

Desertification of the Savanna: Illegal Logging of Rosewood, Causes and Effects on the People of Kabonwule, Northern Region

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Abstract: Illegal logging of rosewood has become an environmental concern in the Northern Region of Ghana. Some affected districts in the region include; West Gonja, Central Gonja, East Gonja and Kpandai Districts. This study was conducted on illegal logging of Rosewood in Northern Ghana using Kabonwule in the Kpandai district as a case study because of the varied domestic uses of rosewood and the implications of its depletion. The study design adopted was a combination of qualitative and quantitative research approaches while the research methodology was case study and descriptive survey. The sample frame was 350 with a sample size of 70. Data was collected using interview guides, analyzed and presented in tables using Statistical Package for Social Scientist (SPSS) version 16. Results of the study indicated that illegal logging of Rosewood was a major environmental problem in the study area. Estimates by affected farmers indicated large scale destruction of farm lands by illegal logging of rosewood. High demand for Rosewood and corruption were concluded as the main causes of the illegal logging activity. Government should review existing laws to ensure that punishments for illegal logging activities are severe enough to discourage perpetrators.

Keywords: Environment, Kabonwule, Law enforcement, Rosewood, Royalty

INTRODUCTION

Rosewood belongs to the family Fabaceae - Papilionoideae. It is a characteristically dark, highly grained wood from trees in the genera *Tipuana*, *Pterocarpus*, or *Dalbergia*. Trees from other species may also be sold with this name [1], since this wood has been traditionally prized for fine woodworking and musical instruments for centuries. True Rosewoods, which are much appreciated in the western world, come from the wood of *Dalbergianigra*. Brazilian rosewood is endemic to the coastal Brazilian Atlantic Forest, one of the most diverse ecosystems in the world. Over 8,000 plants species grow in the Brazilian Atlantic Forest and Brazilian rosewood is one of the largest, growing to a height of 40m [2]. It can also be recognized by its dark branches which grow in zigzag patterns and by its feathery leaflets. Its timber is heavy and strong, making it highly resistant to insect attack and decay. It is therefore much sought after in local markets as a building material for use in flooring, structural beams and wall panelling/lining. Worldwide, its timber, being highly resonant, is also used to make musical instruments [2].

The Honduras rosewood is found in Belize in Central America and produces timber, which is extremely valued on the world market because of its use

in musical instrument production. Since the Honduras Rosewood supplies hard, heavy, durable and very resonant timber, when struck, it gives off a clear, loud note and making it itself most highly valued in the production of orchestral xylophones and claves (www.arkive.org). It is also used to make thin covering for fine furniture and cabinets, knife handles etc (www.arkive.org).

The origin of this species varies but is mostly sourced from the South western rural areas of Nigeria, DR Congo and Ghana. Sometimes referred to as Rosewood, this product is a durable wood used to produce furniture, flooring and ornaments all over the world [3]. *Pterocarpus erinaceous* (West African Rosewood) is a medium-sized, generally deciduous tree 12-15m tall [4]. The bark surface is brown-blackish with thin inner bark and produces red sap when cut. Traditionally, the species is used for the production of high quality charcoal and for building construction especially by local people. The species occurs mostly in the forest savannah transitional zone and parts of the northern savannah woodland ecological zone [4]. Until recently Rosewood timber was used locally, but the growth of markets in Asia, particularly China, led to excessive exploitation of the species. Export bans on

Rosewood usually arise from increased suspicion of impropriety in its exploitation and trade.

There are ten regions in Ghana and Rosewood occurs in six of these regions, namely, Ashanti, Brong-Ahafo, Northern, Upper East, Upper West and Volta regions [4]. Rosewood is only found in the savannah zones of Ghana, particularly the Northern and the Brong-Ahafo regions. Rosewood exports from Ghana started in 2005. Export volumes and values have consistently increased. China is the dominant importer of Ghanaian Rosewood, contributing averagely 96% of total imports [4]. On 1 January, 2014, Ghana began a total ban on the harvest and export of rosewood [5]. This move was made because of the indiscriminate felling of rosewood, demand for which is very high on the international market. Companies with licenses for the export of rosewood had between October and December, 2013 to process all current stocks of rosewood before the ban was enforced [5].

