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SACRED GROVES AND BIODIVERSITY CONSERVATION IN THE TOLON DISTRICT, NORTHERN REGION, GHANA

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ABSTRACT

The aim of this study is to contribute to knowledge about how a traditional belief in sacred groves helps conserve biodiversity in Ghana. Qualitative data were collected with key informant interviews and focus group discussions from three selected communities. Four sacred groves were visited to measure their location and sizes and the plants and wild animals found in them were recorded. The study identified 29 plants, four of which are listed as threatened, and 23 wild animals with one species also threatened, in the sacred groves. The sacred groves are owned by the communities, but held in trust by the chiefs. Management of the groves is by the *tindanas* in collaboration with the chief and elders. Traditional management systems in use are taboos, restrictions and bye-laws. Women are alienated from management and cannot access the groves when menstruating and strangers need to ask for permission before they are allowed to enter. Various material and spiritual benefits from the sacred groves were identified, such as fourteen types of medicinal plants for treating various diseases, water, fruits, enskinment of chiefs, inducing of rainfall, personal fortification and cure for bareness. The study also reveals

that management of these sacred groves faces challenges from bushfires, encroachment of farmland, illegal plant harvesting and road construction.

Keywords: sacred groves, traditional conservation, herbal medicine, Tolon District, Ghana.

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1. INTRODUCTION

The world is facing challenges of diminishing natural resources and deteriorating ecosystems services due to human activities. The increase in exploitation and consumption of natural resources due to population increased is affecting the sustainability and management of biodiversity (plants and wildlife habitats).

In Ghana, biodiversity conservation has focused on protected areas or national parks, where an area is demarcated and protected as a refuge of endangered and representative plants and wildlife. Guards are usually assigned to protect these areas from human activities such as poaching. This conventional method of protection (sometimes called 'fortress conservation') is costly. Moreover, it does not always prevent people from entering the protected areas, as poachers frequently invade these places (Attuquayefio & Folib 2005).

Traditional methods of biodiversity conservation, like those found in the management of sacred groves, even though exploitative, can provide cheap and effective ways of protecting natural resources using various indigenous means such as religious/cultural beliefs and taboos. However, despite the often important contribution of these traditional belief systems to biodiversity conservation and land restoration programmes, their significance is usually downplayed by formal conservationists.

In Ghana, especially in the Dagbon and Mamprugu traditional areas in the northern part of the country, communities have assigned a special status to groves that are considered as sacred because of the belief that this is the abode of deities and spirits. They are treated as shrines dedicated to the ancestors. These groves are spiritual sites for contemplation, consultation and meditation. The sacredness of a site can be distinguished from the immediate non-sacred areas that generally make up most of the land area such as was reported in the Talensi-Nabdam District in Upper East Region of Ghana (Barre et al. 2009). Sacred groves can be of substantial size, but they can also be a small area of land, sometimes only a few square meters. They are protected from economic exploitation of their natural resources. Because of the special protection given to them, they often harbour important flora and fauna.

Traditional knowledge of biodiversity conservation in Ghana has gained much importance and recognition in recent times. Traditional conservation practices have been used to conserve wildlife and forest where conventional methods of conservation have failed. Conservation of sacred groves existed long before the creation of protected areas by the state. Most of these groves are still in a fairly good condition in terms of biodiversity. This is in contrast with some protected areas where poaching and illegal harvesting of resources have led to some degradation and conflicts between conservation authorities and poachers. Therefore, if local traditional knowledge of biodiversity conservation can be so effective, it can be encouraged and even be tapped for the sustainable conservation of natural resources.

Traditional methods of biodiversity conservation have in recent times faced many setbacks due to modernization and the altered lifestyle of the people, increasing population pressure, and the high demand for land for development and agriculture (Ntiamoa-Baido 2008). Traditional beliefs supporting biodiversity conservation are losing their value and, if steps are not taken to protect this noble tradition, Ghana stands a chance of losing its already precarious biodiversity.

The population of the Northern Region, where the study area in Tolon District is found (Fig. 1, page 9), increased from 532,000 in 1960 to about 2,500,000 in 2010 (GSS [Ghana Statistical

Service] 2010). The 2010 Population and Housing Census estimated the population in Tolon District to be just over 112,000 with a growth rate of three percent (GSS 2012). Therefore, land for farming, settlement, grazing and fuel wood for domestic use is in high demand. This will negatively affect the sustainability of sacred groves in the district if some kind of intervention is not forthcoming.

The elders of the communities where sacred groves are found complain of the reduction in size and loss of valuable plant and animal species in the groves (personal communication with elders of Tolon, Feb. 2014), but there is no scientific evidence to back up their claims, even though one can see evidence of the shrinking of the groves. Some studies have been carried out on the Malshegu sacred grove (Dorm-Adzobu 1991) and the Jaagbo sacred grove in the Tolon District (Telly 2006) to find out how traditional conservation methods can be tapped for the conservation of natural resources. However, many sacred groves exist throughout the region that have not been given the needed attention. Their sizes and location, species composition, management practices and uses are yet to be uncovered.

Most sacred groves in Tolon face various threats, including bushfires, farming, and illegal and unsustainable methods of harvesting of medicinal plants and wildlife. Road construction has also degraded some of them. An example is the Jaagbo sacred grove, the best known in the Northern Region. With the creation of a new district with Daboya as its district capital, there will be increased vehicular pressure on the only road that leads to Daboya from the regional capital Tamale which passes through the Jaagbo sacred grove. This road will soon be tarred and drains built, which may lead to further reduction in biodiversity and reduce the size of this sacred grove drastically. This is not peculiar to Jaagbo only; other sacred groves are at risk too from similar causes.

