bamboo management and development. The result revealed that quite apart from very few numbers of plantations, Bamboo nursery and development is dependent on some essential management factors which they are faced with. These are:

- Lack of Financial Support.
- Lack of Education and Training
- Lack of Market (Industry)
- Lack of Inputs (Exotic variety, tools and equipment.)
- Lack of Government Policy

## 7. Analysis of Results

From critical examination of the researchers, many farmers would have been interested in raising commercial bamboo plantations, but for the absence of those unfavourable factors which basically could have been catered for by the government, many farmers have lost the zeal to bamboo farming hence the fewer the number of actual bamboo developers. In much the same way, statistics show that very

few people grow bamboo nationwide. This is due to the fact that farmers have not had any serious attention in terms of support. The figure shows the few developers in Ghana, their areas of operation and their small farm holdings.

#### LIST OF BAMBOO NURSERY DEVELOPERS IN GHANA (2013)

Name of Company/Individual	Region	Location Town/Country	Type/Plantation/Nursery	Size/Capacity	Contact Person
Global Bamboo Production Ltd	Brong	Akomadan	Plantation	8 acres	Gloria Adu-0208169533
Baradep/Darlow Ghana Ltd	Brong	Prang Atebubu	Plantation	2 acres	Dickson Yeboah-0246828567
Baradep FSD	Ahafo	Nsemme Forest	Plantation	8 acres	Mr Sintim-0244465597
Ntrong Community	Ahafo	Preserve, near Bouku	Plantation	37 acres	Dormaa FSD
Gu-Go Fun Club	Brong	Jinjini	Plantation	5 acres	Dormaa FSD
Darlow Ghana Ltd/Baradep	Western	Tarkwa/Nsuta	Plantation & Nursery	20acres/38,00 propagates	Dickson Yeboah-0246828567
Susri Industrial Plantation Ltd	Western	Dabaase	Plantation & Nursery	15 acres	Mr Otoba-0202877131
Forest Research Institutue of Ghana/Baradep	Ashanti	Mesewam	Plantation & Nursery	2 acres	Dr. Emma Ebanyenle 050-8541272
Kwamoka Farms & Processing	Ashanti	Afram Plains	Nursery		Janet Akon-020840828
Baradep/Boahim Community	Ashanti	Boanim-Mampong	Plantation & Nursery	2.5 acres	Baradep
Brimso Forest Reserve	Centra	BimsoApewosika	Plantation	2.5 acres	Cape FSD
Global Bamboo	Eastern	Nkawanda	Plantation	2.5 acres	Gloria Adu-0208169533
Banett/Baradep/FSD	Accra	Pokuase	Plantation & Nursery	1 acres	Baradep

Table 2: Source: Ministry of Environment and Natural Resource

#### 7.1. Lack of Financial Support

According to the few bamboo farmers the researchers met with on their farms, the government does not give them any financial assistance to enhance their activities unlike farmers who are engaged in cocoa, coffee, oil palm etc. Table 3 declares the forms of support the government gives to cocoa and other crop producers which otherwise bamboo should have been included in the package.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Loans	42	46.7	46.7	46.7
	Grants	25	27.8	27.8	74.4
	Credit Facility	14	15.6	15.6	90.0
	Subsidy	5	5.6	5.6	95.6
	None Above	4	4.4	4.4	100.0
	Total	90	100.0	100.0	

Table 3: Form of support to Cocoa, Coffee and Oil Palm Farmers

Source: Researchers' Field Study 2014

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<b>0-9</b>	<b>68</b>	<b>75.6</b>	<b>75.6</b>	<b>75.6</b>
	10-19	7	7.8	7.8	83.3
	20-29	5	5.6	5.6	88.9
	30-39	6	6.7	6.7	95.6
	40-49	1	1.1	1.1	96.7
	Above 50	3	3.3	3.3	100.0
	Total	90	100.0	100.0	

Table 4: Level of Government Finance to Bamboo Farmers

Source: Researchers' Field Study 2014

From Table 4, statistics show that about 75.6% of the total respondents indicated that the government's effort in terms of financial support given to Bamboo developers is as low as between the range of 0-9percent. A total of 7.8% indicated a financial assistance of the range of 10-19 percent whereas 5.6% and 6.7% of the respondents indicated the ranges of 20-29 percent, 30-39 percent respectively. However, just 1.1% of the total number according to table 4 indicated the financial assistance of the level of 40-49 percent. Researchers also found in their field study that farm holdings were very small; nurseries were quite negligible with stunted growth. More so very few people are found in bamboo growing. Figure 6 are examples of stunted growth of some bamboo farms and nurseries captured during researchers' field trips.



*Figure 6: Samples of bamboo nurseries.  
Source: Researchers' field Study 2014*

These suffice to say that bamboo developers have financial challenges and this does not augur well for development.