Kabonwule is losing a large acreage of remnant lush and thriving woodlands in the fragile savannah ecosystems of Northern Region to illegal logging of Rosewood. What started as salvage activities, with the issuance of salvage permit by the Forest Services Division (FSD) of the Forestry Commission for the removal of trees along the newly constructed Kabonwule-Kitare trunk road, turned into a nightmare of widespread, massive and flourishing illegal logging and trade in Rosewood. By intent or negligence, these salvage permits were issued with no monitoring system in place, turning salvage activities into a massive Rosewood logging and timber trade in Kabonwule and its surroundings. Traditionally, Rosewood is used for the production of high quality charcoal and for building and construction especially by the local people. It is also used for fuel wood, for medicinal purposes, as a woodworking material and also as a nitrogen-fixing plant that helps to improve nutrient-depleted farm lands. Rosewood is dear to the people of Kabonwule because of its numerous uses as outlined above. Should illegal logging of rosewood continue in Kabonwule unabated, there would be environmental consequences as the environment would not only be destroyed but also the local people's livelihoods that depend on it. The current study was meant to contribute to knowledge on Rosewood and is also intended for policy consideration.

Recent pressure from the international timber markets, mainly from Asia and other destinations have resulted in an explosive, illegal and well-organized system of unsustainable chainsaw activity, permits, and exports of these precious Rosewoods. Harvesting of rosewood in Kabonwule has been so intense that the species is being over-cut, thereby threatening the environment and livelihoods of the people. Despite a national ban on the export of rosewood, illegal logging

is still being carried out and hence the need for this study to understand the factors responsible for these illegal logging activities. The main purposes of the study was to identify the causes and effects of illegal logging of Rosewood at Kabonwule in the Kpandai District of Northern Region. The study also launched an investigation to estimate the level of deforestation as a result of illegal logging of Rosewood; to ascertain farmers' opinion on the possible solution to illegal logging of Rosewood and to identify the causes of illegal logging of Rosewood in the study area.

REVIEW OF RESTRICTIONS AND SUBSTITUTES FOR ROSEWOOD

Brazilian Rosewood, like other exploited hardwoods such as Cuban Mahogany has earned worldwide fame. Historically, it has perhaps been the species most frequently associated with the term "Rosewood," and with its strength, hardness, stability, beauty, and acoustic properties, it's easy to see why *Dalbergianigra* has been used for everything from flooring to xylophone keys [6]. Due to the high demand and limited supply of Brazilian Rosewood, and its continued exploitation in recent decades, it has been listed in the most restrictive category of endangered species. Not only is the lumber restricted from being imported or exported from country to country, but even its *finished products* may not cross international borders [6].

As a result of these heavy and justifiable restrictions, several substitutes from the *Dalbergia* genus have been used in recent years, such as East Indian Rosewood, Honduran Rosewood, and Cocobolo (www.traffic.org). The closest rosewood in terms of color and appearance may be Amazon Rosewood (*Dalbergia spruceana*). Although beautiful and venerated as true rosewood in the *Dalbergia* genus, Siamese Rosewood has been one of the central species in illegal logging in Asia. As at 2013, the largest remaining *Dalbergia cochinchinensis* tree in Thailand was guarded day and night by an entire platoon of Thai soldiers. Siamese Rosewood may fairly be called a blood wood, and sadly, the label has nothing to do with the colour of the wood (www.arkive.org).

Dalbergiaretusa (Central America rosewood) is a wood species on CITES and IUCN Red List. It is listed as vulnerable due to a population reduction of over 20% in the past three generations, caused by a decline in its natural range, and exploitation and is one of today's most prized lumbers for its outstanding colour [6].