1.1 Aims of the research

This study aimed to provide a baseline for future measurement to determine changes in size or species diversity in groves in the Tolon District. It unravelled traditional management practices in these groves and threats that their management is faced with.

Specifically, the study assessed the species of flora (woody species) and fauna present in the sacred groves and the threat status. It also identified the benefits derived by different groups and assessed methods of conservation.

It is hoped that the findings from this research will help create awareness of stakeholders (local people, government, conservationists and local authorities) to support efforts by local people to conserve the environment and its biodiversity so as to combat land degradation. It can serve as a guide for the district assembly to locations of the groves which can then be incorporated into the district's land use planning policy. This is especially important regarding developments proposed to take place near sacred groves and are likely to impact on them and on lands and waters traditionally occupied or used by local communities.

1.2 Research questions

The research sought answers to the following questions:

1. What are the size of the sacred groves in the selected communities and what natural resources do they conserve?

2. Who owns and controls the use of resources in the sacred groves?
3. What traditional conservation methods are used in sacred groves?
4. What are the benefits derived from these sacred groves?
5. Are there any threats to the conservation of resources in the sacred groves?

After the introduction, relevant literature is reviewed on research on sacred groves in the world and Ghana in particular. In chapter three the study area is introduced and methods of data collection and analysis explained. The findings of the study are presented in chapter four with maps, photos, tables on species of plants and animals identified, and analysis of interview themes that emerged as important. In the final chapter, the results are discussed and some conclusions drawn.

2. A REVIEW OF BACKGROUND LITERATURE

2.1 Importance of sacred groves

Sacred groves are remnants of forest with unique features often different from the immediate surrounding areas. They are noted to harbour a rich biodiversity and are jealously guarded and protected by traditional societies for their spiritual well-being (Ramakrishnan et al. 1998). Sacred groves are believed to be the abode of the ancestral spirits and deities and therefore they are prevented from open access through traditional institutional arrangements such as taboos and local beliefs.

They are noted for providing various services, including spiritual, medicinal, material and some ecological functions that may help the restoration of degraded lands (Khan et al. 2008). They can therefore play a very important part in land restoration programmes by preventing or minimizing erosion through their shading effect and provide an atmosphere conducive for both macro- and micro-organisms that help in nutrient cycling, resulting in improved soil fertility (Tiwari et al. 1998).

Important sources of water such as rivers, ponds and streams which can serve as sources of drinking water for both humans and animals can be found in sacred groves (Swamy et al. 2003). They are also noted for improving soil fertility and preventing surface runoff and thereby reducing soil erosion (Tiwari et al. 1998).

Sacred groves serve as habitat and places of refuge for many species of wildlife (Joshi & Gadgil 1991; Swamy 1997; Islam et al. 1998; Wadley & Colfer 2004), especially as places for refuge. Bhagwat et al. (2005) found that sacred groves in the Western Ghats of India were more abundant in trees, threatened trees and macro-fungi than in formal protected forest and cultivated lands and therefore recommended that traditional systems of conservation in sacred groves be encouraged.

2.2 Studies of sacred groves worldwide

Sacred groves are found all over the world, ranging from mountainous to riverine, oceanic and savannah landscapes and habitats (Hughes & Chandran 1998, Chandran & Hughes 2000, Bhagwat & Rutte 2006). India has more documented sacred groves than any other country in the world. Malhotra et al. (2001) state that out of the country's 28 states, 19 are reported to contain sacred groves. It has been estimated that between 100,000 and 150,000 sacred groves

exist in India (Bhagwat et al. 2005b), although some of these groves are too small to contribute significantly to biodiversity conservation. Other countries in Asia where sacred groves are found include China, Nepal, Japan, Russia and Kazakhstan. In Europe they are found in Greece, France, Italy, Spain and the United Kingdom, and in the Americas in Canada, the United States, Mexico, Chile, Peru and Guatemala and in Oceania in both Australia and New Zealand (Conservation International 2005, Bhagwat & Rutte 2006).

Sacred groves have been studied in many African countries, including Kenya, Tanzania and South Africa and most West African countries: Benin, Ghana, Guinea Bissau, Nigeria, Sierra Leone, Senegal and Togo (Bhagwat & Rutte 2006, Wadley and Colfer 2004). The significance of sacred groves and how traditional knowledge has led to the conservation of biodiversity has been reported in some West African countries, including Ghana, Nigeria, and Senegal (MAB [Man and the Biosphere] 1995).

Schaaf (2003) has asserted that local belief systems in sacred groves play a very critical role in the understanding and the development of sustainable conservation strategies for any local community. He emphasizes that culture and environment are interdependent and therefore can help to shape one another. Colding and Folke (2001) suggest that developing countries should include already existing local knowledge and informal conservation institutions in conservation planning by involving local people in the conservation of biodiversity.

2.3 Studies of traditional conservation in Ghana

Studies on traditional biodiversity conservation have been carried out in Southern Ghana, focusing on the effectiveness of sacred forest taboos and totems as a help in the conservation of biodiversity (Ntiamoa-Baido 1992, 1995, 2008; EPC (Environmental Protection Council) 1976; Amoako-Atta 1995, 1998; Millar 2004; Campbell 2005). An example of how traditional values have helped in conserving biodiversity in Ghana is the Boabeng-Fiema monkey sanctuary, which has successfully conserved the black and white colobus *(Colobus vellerosus)* and Mona monkeys (*Cercopithecus mona*) and their habitat (Attuquayefio & Gyampoh 2010; Saj et al. 2006). This can be contrasted with some national parks that are struggling with conservation issues, for example the declining numbers of lions in the Mole National Park in Ghana (Burton et al. 2011). The government of Ghana has now seen the need to involve traditional communities as part owners of natural resources within their jurisdiction and involving them in conservation of these resources through the establishment of Community Resource Management Areas (CREMAs) such as the Boabeng-Fiema monkey sanctuary.