Malaysia, until sometime did not give priority to Bamboo as a potential Natural Resource to be exploited. Traditionally, Bamboo was considered as weed as it is in Ghana. And now attempt was made in 1981 at quantifying and stocking of Bamboo and Rattan in the North-Western Peninsular Malaysian state of Kedah in conjunction with further development of the rural industries there (Anon, 1982). In a short period a total of 512 clumps were recorded during this inventory. This yielded an estimated average culm density of 40 per clump with an average harvestable lengths of 3m giving an estimate of 152 million pieces equivalent to a total of over 185,000 metric tonnes (at a conversion of 820 pieces per tonnes) of air dried bamboo. Now Bamboo comes to the fore front as one of the more easily available resources within rural communities in Malaysia. The researchers feel that, fresh consideration should be given to Bamboo in Ghana, by building and managing on a scale large enough to support feasible industries in areas that are ecologically suitable, commensurate with the government interest in financing Bamboo plantation to further raise the standard of living of the rural population. (Anon, 1982).

### *7.2. Lack of Education and Training*

Lack of education and training contribute immensely to poor bamboo management in the two areas the study was conducted. An appropriate management system is the guarantee for high yield and fine quality of bamboo. The task is to deal properly with the relationship regarding the cycle of growth of woody tissue and the life cycle of Bamboo, so that the plant will grow luxuriantly in an unflinching way. In wet season shoots should be protected, rhizomes be well groomed. In the dry season, trimming of shoots and preservation of moisture is to be effected and above all felling in a rational way should be exercised. In table 5, there is a clear indication after the study that, government policy on education and training on cocoa is 75.6% compared to that on Bamboo which is woefully about 7%. The government has Cocoa Services Division working hard to accelerate productivity of cocoa losing sight of that of bamboo. Even though Bamboo Research and Development Programme may be responsible it is not resourced to take care of bamboo farmers.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cocoa	68	75.6	75.6	75.6
	Oil Palm	15	16.7	16.7	92.2
	Bamboo	7	7.8	7.8	100.0
	Total	90	100.0	100.0	

Table 5: Trend of Education & Training on Cocoa, Oil Palm and Bamboo  
Source: Researchers' field study 2014

Education and training are the basic tasks in the management and operation system which have bearing on yield. Bamboo developers should be well trained to gain a skill to undergo basic farm practices for greater productivity. There are other technical operations that an ordinary developer may need. Operation based on the formation of woody tissues is such that bamboo under 3 years are retained and those over 4 years felled, except for those necessary for maintenance of the required density of canopy. The maximum age should not exceed 7 years. The period may be determined on the basis of the relationship between specific gravity of the bamboo and the age, or the relationship between index of foliage area and age of bamboo. The developer must know the period between consecutive blooming, which is generally several decades, be possibly prolonged if operation based on the former two cycles is rigorously enforced. It is known that long-lasting droughts and lack of soil fertility will lead to twisting and gnarling of the old rhizomes and improper management practice such as ignorance and negligence of application of earth and manure.

From the above, education and training speak volumes when it comes to bamboo management. However, that was one of the primary problems the researchers discovered during their visits to the farmers. Due to little or lack of training and education farm sizes we visited were very small. Should the government set foot to educate even the few bamboo developers; a certain margin of bamboo productivity can be achieved to sustain the cottage industries that will go a long way to curb rural urban migration and other economic tendencies.

### 7.3. Lack of Inputs (Exotic breed, technology)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Farm Implement	7	7.8	7.8	7.8
	Insecticide	7	7.8	7.8	15.6
	Seeds/Seedlings	7	7.8	7.8	23.3
	Exotic Species	6	6.7	6.7	30.0
	None above	63	70.0	70.0	100.0
	Total	90	100.0	100.0	

Table 6: Expected Form of Inputs to Bamboo  
Source: Researchers' field study 2014

Table 4 shows the reaction of respondents on the supply of inputs like farm implements, insecticides, seeds, exotic species etc. which bamboo farmers are expected to get. Sixty-three (63) out of the total population of ninety (90) representing 70% declared that they have not experienced the supply of those inputs to bamboo farmers. The researchers' interview granted to the actual bamboo farmers in the two regions revealed that they are not supplied with such inputs. But Cocoa and other crop farmers receive a comprehensive package of inputs to improve upon their farming activities. A situation, which discourages many from bamboo farming.

The researchers in the course of the study found that, there has not been enough attempt of cross-breeding the exotic breeds with the local species to achieve the hybrid species as part of quality control measures.

Most native bamboo species growing in Ghana are sympodial which multiply mostly through rhizomes and very rarely by seeds. The seeds of the other exotic monopodial or amphipodial varieties could be imported for planting to generate seeds for farmers. Plantations of some economic bamboo species like *Bambusa abyssinica*, *Dendrocalamus strictus*, *Dendrocalamus hamiltonii*, *Ochlandra scriptoria*, *Bambusa tulda*, etc, will be produced in greater quantities which will invariably impact the Gross Domestic Product (GDP).