According to [3] the tree *Pterocarpus erinaceous* is native to Sahelian region of West Africa and is used for fuel wood, for medicinal purposes, as a woodworking material, and that is useful as a nitrogen-fixing plant that helps to improve nutrient-depleted farm

lands. Groves of the tree can be found on the savannahs of West Africa, but it is becoming increasingly rare and is sometimes cultivated. The tree also grows in forests of Comoé National Park in Côte d'Ivoire, a region geographically close to the Sahel but with a higher moisture regime due to its location between two large rivers. The tree grows to about 11 meters in height on average, and bears dark, scaly bark and yellow flowers and winged pods fruits. *P. erinaceous* grows well on sunny, hot African plains with long dry seasons and frequent fires [3].

The wood, which varies from yellowish to rosy reds and rich browns, is valued for woodworking, and makes good charcoal and fuel wood. The tree exudes a red sap called *Kino*, which is used as a dye in tanning and cloth-making [3]. As a legume, the tree harbours rhizobia that return nitrogen to the soil, making it more fertile. In addition, the foliage is a nutritious fodder for farm animals. Mali has an active market for *P. erinaceous* foliage, which is in high demand by sheep farmers for fodder. The tree has several medicinal uses, including reduction of fever and cough suppression [3].

Deforestation is a global menace which has received much public attention in most countries in recent years. The international community, governments at national level, NGOs, and other such organizations are raising awareness about the dangerous consequences of forest loss to the environment and hence humanity [7]. In Ghana, deforestation is the result of a number of economic activities: legal and illicit logging, clearing trees to increase arable land, fuel wood extraction and mining [8]. Recent pressure from the international timber markets, mainly from Asia and other destinations have resulted in an explosive, illegal and well-organized system of unsustainable chainsaw activity, permits, and exports of these precious Rosewoods, despite a national ban on the export of the commodity [1]. Brazilian rosewood is threatened by illegal logging and habitat loss. The Brazilian Atlantic Forest retains just 7% of its original cover and the Brazilian rosewood now only occurs in fragmented, small populations with low genetic variability in the Brazilian states of Bahia, Minas Gerais, Espirito Santo, Rio de Janeiro and Sao Paulo [9]. Furthermore, the regeneration of this species may be limited, possibly as a result of high seed predation by rodents [9].

In 1992, in response to the threat of logging, Brazilian rosewood became one of the first ever tree species to be listed on Convention on International Trade in Endangered Species of fauna and flora (CITES), prohibiting international trade in the timber or other products from this species [6]. Despite its inclusion the species continues to be illegally logged and traded internationally. For example, in 2009, 249 sheets of Brazilian rosewood timber were seized by TRAFFIC police in Rotterdam [6].

The Honduras Rosewood supplies hard, heavy, durable and very resonant timber, when struck, it gives off a clear, loud note and making itself most highly valued in the production of orchestral xylophones and claves. It is also used to make thin covering for fine furniture and cabinets, knife handles etc. Rosewood has international familiarity and is found in Tamil Nadu and Coorge of Western Ghats in India. The discovery of the high economic value and demand for Rosewood in Ghana has contributed to illegal logging of this timber specie [1]. Trade volumes of Rosewood have increased from 125 cubic metres in 2005 to over 40,000 cubic metres by close of market year 2013 [4]. The main cause of deforestation in Ghana is logging (both legal and illegal). Illegal logging is a major cause of deforestation, depriving the Ghanaian economy of fibre, legal employment and tax revenues [10].

Total land area of Ghana is about 23.85 million hectares. At the beginning of the last century, about one-third (i.e. 8.2 million hectares) of the area was covered by high forest while the remaining two-third (15.7 million hectares) was savanna woodland. By 1950, the area had been reduced to 4.2 million ha and further, to about 1.5 million ha by 1999 [11].

Since 2000 the Forestry Commission of Ghana has embarked on a national plantation development programme with a target of 20,000 ha a year due to the high rate of deforestation [12]. Estimated deforestation rates in Ghana, currently stands at 135, 395 ha per year. Two thirds of the country is already classified as savannah woodland. What is alarming is that, the deforested area is more than half the total area of Ghana [13].