Different clans in Ghana do not kill or eat certain plants and animals because they are considered to be their brothers and sisters (totems) in the bush (Tengan 1994; Awedora 2002). The clans are therefore responsible for the protection of these plants and animals. This taboo system has influenced the settlement of local people. To ensure that strangers on the land comply with the traditional norms, they are educated about the taboos, especially on animals and plants that are protected by tradition, and offenders are punished by banishment or a fine (Aalangdong et al. 2010). This has contributed significantly to biodiversity conservation in Ghana.

Ntiamoah-Baido (2008) has argued that sacred groves in Ghana play important roles in biological conservation and therefore those traditional values and systems that promote biodiversity conservation need to be preserved and promoted to compliment conventional conservation efforts. To conserve sacred groves and their resources, Ntiamoa-Baidu et al.

(1992) suggested some management strategies: (i) legislation to strengthen traditional management systems so as to control the use and access of their resources; (ii) provision of resources to support and encourage local people to manage their groves and (iii) inventory of all sacred groves in Ghana to study the biological resources they contain. It is against this background and in this direction that this study was carried out.

Few attempts have been made in the Northern Region to study sacred groves, their biodiversity, traditional beliefs, taboos, management and uses of their resources. Some studies have been carried out on the Malshegu sacred grove in Tamale (Dorm-Adzobu 1991) and the Jaagbo sacred grove in the Tolon District (Telly 2006) to find out how traditional conservation methods can be tapped for the conservation of natural resources.

The Jaagbo sacred grove is the most important sacred grove in the district, supporting the material, spiritual and cultural needs of the communities surrounding it and beyond. It was researched by the Cooperative Integrated Project on Savanna Ecosystems in Ghana (CIPSEG) executed by UNESCO from 1993 to 1996. This grove is approximately 1 km² in size and harbours many medicinal plants and animals (Telly 2006).

In the case of Tolon, for example, the land is left bare in the dry season because the grasses dry up and in most cases are burned. This destroys food and habitat for wildlife. Sacred groves in this area therefore serve as hiding places for wildlife. Another advantage is that all animals found within the sacred grove are considered sacred and therefore cannot be hunted or eaten by members of the community; this can lead to their conservation and increase in population and diversity.

Sacred groves and the natural resources they contain have played significant roles in the diet of people, improvement in their economy, as well as their social, cultural, medicinal, ritual and spiritual needs (Achin and Gonzalo 2004; CECIK (Centre for Cosmovision and Indigenous Knowledge) 2007; Oku 2013). The local use of natural resources is based on traditional values ascribed to these resources and is governed by rules such as taboos (Chambers 1991; Awedora 2002). These practices ensured that resources are exploited sustainably and enhanced equitable distribution since all members of a community are allowed to use the resources.

However, the intensified use of these natural resources has brought about problems in terms of management, which is becoming unsustainable due to increasing population and high demands for these resources and has led to reduction in size and even threatened the survival of sacred groves (Decher 1997; Sarfo-Mensah et al. 2010). Several problems have accounted for the over exploitation of these resources, both in the wild and protected areas.

2.4 Threats to sacred grove conservation

Research findings from India noted that sacred groves are significantly being reduced in sizes due to changes in culture, high pressure on land and the indiscriminate use of the natural resources that these groves contain (Bandana & Sanjay 2013; Chandrakanth et al. 2004; Gadgil and Vartak 1976). Changes in religion and beliefs can affect conservation in sacred groves. In India for example, the conversion of the adherents of the Meghalaya religion to Christianity affected traditional beliefs and therefore affected conservation of sacred groves (Ormsby 2013). The changing attitudes of people (especially the youth) towards biodiversity conservation, the eroding of traditional values, the introduction of alien species and the quest to generate more and fast income have led to the degradation of most sacred groves (Khan et al. 2008).

Tolon District is dominated by African traditional religion. With the increase in development, people from different cultures may come in with their cultures and behaviours, and this can influence the culture and behaviour of the people, especially the youth, and consequently affect the conservation of sacred groves.

The rise in population can lead to higher demands for herbal medicine resulting in illegal harvesting and over exploitation of herbs from the sacred groves. The consequences of this may be the extermination of many plants. The use of herbal medicine is gaining popularity in Ghana, because it is cheap and accessible (Ziblim et al. 2013) compared to public health care. Even though the government of Ghana has been making frantic efforts to make health care delivery accessible to all Ghanaians, especially rural dwellers, through the Community-based Health Planning and Services (CHPS) programme (Nyonator et al. 2005), the CHPS compounds are often too far away, or lack health personnel and drugs. Sometimes the road network in the rainy season is completely impassable, preventing people from accessing public health services. Most rural people therefore resort to traditional medicine, which is affordable for the treatment of some diseases. According to the World Health Organization (WHO 2008) estimates, about 80% of Ghanaians rely on herbal medicines for their basic health needs. This makes plant medicine a very important aspect of the health care delivery in Ghana, as in many other African countries (Gbile 1988). It is estimated that about 45,000 traditional healers exist in Ghana, many of whom are recognized and licensed by the Ghana Federation of Traditional Medicine Practitioners' Association (GHAFTRAM) (Esenam et al. 2007).