The science of managing bamboo is new to a number of countries but specific prescriptions will have to be worked out for Ghana. In the study we recognised that some basic technical tools needed by farmers in their operations were lacking.eg.

- cultural operations to bamboo stand from time of formation
- clump and culm spacing
- moisture retention techniques
- felling intensities and method of felling
- fabrication of improved tools for cutting, splitting and binding bamboo.

This is indicative of the fact that, there is the need to modernize the bamboo based industrial sector by bringing in better technology, processing and manufacturing support as well as improved management practices so that our bamboo industry can be globally competitive and the country can secure its due place as manufacturer and exporter of new generation bamboo products. To achieve this objective, well co-ordinated efforts involving government agencies at the central and state levels, private, corporate, co-operative and farm sectors and community based organizations are critically needed.

#### 7.4. Lack of Market

The researchers discovered from the field that bamboo farmers really sell the raw material, and therefore decided to find out the type of market that patronize the material.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Internal/International	6	6.7	6.7	6.7
	Industry	7	7.8	7.8	14.4
	Private	65	72.2	72.2	86.7
	None Above	12	13.3	13.3	100.0
	Total	90	100.0	100.0	

Table 7: Structure of Market for Bamboo

Source: Researchers' field study 2014

Table 7 shows the frequencies of market types that patronize the bamboo culms. It can be said that 72.2% of both bamboo farmers and others share the view that, bulk of bamboo culms produced in these areas are sold to few local purchasers who use them just as props for construction and fencing. According to the bamboo cultivators, there has not been a special market being it internal or external to sell the raw material. Price per pole or tonnage is nothing to write home about hence killing the interest for production. From table 7 only about 6.7% of the population suggested the existence of an International Market while 7.8 % also thought the industry has a Market for bamboo. However, 13% claim none of the above markets exist at all.

The researchers from their studies deduced that there has not been a serious market for bamboo both home and abroad. This is due to the fact that the bamboo industry has not been developed to the level of that of cocoa, timber and other agricultural produce. The researchers maintain that, market for bamboo should not be limited to only selling of the culms, because bamboo can be processed into about 5000 meticulous articles that can be exported to earn greater foreign exchange to augment the economy of Ghana.

#### 7.5. Government Policy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	4	4.4	4.4	4.4
	Low	10	11.1	11.1	15.6
	Average	35	38.9	38.9	54.4
	High	38	42.2	42.2	96.7
	None Above	3	3.3	3.3	100.0
	Total	90	100.0	100.0	

Table 8: Level of Government Policy on Cocoa

Source: Researchers' field study 2014

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	67	74.4	74.4	74.4
	Low	14	15.6	15.6	90.0
	Average	3	3.3	3.3	93.3
	High	1	1.1	1.1	94.4
	Very High	1	1.1	1.1	95.6
	None Above	4	4.4	4.4	100.0
	Total	90	100.0	100.0	

Table 9: Government Policy on Bamboo

Source: Researchers' field study 2014

In table 8 researchers tried to weigh the level of government policy with regards to the development of cocoa industry in Ghana and that of bamboo. Respondents indicated 42.2% for high concern and 39.8% also of average concern of government policy on cocoa. When the two percentages were put together, researchers realised about 82% out of the total respondents pointing to the fact that the government shows much concern about cocoa in terms of allocation of resources.

However, the trend of government policy on bamboo in terms of national budget on table 9 is clearly towards negativism. A valid per cent of 74.4 of the respondents indicated that government policy on bamboo is very low. On the other hand, we realised from the table that a frequency of 14 of the respondents representing 15.6% declared that government policy on bamboo is rather low. Judging from the insignificant values of 1.1% for high and 1.1% for very high government policy on bamboo respectively as shown in table 9, together with negative information found during the field trip, the researchers are of the view that government policy regarding bamboo as a natural resource is not so strong to enable development. It is therefore imperative for a very high policy to be formed to promote bamboo industry in Ghana.

## 8. Conclusion

Findings from this research reveal critically that, the bamboo industry of Ghana has not been well managed as compared to the other industries like cocoa, timber, oil, cotton, gold etc. It must be said that bamboo as a natural resource has the potential to sustain the economy of Ghana. Income could have been generated from Paper Industry, Mat Industry, Tooth Pick Industry, Laminated Board Industry, Carving Industry and the export of the culm (Poles)etc., hence contributing immensely to the Gross Domestic Product with less cost of production. The government should endeavour to support the Bamboo industry financially by including bamboo funding in the budget every fiscal year. The Forestry Division Services (FSD), the Ministry of Food and Agriculture (MOFA) the Bamboo and Rattan Development Programme (BARADEP), Ministry of Environment and Natural Resources (MENR) can be organized to research deep into other areas of Bamboo in Ghana through government funding. This is what is exactly lacking, and that has indeed, killed the interest of the very few bamboo developers in Ghana.

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