According to Bosu [1], a container of rosewood sold to buyers on site ranges from GH¢7000 to 10000 (negotiable). Average volume of logs per 40 feet container is 20m³. Operator Cost GH¢ 300 to 500 per container and sometimes depends on the number of trees felled (negotiable). 'Royalty' paid to Divisional Chiefs ranges from GH¢700 to 1000 which is paid per 40 Feet container (non-negotiable). GH¢200 to 500 is paid to Chiefs in the communities per 40 feet container. GH¢250 is paid to the Police, which is the minimum fee per container (negotiable). Allowance for the Forestry Technical Officer is GH¢500 per container (negotiable). Transport to ports cost GH¢4000 for Driver and Truck Owner (negotiable) Bosu [1].

MATERIALS AND METHODS

Description of the Study Area

Kabonwule is located on Latitude 8.4000 N and Longitude 0.0333W in the South Eastern part of Kpandai District in the Northern Region. It shares boundaries with Bladjai, Katiejeli, Meme, Kitare and Binandu to the East, West, North, South East and South

respectively. Kabonwule community has a population of 1,369 (PHC, 2000) with a 2008 projection of 1,619. The community lies in the transitional zone between the Northern Savannah and the moist semi-deciduous forest with temperatures ranging between 29°C and 40°C in April and December respectively. The total annual rainfall ranges between 1150mm to 1500mm (GMET). The natural vegetation is the Guinea Savannah Woodland. The tree cover consists of semi-deciduous trees such as *Borassus palm trees (Borassusaethiopum)*, Shea nut trees (*Vitellariaparadoxa*), Dawadawa trees (*Parkiabiglobosa*), Baobab (*Adansoniadigitata*) Rosewood (*Pterocarpus erinaceous*) among others (Kpandai District Composite Budget, 2013)

Methods of Data Collection

The study design adopted was a combination of qualitative and quantitative research approaches while the research methodology was case study and descriptive survey. Probability sampling strategy was used in the study. Target population constituted all farmers in Kabonwule community. The Sample frame was 350 affected farmers with a sample size of 70 farmers.

Sampling procedure

Stratified sampling was used to select four (4) sections: Eastern section had 40 affected farmers, western section 90, southern section 100 and central section 120 farmers. Simple random sampling was used to select 15% of affected farmers from each section making a sum total of 70 farmers. The rationale behind the choice of stratified sampling was for the study to be a fair representation of the community while simple random sampling was to give every affected farmer an equal chance of being selected for the study. Data collection instruments used during the research was interview schedules. Some of the data collected included gender, age, educational background, occupation, measures to curb illegal logging, extent of deforestation, and causes of illegal logging.

Data Analysis

The Statistical Package for Social Scientist (SPSS) version 16 was used to analyze the data. In all, eleven (11) responses were obtained from affected farmers with four questions on bio data and seven (7) key questions on illegal logging of rosewood. Data was presented in frequency tables.

RESULTS AND DISCUSSION

Sex of Respondents

Table 1 represents the sex of respondents interviewed during the study. Majority of the respondents, Fifty (55), representing 78.6% of the total respondents interviewed were males while the remaining fifteen (15) (21.4%) were females.

Table 1: Sex of respondents

| Sex | Frequency | Percent |
|--------|-----------|---------|
| Male | 55 | 78.6 |
| Female | 15 | 21.4 |
| Total | 70 | 100.0 |

Age of Respondents

Table 2 represents age of respondents interviewed during the study. Majority (21; 30%) of the respondents fell within the 30-39 age groups while a small Seven (7) respondents representing 10% were within the 20-29 age groups. Fifteen (15) respondents, made up of 21.4% were between 40-49 years, eighteen (18) making up 25.7% were between 50-59 years while nine (9) representing 12.9% of total respondents interviewed were between 60-69 years. In all, a total of 70 affected farmers were interviewed during the study.

Table 2: Age of respondents

| Age | Frequency | Percent |
|-------|-----------|---------|
| 20-29 | 7 | 10.0 |
| 30-39 | 21 | 30.0 |
| 40-49 | 15 | 21.4 |
| 50-59 | 18 | 25.7 |
| 60-69 | 9 | 12.9 |
| Total | 70 | 100.0 |

Occupation of Respondents

According to result in Table 3, while forty five (45) of the respondents (64.3%) had farming as their main occupation, only fourteen (14; 20%) combined farming with trading and eleven (11; 15.7%) combined teaching and farming. Kabonwule is a farming community; hence it is common to find traders and teachers doing farming as additional occupation.