Inexperienced plant harvesters, gathering medicinal plant species on a large scale for profit, are capable of destroying plants in sacred groves with unsustainable harvesting methods. This commercialized practice is different from the traditional practice of selective harvesting techniques which are geared towards sustainability, i.e. harvesting just enough for a purpose. Once the sacred groves are rid of their vegetation, wildlife habitat will also be affected (Islam et al. 1998).

2.5 Gendered use and restrictions

Land degradation is a problem that affects both men and women. In rural communities in Ghana the majority of men and women work in agriculture, but household chores like fetching water, gathering of firewood and caring for sick people are mainly the responsibility of women (Amu 2005). In most communities, streams and rivers dry up in the dry season, leaving sacred groves as the only source of water in some cases. Bad management of sacred groves can lead to the drying up of their water sources, resulting in women having to walk longer distances to look for water. Medical herbs in sacred groves are used as first aid for varied ailments, and also during labour by traditional birth attendants. The depletion of these medicinal plants (Ofori et al. 2011) can affect the health of people in rural areas and increase the workload of women in care work.

In traditional society in northern Ghana, ownership of lands and natural resources is by the men, and especially communal properties are owned and managed by chiefs, tindanas and elders of the communities (Abu & Millar 2004; Bonye & Millar 2011). Women are marginalized when it comes to participation, management and decision making in natural resources management. Women are considered strangers in their marital homes and therefore cannot inherit their husbands' properties, including natural resources, and hence are alienated from the management of the resources. Women are sometimes strictly prohibited from entry to places considered as sacred at a certain time of the month (Aalangdong et al. 2010). Similar restrictions

based on gender have been reported elsewhere. Chandra (2011) reported that women in the Pachmarhi biosphere reserve in India are expected to bathe before entering the local sacred grove during monthly menstruation, in order to maintain the sanctity of the sacred grove. The local belief is that a woman with blood stained on her will defile the purity of the sacred grove. These customs and beliefs sometimes alienate women from the use of natural resources at certain critical times when the need arises. To give women equal access to the use of these resources requires knowledge on the gendering of cultural taboos.

The activities of women and men alike (farming and harvesting of medicinal plants) can have serious consequences for the conservation and use of biodiversity in sacred groves. There is therefore the need to involve both parties in the management and decision making process so as to sustainably conserve these sacred groves.

3. STUDY AREA, METHODS AND DATA ANALYSIS

3.1 Study area

The Tolon District is located in the Northern Region of Ghana. This district was created in 2012, when the former Tolon-Kumbungu District (Fig. 1) was divided into two separate districts, with the towns of Tolon and Kumbungu as their respective capitals.

Figure 1. Map of Ghana, showing the location of the Tolon-Kumbungu District**.** (source: modified from http://www.nationsonline.org/oneworld/map/ghana_map.htm)

The district capital, Tolon, is about 25 km from the regional capital, Tamale. The district is drained by the White Volta River and its tributaries. Rainfall is unimodal. The rainy season starts in May and ends in October with peaks in August and September. The dry season begins in November and ends in April. Annual average rainfall is 1,000 mm and minimum and maximum temperatures are between 14 ºC during the Harmattan period from late November to January and 40 ºC from February to early March.

The vegetation cover is basically Guinea Savanna interspersed with drought resistant trees, shrubs and grassland. The land is generally undulating with a number of scattered depressions. The soils are generally of the sandy loam type except in low-lying areas where alluvial deposits are found. Major tree species include the *Vitellaria paradoxa* (shea tree), *Parkia biglobosa* (locust bean, or dawadawa) and *Mangifera indica* (mango), all of which are economic trees and form an integral part of the livelihood of the people. Shrubs like *Isoberlinia doka*, *Combretum* spp. *Diospyros mespiliformis*, *Detarium microcarpum*, and others can be found scattered, especially on degraded lands. Grass species such as *Andropogon gayanus, Panicum maximum*, and *Sporobolus pyramidatus* can also be found on rangelands.

3.2 Social and cultural structure

The Tolon District is made up of about 40 settlements, most of which are farming communities. The main source of employment in the area is rain-fed agriculture, mainly subsistence farming and dry season gardening which accounts for about 74% of employment for people over 15 years of age (Tolon-Kumbungu District assembly 2012). Some are involved in fishing, charcoal burning, smock weaving, shea butter extraction, groundnut oil extraction and trading. Crops cultivated include maize, rice, groundnuts, yam, beans and vegetables, and the animals reared are cattle, sheep, goats and poultry.

The indigenous people are Dagombas, but other tribes like Gonja and Ewe are found around the White Volta River, who are involved in fishing. Islam and traditional religions are the most dominant beliefs, with a few Christians, especially in urban areas. Traditionally the district has one paramount chief, located in the Tolon community, and a number of divisional chiefs (Tolon District Assembly 2012).

The culture of Dagombas is influenced by the Islamic religion, especially during the reign of Naa Zangina in 1648 to 1677 when Islam was introduced (Tonah 2012). Although most Dagombas are Muslims, many also believe in and worship additional spirits and gods. Each village makes sacrifices to their ancestral gods.

Dagomba society is patrilineal, where the eldest son or the brother of a deceased man inherits all properties. Women leave their parental homes and join their husbands when they are married. When a woman loses her husband to death, the younger brother of the deceased can marry the widow to continue to produce children for the lineage.

The social hierarchy of Dagombas is organized around the chief, *tindana,* elders, *magazias,* and linguists who assist the chief in his daily activities.

