

Views of Preventing *Borassus Aethiopum* from Extinction among Four Communities in Ghana

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Abstract

An investigation into how *Borassus aethiopum* might be prevented from extinction among farmers was carried out in four communities (Fiaso, Oforikrom, Nyamebikyere and Bayerenkwantu) in the transitional vegetation zone of Ghana, from April 2013 to July 2013. The farmers were randomly selected from the communities. Data were collected from the farmers using questionnaire supplemented with interviews. In addition to the crops grown for food, farmers also obtained food from the wild/non domesticated plants of which *Borassus aethiopum* was one. Farmers also used *Borassus aethiopum*, as a timber source, for the production of wine, for roofing and for making fan, as fire wood and as a medicinal plant. No education had been received on the plant or even on any other non domesticated plant. All the farmers agreed that the plant should be preserved, however, only few (Fiaso – 44%; Oforikrom – 48%; Nyamebikyere – 40%; Bayerenkwantu – 20%) had some ideas on how the plant might be preserved. The few farmers considered cultivation (Fiaso – 40%; Oforikrom – 33%; Nyamebikyere – 50%; Bayerenkwantu – 60%) as a means of preventing the extinction of the plant. Other preservation methods were; prevention of bush burning and indiscriminate felling of the tree, and enacting laws on the usage of the plant. It was recommended that all communities with the support of governments should create community forest reserves/parks made up *Borassus aethiopum*/non domesticated plant food species, and also enact laws to preserve these plants.

Keywords: *Borassus aethiopum*, extinction, preservation

1. Introduction

The extinction of plants and animals is a natural part of evolution, however, human modifications to the ecosystem, have greatly accelerated the rate at which extinctions occur. Over 8000 tree species, representing 10% of the planet's trees, are threatened with extinction due to the degradation or destruction of woodland and forest habitat (Royal Forestry Society, 2013). Both domesticated and non domesticated plants may be affected by extinction, however, the wild unprotected plant is likely to be more affected.

Plants in the wild/non domesticated plants are used as food, medicinal purposes and as genetic bank for breeding purposes. Preservation of such plants would significantly affect the survival of man. *Borassus aethiopum* (mart), African fan palm (Figure 1) is one of such non domesticated plants, a dioecious palm tree which grows naturally throughout the semi arid to sub-humid regions of Africa, from Senegal to the Central African Republic (Cretenet et al., 2002). The plant is capable of growing up to 30 m high (98 ft) (Wikipedia, 2013). Every part of the tree can serve any of the socio-cultural, economic and environmental needs of human kind. The tree has many uses: the fruit are edible, as are the tender roots produced by the young plant; fibres can be obtained from the leaves; and the wood (which is reputed to be termite-proof) can be used in construction (Wikipedia, 2013). In West Africa the tree is also used to produce wine and as timber from the trunk for sale. Large quantities of planks (Figure 2) are sawn from the trunks in Ghana and are exported to neighboring countries by the local people. The wine is prepared through the cutting of the apical meristem of the plant. Individual trees produce on average 10L per day, and after 35–45 days the sap production ceases and the palm dies. A harvester kills on average 56 individuals of *B. aethiopum* per year (Sambou et al., 2002).

Though the plant serves the socio-cultural, economic and environmental needs of human kind, the production of timber and wine from the tree is destructive and threatens the sustainability and survival of the plant's population.

The study was therefore carried out to investigate how *Borassus aethiopum* might be prevented from extinction among farmers in four communities in Ghana.



Figure 1. *Borassus aethiopum* tree



Figure 2. Planks prepared from the trunks of *Borassus aethiopum*

2. Materials and Methods

The study was carried out in four communities (Fiaso and Oforikrom – Techiman Municipality; Nyamebkyere and Bayerenkwanata – Ejura Municipality) in the transitional vegetation zone of Ghana (Figure 3).