Table 3: Occupation of respondents

| Occupation | Frequency | Percent |
|--------------------|-----------|---------|
| Farmer | 45 | 64.3 |
| Farmer and trader | 14 | 20.0 |
| Teacher and farmer | 11 | 15.7 |
| Total | 70 | 100.0 |

Education of Respondents

From results of the current study (Table 4) shows that, out of the seventy (70) respondents interviewed, thirty five (35; 50%) majority had no formal education, whereas a small four (4; 5.7%) had tertiary education. Nineteen (19) which constituted 27.1% had primary education; twelve (12), making up 17.1% had secondary education

Table 4: Education of respondents

| Educational level | Frequency | Percent |
|-------------------|-----------|---------|
| None | 35 | 50.0 |
| Primary | 19 | 27.1 |
| Secondary | 12 | 17.1 |
| Tertiary | 4 | 5.7 |
| Total | 70 | 100.0 |

Perception on illegal logging

Table 5 represents opinions of respondents regarding whether illegal logging of rosewood constituted a problem in Kabonwule community or not. The study discovered that, a whopping percentage close to ninety-three (65; 92.9%) considered illegal logging of rosewood as a serious environmental problem, whereas a small one (1) respondent (1.4%) did not actually consider illegal logging of rosewood as a problem. Four (4) respondents (5.7%) considered it somewhat a problem.

Table 5: Perception on illegal logging

| Perception | Frequency | Percent |
|--------------------|-----------|---------|
| Not at all | 1 | 1.4 |
| Somewhat a problem | 4 | 5.7 |
| Serious problem | 65 | 92.9 |
| Total | 70 | 100.0 |

Results from this study agree with Fairhead's observations [7] that deforestation is a global menace which has received much public attention in most countries in recent years and concluded that the international community, governments at national level, NGOs, and other such organizations are raising awareness about the dangerous consequences of forest loss to the environment and hence humanity.

Estimated level of Deforestation

Table 6 is the level of deforestation as estimated by the farmers (respondents) as they saw it on their farm lands. A large number of twenty seven (27; 38.6%) estimated the level of deforestation to be above 40 acres (16ha). The lowest estimate was below 20 acres (8ha). Three (3) respondents (3.4%) estimated the level of deforestation due to illegal logging of rosewood to be less than twenty (20) acres, five (5) which made up of 7.1% estimated it between 20-25 acres. Seven (7), constituting 10% estimated it between 25-30 acres. Twelve (12) representing 17.1% estimated it between 30-35 acres; sixteen (16), constituting 22.9% estimated it between 35-40 acres while It came up that illegal logging and the subsequent deforestation started in 2012 which is three years ago. 8ha over three years leads to annual deforestation rate of 2.7ha per annum and 16ha leads to 5.3ha per annum. The results show that just a fraction of affected farmers are suffering deforestation rates of 2.7 and 5.3ha per annum and by implication the majority of people not covered during the study could be suffering more deforestation on their farm lands. If a small farming community where just a few farmers interviewed suffered this rate of deforestation then, the results cannot but agree with FAO reports [13] which estimated deforestation rates in Ghana at 135, 395 ha per annum.

Table 6: Estimated level of deforestation

| Extent of deforestation | Frequency | Percent |
|-------------------------|-----------|---------|
| Less than 20 acres | 3 | 4.3 |
| 20-25 acres | 5 | 7.1 |
| 25-30 acres | 7 | 10.0 |
| 30-35 acres | 12 | 17.1 |
| 35-40 acres | 16 | 22.9 |
| 40+ acres | 27 | 38.6 |
| Total | 70 | 100.0 |