The *chief* is the traditional leader of a community. He is responsible for community organization and managing the resources of the community in collaboration with the *tindana* and elders. He acts as the traditional judge and represents the culture of his community. The position of the chief is hereditary; it is usually the most senior son who inherits the position from his father.

The *tindana,* also called the ‘earth priest’, is the spiritual leader of a community. The *tindanas* are the supposed descendants of the first settlers on the land and are the people who know the spirits and the spirits also know them. The position of the *tindana* is hereditary, not elected. They have authority over land and natural resources in their communities and therefore have first user rights to the natural resources.

The *elders* (Fig. 2 & 3) are older men above 50 years who are known to have good knowledge of the culture and tradition of the community. They can be family or sectional heads. They advise the chief on matters of tradition and help him take decisions concerning the community.

The *wulana/gbanlana* is the head of all the linguists of the chief and is responsible for conveying messages from the chief to the other community members. The *Gbanlana* is the head linguist of the paramount chief and the *Wulanas* are linguists for a divisional chief.

The *magazia* is the women's leader. This is usually an elderly woman with good leadership qualities in community organization and management (Bonye and Millar, 2004). She sometimes acts as the traditional birth attendant. She organizes and educates women on health issues, housekeeping and income generation, and most importantly is the mouthpiece for women's rights in her community.

Figure 2. *Tindana*, chief and elders of Kpasogu. (Photo taken by research assistant in June 2014.)

Figure 3. Elders of Kukpehi, with research assistant Eric Lawer at the back. (Photo taken by research assistant in June 2014.)

The district has one Senior High School, a Vocational School and a number of Basic Schools, most of them located in the district capital. There is one health centre which serves the basic health needs of the people. There is no resident doctor who can attend to patients; therefore

most cases that need the attention of a doctor are referred to the Tamale Teaching Hospital for attention. Because of insufficient health facilities, the people tend to rely on medicinal herbs for the treatment of their diseases.

3.3 Methods of data collection

A mixed research method was used, involving direct field observations, key informant interviews and focus group discussions in three selected communities, Tolon, Kpasogu and Kukpehi, in the Tolon District. An interview guide (appendix 1) was prepared according to the guidelines of Esterberg (2002) and used to investigate the following themes; ownership/control and management of sacred groves, access by different groups and spiritual and material benefits derived from these sacred groves. The interviews were audio-recorded and later transcribed (DeVault 1999; Esterberg 2002). Audio-recording the interviews was advantageous because it saved time and captured all details of the interviews (Vandana & Robert 2006).

The three communities that were selected for the study were chosen using the snowball sampling method (Goodman 1961). This method involved first locating a community where a sacred grove could be found and the community members then directed the researcher to the next village where sacred groves were located. The study was restricted to four sacred groves in three communities within the district, even though most communities in the district have at least one sacred grove where community members make consultations with their ancestors, according to the chief of the Tolon community.

The first community visited was Kukpehi, because it has a sacred grove located on the way from Tamale to the University for Development Studies which was easily identified by the researchers. The researchers went to the chief, who told them to go and come the following day because he needed to organize his *tindana*, elders, and women for the interviews. On the meeting day, the *magazia* organized the women's group and they were interviewed by a female. The *tindana* and elders were interviewed separately. After the interview, the researchers asked the *tindana* and elders for directions to the next community where sacred groves can be found. They were directed to Kpasogu community. At Kpasogu, they met with the local chief, who quickly organized his elders and *tindana* for the interviews while the *magazia* organized the women. The *tindana* of Kpasogu also directed the researchers to the Tolon community and the Jaagbo sacred grove. In Tolon they met with the chief, who also called his *wulana* to organize the *tindana*, elders and *magazia* for the interviews. The researchers could not ask for directions to more communities because of the short time for this project. People were generally willing to participate and be interviewed and they gave information freely.

In each community, the chief was the first contact to be briefed about the intended research. Even though the chiefs were not interviewed formally, they gave useful information about the practices that go on in the sacred groves. From the three communities, the *tindana*, elders and women, led by the *magazia* were interviewed. In Kpasogu, the focus groups were composed of five male elder members and the women were six in number. The elders of Kukpehi were four and the women were seven in number while the Tolon community recorded four elders and nine women. Three *tindanas* and three *magazias* were interviewed, one from each community.

Four sacred groves were located. They were visited with the *tindana* and community members to establish the exact location within the community, measure its size and identify plants and animals. A Garmin 62s GPS device was used for location and measurement. Animals were identified by sighting, nesting sites and inspection of burrows. A pair of binoculars was used to

help with the sighting of animals. Colour pictures of mammals, birds and plants were also used to help villagers identify the animals and plants that live in the sacred groves.

Data were collected by four research assistants, one woman and three men. One of them, from the Department of Forestry and Forest Resources Management, identified the trees and other plants. Two assistants from the Department of Range and wildlife Management identified animals and measured the location and sizes of the groves. A female assistant from the Department of Ecotourism and Environmental Management interviewed the women's groups and the traditional birth attendant. This was because women are more likely to be open about specific women's health concerns to other women (if not generally discussed with men) (Madriz 1998, 2000). The language used during the interviews was Dagbani, the local language of the area. Three of the research assistants can speak Dagbani. The most fluent speaker of Dagbani (Eric Lawer) led the interviews with the elders, *tindana* and chief, one did the recordings and the third assisted in the interview process. The female researcher however did not speak Dagbani. Therefore, a female teacher from the community translated the interview into Dagbani and a high school girl from the community did the audio recordings of the interviews with women.