Figure 3. Map of Ghana showing the study areas

Twenty-five farmers each were randomly selected from the four communities for the study. Data were obtained through the use of questionnaire which was made up of both open ended and close ended questions. The elements of the questionnaire were: Age of respondents; Educational level of respondents; Crops grown by respondents; Responses to receiving education in farming activities; Areas of education received by respondents; Sources of education received by respondents; Some non-domesticated plants used as food among respondents; Uses of *Borassus aethiopum*; Responses to the cultivation of *Borassus aethiopum*; Responses to whether farmers have received any education on *Borassus aethiopum* or on any other non domesticated plant; Responses to whether farmers have some ideas on how to preserve *Borassus aethiopum* and Respondents' ideas on how *Borassus aethiopum* should be preserved. The questionnaire was pretested and reviewed by the authors before administration. The administration and collection of questionnaire spread between April 2013 and July 2013. Agricultural extension agents in-charge of the four settlements helped the authors to carry out the administration and collection of questionnaire.

Data were presented in simple frequencies and percentages.

3. Results and Discussions

Many of the farmers (Fiaso – 64%; Oforikrom – 72%; Nyamebkyere – 72%; Bayerenkwanata – 64%) in the study are 50 years and below (Table 1), which is an indication of a youthful farming communities capable of carrying out effective farm activities. Table 2 shows the educational background of the farmers, where it is observed that higher percentage (Fiaso – 68%; Oforikrom – 76%; Nyamebkyere – 92%; Bayerenkwanata – 80%)

of the farmers are either illiterates or have attended school up to the primary level. Such low educational level among the farmers will not enhance their acceptance to innovations in farming practices, as farmers with higher level of education have been found to accept new agricultural practices willingly (Yamota and Tan-Cruz, 2007). The age trend and the low educational levels among the farmers fall in line with a study conducted by Agyarko et al. (2011) in the Techiman Municipality on soil fertility determination.

Table 1. Age of respondent

Age (years)	Community							
	Fiaso		Oforikrom		Nyamebekyere		Bayerenkwanta	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
- ≤20	1	4	0	0	0	0	0	0
- 21-30	4	16	5	20	2	8	1	4
- 31-40	6	24	5	20	7	28	6	24
- 41-50	5	20	8	32	9	36	8	32
- 51-60	2	8	5	20	6	24	7	28
- 61-70	4	16	2	8	1	4	3	12
- ≥71	3	12	0	0	0	0	0	0
TOTAL	25	100	25	100	25	100	25	100

Table 2. Educational level of respondents

Educational level	Community							
	Fiaso		Oforikrom		Nyamebekyere		Bayerenkwanta	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
- No Education	9	36	10	40	16	64	11	44
- Primary	8	32	9	36	7	28	9	36
- Secondary	8	32	6	24	2	8	5	20
- Tertiary	0	0	0	0	0	0	0	0
TOTAL	25	100	25	100	25	100	25	100

The major crops grown by the farmers in the four communities are presented in Table 3. Most farmers in the Fiaso community are much into tuber (yam, cassava and sweet potato) production, Oforikrom farmers are inclined to the production of tubers and some cereal (maize) while Nyamebekyere and Bayerenkwanta farmers are much into cereal production and also, tuber and legume production.

Not all the farmers receive education on their cropping activities, however, higher percentage (Fiaso – 60%; Oforikrom – 56%; Nyamebekyere – 76%; Bayerenkwanta – 68%) of them do receive education on their farming activities (Table 4), with the major providers of the education being the Ministry of Food and Agriculture (MOFA) (Table 5). The major areas where farmers receive much education include; farm management and cultural practices (Table 6). Farmers also receive some education in the areas of post harvest technology, pest control and bush burning control. Agriculture education received through MOFA and other agencies is very important and needs to be spread to cover all farmers for it promotes the adoption and utilization of new scientific farming practices (Anaeto, 2012).

Table 3. Crops grown by respondents

Community	Crop									
	Cereal		Legumes		Vegetables		Tubers		Cash Crops	
	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%
Fiaso	7	28	0	0	1	4	22	88	8	32
Oforikrom	17	68	0	0	3	12	20	80	13	52
Nyamebekyere	25	100	16	64	5	20	15	60	4	16
Bayerenkwanta	24	96	15	60	0	0	21	84	1	4

Table 4. Response to receiving education in farming activities

Response	Community							
	Fiaso		Oforikrom		Nyamebekyere		Bayerenkwanta	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Have received education in farming activities	15	60	14	56	19	76	17	68
Have not received any kind of education in farming activities	10	40	11	44	6	24	8	32
TOTAL	25	100	25	100	25	100	25	100