Perception on the Effects of Illegal Logging

From result of the study, as presented in Table7, regarding the opinion of respondents on the possible effects of illegal logging of rosewood in their community, thirty (30) respondents (42.9%) were of the opinion that illegal logging would certainly open up the forest cover leading to deforestation in the community. Sixteen (16; 22.9%) thought it will lead to high temperatures because they think more trees keeps the environment cool and less trees makes it hot. Fourteen (14; 20%) said illegal logging will reduce rainfall amounts in the community because they think more trees bring more rainfall and vice versa. Ten (10; 14.3%) were of the opinion that illegal logging will lead to low crop yields because trees protect the environment, bring more rains and more food but less trees will mean less rains and less crop yields. Harvesting of rosewood in Kabonwule has been so intense that the species is being over-cut, thereby threatening the environment and livelihoods of the people. The concerns raised by respondents agree with Daryl Bosu's [1] that, if nothing is done now, affected communities will soon be wrestling with a deforested and degraded landscape; with serious and long-term negative effects on life sustaining ecosystem functions and services as well as reduce the capacity of the already stressed semi-arid lands to continue to support the livelihoods of the people.

Table7: Perception on the effects of illegal logging

| Perception | Frequency | Percent |
|-------------------|-----------|---------|
| Deforestation | 30 | 42.9 |
| High temperatures | 16 | 22.9 |
| Reduced rainfall | 14 | 20.0 |
| Low crop yields | 10 | 14.3 |
| Total | 70 | 100.0 |

Proposed Measures to Curb Illegal Logging

From results of the current research in Table8, Four (4) respondents (5.7%) called for effective monitoring by forestry officials to help curb the illegal logging problem as they thought ineffective monitoring is responsible for what is happening in the community. Three (3) representing 4.3% argued that forestry officials should embark on strict law enforcement as weak law enforcement is responsible for the problem facing the community. Ten (10) representing 14.3% called for the formation of Community watch dog committees to protect the remaining environment as

they think the resources belong to the community and so will be well protected by the community instead of relying on outsiders to do the protection. Fifty three (53) making up 75.7% suggested that Illegal logging of rosewood should be completely outlawed. Legislation should be put in place so that it becomes a crime to illegally log rosewood and only then will it be deterring to engage in illegal logging of rosewood, they concluded. The deforestation of rosewoods will most likely continue illegally as long as the people of Kabonwule remain helpless. The findings of the current study are in agreement with James Boafo's recommendations [8] that to better mitigate the rate and impacts of deforestation on forest communities in Ghana, sustainable livelihood activities should be mainstreamed into national policies.

Table 8: Proposed measures to curb illegal logging

| Measure | Frequency | Percent |
|--|-----------|---------|
| Effective monitoring by forestry officials | 4 | 5.7 |
| Strict law enforcement by forestry officials | 3 | 4.3 |
| Community watch dog committees | 10 | 14.3 |
| Illegal logging of rosewood should be outlawed | 53 | 75.7 |
| Total | 70 | 100.0 |

Causes of Illegal Logging of Rosewood

Table 9 provides an indication of the various opinions of respondents on the possible causes of illegal logging of rosewood in Kabonwule community. While thirty four (34; 48.6%) attributed the problem to high demand for rosewood on the international market, eleven (11; 15.7%) pointed accusing fingers at corrupt forestry officials who they allege condoned and connived with timber contractors to engage in illegal logging. Sixteen (16; 22.9%), alleged that timber contractors engaged in illegal logging compromised opinion leaders in the community in order to engage in the illegal activity. Meanwhile nine (9) representing 12.9% also alleged that government officials other than forestry officers do have a hand in the ongoing illegal logging of rosewood. They alleged that the timber contractors often get the 'blessing' of top government officials before coming to the community and therefore making it difficult for community members to prevent the illegal activity. The study found that high demand for rosewood is a major cause of illegal logging of rosewood which is in agreement with Daryl Bosu's report [1] that recent pressure from the international timber markets, mainly from Asia and other destinations have resulted in an explosive, illegal and well-organized system of unsustainable chainsaw activity, permits, and exports of these precious Rosewoods, despite a national ban on the export of the commodity. The same report equally blamed the

problem on corruption, weak law enforcement and ineffective monitoring by forestry officials.