The local (Dagbani) names were recorded for plants and animals whose English or scientific names were not immediately recognised by the researcher during fieldwork. They were later identified using checklists of plants and animals and their local names prepared by the Forestry Commission of Ghana.

3.4 Data analysis

Some of the sound files from the audio-recording from the interviews were sent to me for transcription. The audio recordings from Kukpehi community was fully transcribed by me while that of the Kpasogu and Tolon communities were transcribed by Imoro A. Ziblim, from the University for Development Studies who is a Dagomba and a native of Kukpehi. The transcription by Mr Ziblim became necessary because the sound files were too big to be sent via the slow internet service in Tamale.

Since I could not collect the data by myself and could not transcribe all the audio recordings, measures were put in place to minimize the effects on the results. The interviewing guide (appendix 1) was thoroughly discussed with the research assistants before they embarked on the data collection and I was in constant contact with them to minimize errors in the field. As I did not have the chance to listen and transcribe the audio recordings from the Tolon and Kpasogu communities, I was constantly communicating with Mr Ziblim and the research assistants during the data analysis for clarification when the need arose.

The results from the analysis of the interviews were organised around the following major themes: location, size and management of sacred groves in the study communities; plants and animals found in the sacred groves and their threat status; benefits (material and spiritual) derived from the groves; ownership/control of sacred groves; and access by different groups.

Plant and animals identified from the sacred groves were tabulated to indicate their scientific name, IUCN threat status, local (Dagbani) name (Appendix 2), medicinal uses characterized with details such as the part(s) used and their use values. The locational data were used to make a map showing the specific locations of these sacred groves in the district, as well as to calculate their sizes.

4 FINDINGS

4.1 Location and size of sacred groves in the study communities

Four sacred groves were identified in the three communities in the Tolon District, two groves (Dakurgli and Gazali) in the Tolon community, one in Kpasogu and another one in Kukpehi (Klusikya sacred grove) (Table 1).

Table 1. Location and sizes of sacred groves in the study communities.

Location **Name of sacred grove**	**Community**	**Size of sacred groves (ha)**	
		Current size	**Previous size (estimate)**
Dakurgli	Tolon	2.98	About twice the current size
Gazali	Tolon	0.49	More than three times the current size
Klusikya	Kukpehi	0.64	About twice the current size
Kpasogu	Kpasogu	0.65	About twice the current size

The *tindanas* of Tolon, Kpasogu and Kukpehi communities who took the researchers to the groves lamented that the sizes of the sacred groves have been reduced to their current sizes due mainly to farming, bush burning and unsustainable harvesting. They said when they were little boys the groves were more than twice their current sizes. The *tindana* of Kpasogu also said the Kpasogu sacred growth was more than twice its present size when he was a boy.

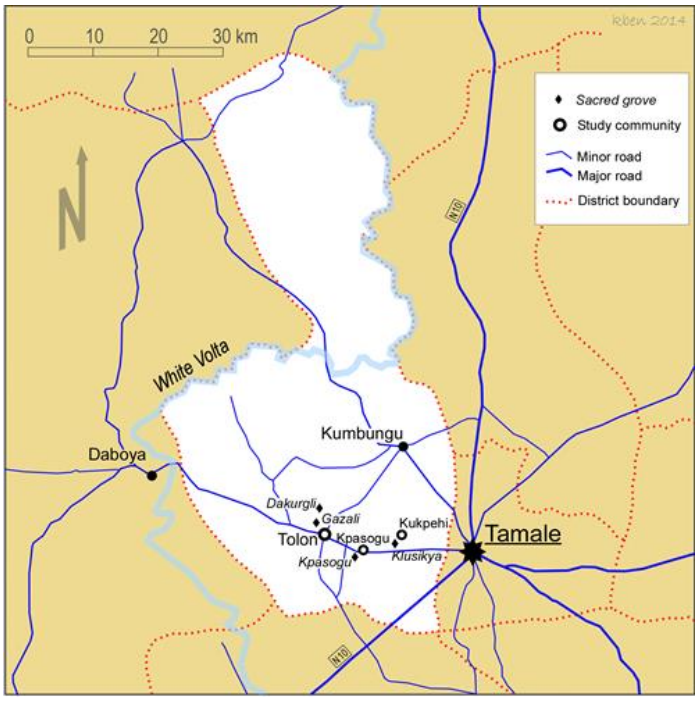

Figure 4. Distribution of sacred groves in the three communities in the study communities. (source: modified from http://www.nationsonline.org/oneworld/map/ghana_map.htm).

Four sacred groves were located in the three communities, two from the Tolon community (Dakurgli and Gazali), one in Kpasogu community (Kpasogu grove) and one in Kukpehi (Klusikya sacred grove).

The Gazali sacred grove (Fig. 5) is surrounded by two communities. The grove is managed by the Tolon community. There is the possibility that the other community which does not own the grove could use resources illegally from the grove and can put much pressure on the resources. This grove is located on a watercourse and is waterlogged throughout the rainy season and this can affect species that are not tolerant of waterlogging.

Figure 5. Satellite imagery clip from Google map of Gazali sacred grove, surrounded by rice farms. (Source: www.google.com/maps/Northernregion+Ghana. Accessed 01/08/14.)

The Dakurgli sacred grove (Fig. 6) is being degraded due to pressure from surrounding farms, as seen below. A road that passes through the grove has divided it into two parts. Also anthropogenic activities of tree cutting and bushfires have caused lots of degradation leading to the separation of a small portion of the grove from the main grove (Fig. 6). The grove is surrounded by scattered shrubby vegetation.