Table 5. Sources of education received by respondents

Sources of education	Community							
	Fiaso		Oforikrom		Nyamebekyere		Bayerenkwanta	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
MOFA	12	80	11	79	15	79	14	82
COCOBOD	3	20	1	7	0	0	0	0
ABOFAP	0	0	2	14	0	0	0	0
MIDA	0	0	0	0	4	21	3	18
TOTAL	15	100	14	100	19	100	17	100

Table 6. Areas of education received by respondents

Areas of Education	Community							
	Fiaso		Oforikrom		Nyamebekyere		Bayerenkwanta	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Farm management	1	7	0	0	7	37	8	47
Cultural practices	7	47	6	43	2	11	2	12
Post harvest technology	2	13	2	14	6	31	4	24
Pest control	3	20	5	36	4	21	3	17
Bush fire control	2	13	1	7	0	0	0	0
TOTAL	15	100	14	100	19	100	17	100

In addition to the crops grown for food, farmers also obtain food from the wild/non domesticated plants, such as, *Spondias mombin*, *Vitex doniana*, *Parkia biglobosa*, *Borassus aethiopicum*, *Dioscorea minutiflora* and *Vitellaria paradoxa* (Table 7). There is a high response (Fiaso – 92%; Oforikrom – 88%; Nyamebekyere – 100%; Bayerenkwanta – 100%) among the farmers for making use of *Borassus aethiopicum* as a food source (The fruits are used to prepare beverage). *Borassus aethiopicum* has other uses aside being used as a food source. These include, seedlings eaten as a vegetable, trunk used as a timber source, apical meristem cut for the production of wine, leaves used for roofing and for making fan, branches used as fire wood and as medicinal source (Table 8). Such wide uses of the various parts of the plant have been reported (FAO, 1988; Akinniyi, et. al., 2000; Palmpedia- Palm and Companion Plant Resources, 2013).

The response to using the plant as a timber source is high (Fiaso – 76%; Oforikrom – 80%; Nyamebekyere – 96%; Bayerenkwanta – 96%). The cutting of the plant as a timber source has become a lucrative business among the communities; large quantities are cut and sown into planks and used locally or transported to nearby countries. Using the plant as a timber source or for the preparation of wine destroy the palm.

Table 7. Some non-domesticated plants used as food among respondents

Community	Non-domesticated plant											
	Atoma Spondias mombin (Anacardiaceae)		Abisaa Vitex doniana (Verbenaceae)		Dawadawa Parkia biglobosa (Fabaceae)		Emaakube Borassus aethiopum (Arecaceae)		Ahabayere Dioscorea minutiflora (Dioscoreaceae)		Sheabutter Vitellaria paradoxa (Sapotaceae)	
	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%
Fiaso	14	56	12	48	11	44	23	92	2	8	5	20
Oforikrom	10	40	8	32	7	28	22	88	7	28	3	12
Nyamebekyere	9	36	2	8	24	96	25	100	0	0	4	16
Bayerenkwantia	6	24	0	0	20	80	25	100	0	0	2	8

Table 8. Uses of Borassus aethiopum

Community	Uses													
	Seedlings eaten as vegetable		Timber source		Wine preparation		Leaves used for roofing		Leaves used for making fan		Branches used as fire wood		Medicinal source	
	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%	Frequency/25 respondents	%
Fiaso	1	4	19	76	8	32	6	24	4	16	3	12	1	4
Oforikrom	1	4	20	80	12	48	11	44	2	8	5	20	1	4
Nyamebekyere	2	8	24	96	11	44	13	52	2	8	6	24	4	16
Bayerenkwantia	4	16	24	96	10	40	7	28	4	16	4	16	3	12

Though *Borassus aethiopum* has economic values for the communities, no one in the communities cultivate the plant (Figure 4), and no education has been received on the plant or even on any other non domesticated plant (Figure 5).