Table 9: Causes of illegal logging of rosewood

| Cause | Frequency | Percent |
|------------------------------|-----------|---------|
| High demand for rosewood | 34 | 48.6 |
| Corrupt forestry officers | 11 | 15.7 |
| Compromised opinion leaders | 16 | 22.9 |
| Corrupt government officials | 9 | 12.9 |
| Total | 70 | 100.0 |

Uses of Rosewood

Table 10 is responses on the uses of rosewood. Three (3; 4.3%) respondents used rosewood as fodder for their animals; eleven (11; 15.7%), used it for fuel wood, four (4; 5.7%) used it for construction material, six (6; 8.6%), used it for charcoal while a majority forty six (46; 65.7%), used it for a combination of fodder, fuel wood, construction and charcoal. Findings from the study indicate that rosewood use by local people is limited and sustainable, unlike the unsustainable exploitation from illegal and government-approved logging for international markets. Rosewood is used domestically for fodder, fuel wood, charcoal and construction (field data, 2015). Worldwide, rosewood timber being highly resonant is used to make musical instruments and also used as building material, for use in flooring, structural beams, wall paneling and lining [2]. The use of rosewood therefore depends on the objective for which it is acquired.

Table 10: Uses of rosewood

| Use | Frequency | Percent |
|---|-----------|---------|
| Fodder | 3 | 4.3 |
| Fuel wood | 11 | 15.7 |
| Construction material | 4 | 5.7 |
| Charcoal | 6 | 8.6 |
| Fodder, fuel wood, construction, charcoal | 46 | 65.7 |
| Total | 70 | 100 |

Adverse effects of rosewood depletion

Statistics in Table 11 represents the possible implications if illegal logging were to lead to rosewood depletion in Kabonwule community. Three (3; 4.3%) respondents said if rosewood were depleted, they would have lost the source of fodder for their animals; eleven (11; 15.7%), said they would have lost their source of fuel wood, four (4; 5.7%) said they would have lost their source of construction material, six (6; 8.6%), said they would have lost their source of quality charcoal while a large group of forty six (46; 65.7%) were of the opinion that they would have lost everything (fodder, fuel wood, construction and charcoal) if rosewood were to be depleted as a result of illegal logging activities. Findings of the study agree with Acheampong and Marfo's report [14] that, not

only does forest loss reduce forest communities' contributions to national economic growth, but more critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country.

Table 11: Adverse effects of rosewood depletion

| Effect | Frequency | Percent |
|--|-----------|---------|
| Loss of fodder for animals | 3 | 4.3 |
| Loss of fuel wood | 11 | 15.7 |
| Loss of construction material | 4 | 5.7 |
| Loss of source of charcoal | 6 | 8.6 |
| Loss of carbon sink and soil nutrients | 46 | 65.7 |
| Total | 70 | 100.0 |

CONCLUSION

Sixty five (65) respondents constituting 92.9% of total number of respondents considered illegal logging of rosewood as a serious environmental problem in the study area. Fifty five (55; 78.6%) respondents of the total number of respondents interviewed, estimated deforestation levels above 30 acres as indicated in table 6. These estimates indicate the large scale destruction of farm lands by illegal logging of rosewood in the study area. Fifty three (53; 75.7%) respondents suggested that illegal logging of rosewood should be completely outlawed. Legislation should be put in place so that it becomes a crime to illegally logged rosewood and only then will it be deterring to engage in illegal logging activity. The number of respondents calling for the outlawing of illegal logging of rosewood suggests that, there is a serious environmental problem in the study area that needs urgent attention. Thirty four (34; 48.6%) respondents which constituted the majority attributed the problem to high demand for rosewood on the international market. They argued that until recently, rosewood was only used for domestic purposes. But twenty seven (27; 38.6%) respondents argued that there could be a high demand for rosewood but if some forestry officers were not corrupt and some opinion leaders in the community were not compromised, the situation would have been better that what is prevailing now. These respondents therefore attributed the problem to corruption. Just like many crime related issues, the support of other state security agencies to deal with these illegal activities in the study area is recommended. Government should step up forest protection activities by ensuring a multi-sectorial approach. Government should also review existing laws to ensure that punishments for illegal logging activities are severe enough to discourage perpetrators.

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