Figure 6. Satellite imagery clipping of Dakurgli sacred grove. (Source: www.google.com/maps/Northernregion+Ghana. (Accessed 01/08/14.)

The Klusikya sacred grove (Fig. 7) is surrounded by the Savanna Agricultural Research Institute (SARI) experimental farms. The farming activities have rendered the area completely without trees, except in the sacred grove. This has led to the planting of trees as a buffer to protect the sacred grove. This sacred grove is also located on a watercourse and the area used for lowland

experimental rice cultivation by SARI (Savanna Agriculture Research Institute) and the accumulation of chemicals from the farm can affect the survival of plant species.

Figure 7. Satellite imagery clipping of Klusikya sacred grove. Surrounded by SARI experimental rice fields. The extended part of the grove to the north-east shows trees that were planted as buffer. (Source: www.google.com/maps/Northernregion+Ghana. (Accessed 01/08/14.)

Figure 8. Klusikya sacred grove. (Photo taken by research assistants on 21st July 2014.)

The Kpasogu sacred grove is located in the village of Kpasogu (Fig. 9), very close to the main Tamale Tolon main road. Two sacred groves are located near each other, but data were taken from the one circled red as the team was not allowed to enter the other because, according to the local people, the gods do not allow strangers to enter. This grove is traversed by paths and in between the groves is an old gravel pit.

Figure 9. Satellite imagery clipping from Google map of Kpasogu sacred grove. (Source: www.google.com/maps/Northernregion+Ghana. Accessed 01/08/14.)

Figure 10. Kpasogu sacred grove. (Photo taken by research assistants on 21st July 2014.)

4.2 Plants and wild animals identified

Plants and wild animals (Tables 2 &3) were identified merely based on their presence in the sacred groves. Their diversity or how many of the individual species present in the sacred groves was not studied.

The plants and animals identified were compared with the IUCN (International Union for the Conservation of Nature or World Conservation Union) list of threatened species of flora and fauna (see www.iucnredlist.org) to ascertain whether their status is threatened or not.

In Table 2 below, different plants were found in different sacred groves, perhaps due to site conditions favouring the growth and establishment of the specific trees. For example, *Vitellaria paradoxa* and *Parkia biglobosa,* which are important economic trees in the area, were found only in the Kpasogu and Dakurgli sacred groves because these groves are not waterlogged throughout the rainy season as the Klusikya and Gazali. These trees cannot tolerate long-term waterlogging. Other trees such as *Tectona grandis, Albizia lebbeck* and *Senna siamea* were

found in the Dakurgli, Klusikya and Kpasogu sacred groves because they were deliberately planted by the communities.

Table 2. List of plant species present in the four sacred groves and IUCN threat status.

Scientific name	**Dakurgli**	**Gazali**	**Klusikya**	**Kpasogu**	**Medicinal use**	**IUCN threat status***
Adansonia digitata	X				M	
Albizia lebbeck			X	X		
Anogeissus leiocarpus	X	X	X		M	
Azadirachta indica	X	X	X	X	M	
Balanites aegytiaca	X	X	X			LR-LC
Combretum ghasalense				X		
*Cyperus articulatus (*grass)		X	X		M	
Detarium microcarpa				X	M	
Diosperos mespiliformes	X	X	X	X	M	
Ficus gnaphalacarpus			X			
Gardenia erubscens	X	X				
Grewia mollis	X	X				
Khaya senegalensis	X		X		M	VU
Lannea acida	X	X		X		
Mangifera indica	X		X	X	M	
Mimosa pigra	X	X				
Mitragyna inermis	X	X	X			
Nauclea latifolia			X		M	
Parkia biglobosa	X			X	M	LR-LC
Piliostigma thonningii		X	X		M	
Pterocarpus erinaceus	X		X			
Saba senegalensis	X	X				
Senna siamea			X	X		
Sterculia setigera			X			
Tectona grandis	X			X		
Vitellaria paradoxa	X			X	M	VU
Vitex doniana			X		M	
Ximenia americana	X					
"Zanga" (grass)		X			M	
Total species	**18**	**13**	**16**	**11**		
Total medicinal plants	**8**	**6**	**9**	**6**	**14**	

* CR = Critically Endangered; CR(PE) = Critically Endangered (Possibly Extinct); EN = Endangered; VU = Vulnerable; NT = Near Threatened; DD = Data Deficient; NE = Not Evaluated; LR = Low Risk; LC = Least Concern.

Of the 29 plant species identified, two plants were vulnerable according to the IUCN red list of species and one of least risk to least concern, and one was threatened (Table 2). Most of the plants were not evaluated for their status or were data deficient. The two have been classified as vulnerable due to the high demand for their wood for timber, charcoal and crafts (for making mortars and pestles, etc.), also bushfires that affect their habitats, medicinal uses of their parts (Table 4 and Fig. 12) and parasites such as mistletoe.

Two introduced exotic species, *Tectona grandis* found in the Dakurgli and Kpasogu and *Albizia lebbeck* found at the Gazali and Dakurgli groves, had been artificially planted by the communities as a buffer against encroachment to the sacred groves. These species according to the chiefs of these communities have prevented encroachers, especially farmers from farming close to the sacred groves.

A total of 23 wild animal species were also identified in the sacred groves (Table 3). Out of this number, 10 birds belonging to eight families were identified, three frogs belonging to the bufanidae, five mammals belonging to four families, two species of fish from two families and three reptiles from three families were also identified, as displayed in table 4 below. Only one bird, *Sagittarius serpentarius,* is considered vulnerable by the IUCN list of red species, due to habitat loss. The rest were of least concern.