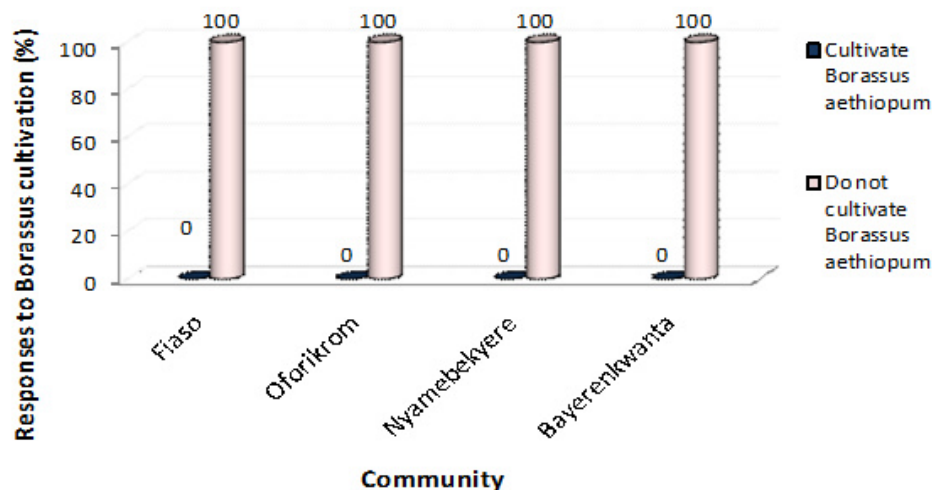


Figure 4. Responses to the cultivation of *Borassus aethiopum*

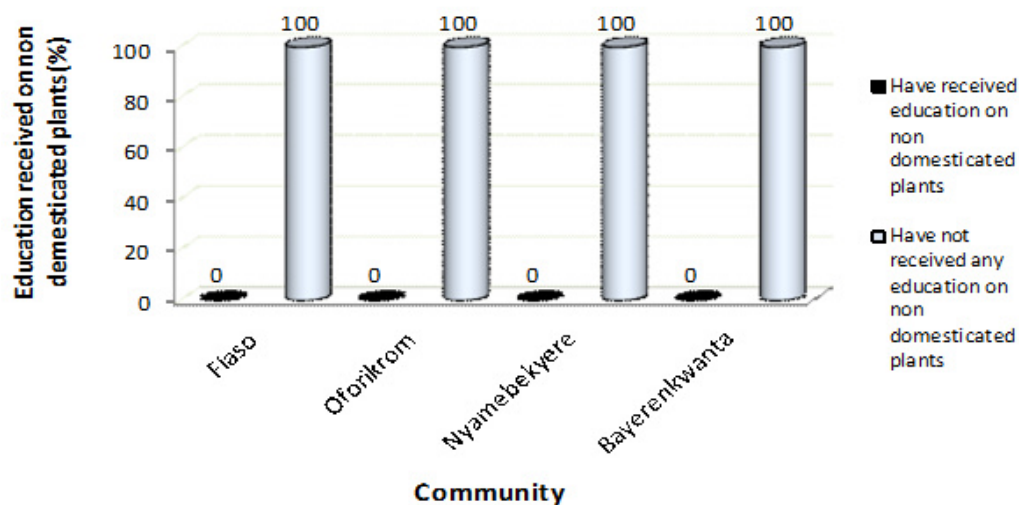


Figure 5. Responses to whether farmers have received any education on *Borassus aethiopum* or on any other non domesticated plant

All the farmers agree that *Borassus aethiopum* should be preserved as it has a lot of economic values for them, however, only less than 50% (Fiaso – 44%; Oforikrom – 48%; Nyamebekyere – 40%; Bayerenkwanata – 20%) of the farmers in the individual communities have some idea on how the plant may be preserved (Figure 6). The few farmers who have ideas of how the *Borassus aethiopum* may be preserved, consider the cultivation (Fiaso – 40%; Oforikrom – 33%; Nyamebekyere – 50%; Bayerenkwanata – 60%) of the plant as a means of preventing the extinction of the plant (Figure 7). Figure 7 also shows other methods of preserving the plant as; prevention of bush burning and indiscriminate felling of the tree, and enacting of laws on the usage of the plant.

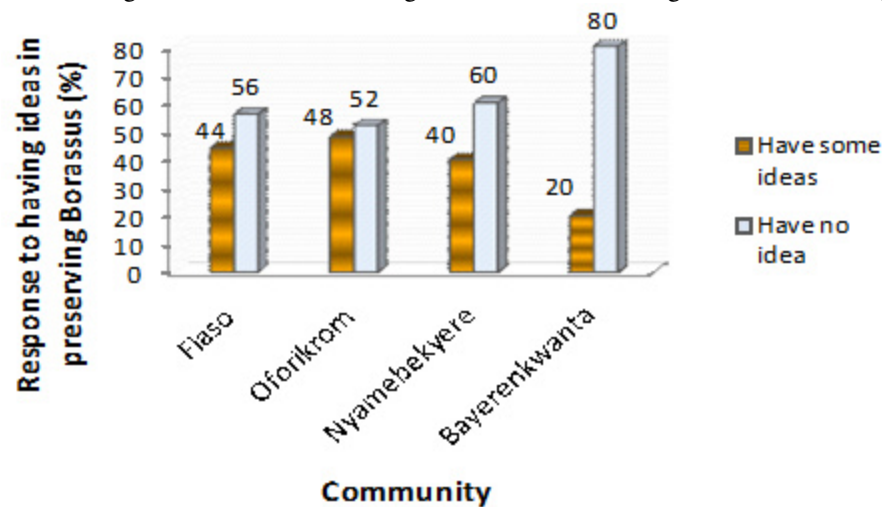


Figure 6. Responses to whether farmers have some ideas on how to preserve *Borassus aethiopum*

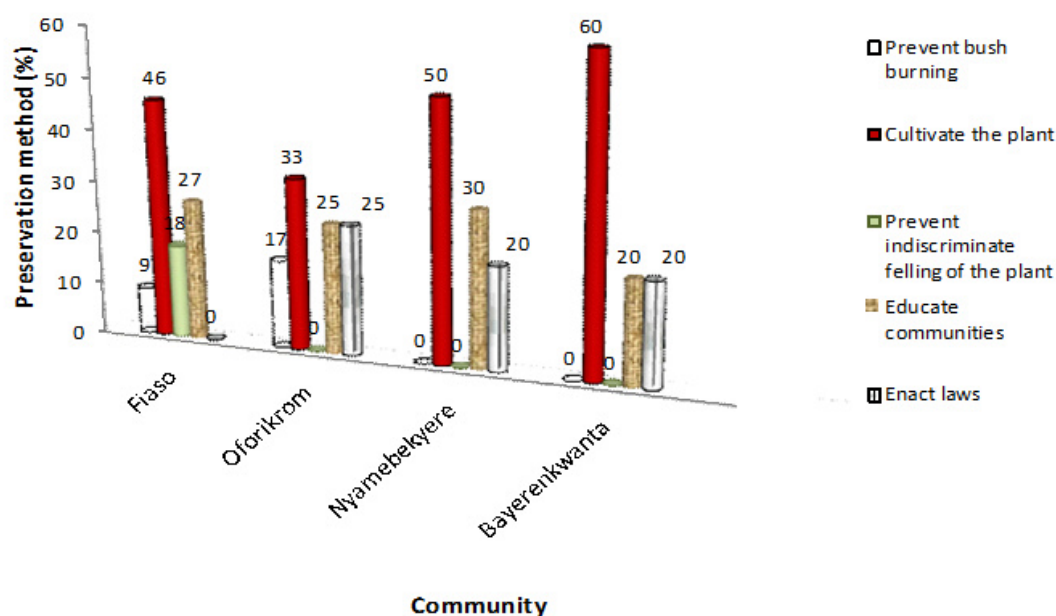


Figure 7. Respondents' ideas on how *Borassus aethiopum* should be preserved

4. Conclusions and Recommendations

Borassus aethiopum has many indispensable uses among the studied communities but no attempt has been made to cultivate or preserve it. Agricultural extension activities are dwelt mainly on domesticated crops with no education given on *Borassus aethiopum* or on any wild food species. Cultivation, prevention of bush burning and indiscriminate felling of the tree and enacting of laws on the usage of the plant are suggested ideas from farmers to preserve *Borassus aethiopum*.

With the consistent rise in the global population with man negatively tempering the ecosystem, species of significant importance are expected to be lost. As a preservation method, the authors recommend that, all communities with the support of governments should create community forest reserves/parks made up of *Borassus aethiopum*/ non domesticated plant food species, and also enact laws to preserve these plants.

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