Table 3. Wild animal species present in the four sacred groves and IUCN threat status

Scientific name	**Dakurgli**	**Gazali**	**Klusikya**	**Kpasogu**	**IUCN threat status***
Aves					
Bubo cinerascens	X	X	X	X	
Bubulcus ibis	X	X	X	X	
Euplectes franciscanus	X	X	X	X	
Francolinus bicalcaratus	X	X	X	X	
Numida meleagris	X	X	X		
Ploceus cucullatus	X	X	X	X	
Ptilopachus petrosus	X	X	X		
Sagittarius serpentarius	X	X	X	X	VU
Streptopelia senegalensis	X	X	X	X	
Streptopelia vinacea	X	X	X	X	
Total species	**10**	**10**	**10**	**8**	
Amphibia					
Amietophrynus maculatus		X	X		
Amietophrynus regularis		X	X		
Arthroleptis sp.		X	X		
Total species		**3**	**3**		
Mammalia					
Cricetomys gambianus	X		X	X	
Eidolon helvum	X	X	X	X	
Epomophorus gambianus	X	X	X	X	
Lepus microtis	X	X			
Mus minutoides	X	X	X	X	
Total species	**5**	**4**	**4**	**4**	
Pisces					
Tilapia zillii		X	X		
Clarias anguillaris		X	X		
Total species		**2**	**2**		
Reptilia					
Agama agama	X	X	X	X	
Chamaeleo africanus	X	X	X	X	
Varanus exanthematicus	X	X	X	X	
Total species	**3**	**3**	**3**	**3**	

* See Table 2 for explanation.

In the Dakurgli, Gazali and Klusikya groves 10 bird species were recorded in each while Kpasogu had 8 species. Three amphibian species were recorded at each of the Gazali and Klusikya groves whilst the others had none (Table 3). This is due to the fact that the Gazali and Klusikya groves have ponds which are used by the amphibians as habitat. Five mammals were also recorded in the Dakurgli sacred grove while the Gazali, Klusikya and Kpasogu had three each. Two fish species were recorded at the Gazali and Klusikya groves and three reptile species each were recorded in the Dakurgli, Gazali and Klusikya groves, but only two in the Kpasogu grove.

Figure 11. Gazali sacred grove (left), with nests of *Ploceus cucullatus* (right). The tallest tree seen on the left is *Anogeissus leiocarpus*. (Photo taken by research assistants in June 2014.)

4.3 Benefits/uses (spiritual and material) derived from sacred groves

The members of the three communities, according to the respondents, derived both spiritual and material benefits from these sacred groves.

Spiritual benefits and rituals in sacred groves

All the respondents agreed that they, personally or as a community, receive spiritual benefits from these sacred groves. The benefits include:

- consultation with ancestral spirits for direction.
- curing of diseases (Table 4).
- curing of bareness.
- inducing of rainfall and ability to stop rainfall on occasion and during harvesting of farm produce (usually done by the rainmaker in consultation with the *tindana*).
- information to the *tindana* about the death of a prominent member of the community beforehand.
- protection against enemies, especially during wars (fortification).

The *tindanas* of the three communities revealed that ceremonies performed in the sacred groves include the enskinment of the chief as a sign of dedication to the ancestors. The process starts with ritual sacrifices of fowls and sheep at the palace before the chief is sent to the Jaagbo sacred grove for the final enskinment where a cow is slaughtered, rituals performed and certain parts are buried.

The *tindanas* acknowledged that individuals, both within and outside the community, also seek spiritual help from the sacred grove such as self-fortification/protection against enemies. The *tindana* of Kukpehi added that during the olden days people from far and wide came for spiritual fortification in the Klusikya sacred grove (Fig. 12 left) and were made to bathe and drink from the pond and were cleansed. He said the leaves that fall from the sacred trees into the pond water give the water a special taste and a characteristic odour and this makes the water spiritually powerful.

The *magazias* and women from the three communities said they also benefit spiritually from these sacred groves but they are prohibited from consulting the gods with their problems personally. Women who want to seek help from the ancestors have to tell their husbands, elder

of the family or the *tindana* who will then consult the gods or ancestors on their behalf, but the woman have to provide for the things needed for the sacrifice. Problems they usually asked for help from the gods or ancestors include fruit of the womb, sickness, personal fortification and prosperity in business.

Material benefits

All the respondents from the three communities agreed that their communities obtain some material benefits from the sacred groves. They obtain various herbs for the treatment of diseases (Table 4), and different kinds of fruits and water from the grove, especially in the dry season. However, fruits harvested from the grove can only be eaten in the grove and cannot be sent home or sold. They also obtain firewood for roasting meat sacrificed to the ancestors and gods. The meat is eaten as food only by the men in the sacred grove, but cannot be sent home. Firewood from the sacred grove cannot be used for domestic cooking. The Klusikya sacred grove also contains a pond (Fig. 8 & 12 left) which does not dry up and serves as a source of water for the community.

The *tindana* of Tolon community revealed during the interview that the gods of the Jaagbo sacred grove are always consulted during times of drought for rainfall. There are also reported cases of people who went to Jaagbo to ask for prosperity in business, some to ask for the fruit of the womb, and according to the *tindana* some of these requests have been granted by the ancestors. This has further deepened their beliefs in the powers of the grove.

Table 4. Medicinal plant species from sacred groves and their uses

Name of plant	Part use	Preparation	Disease treated
Adansonia digitata	Bark	Boiling	Bathe to make people strong
Anogeissus leiocarpus	Leaves Root, bark, leave, fruit	Boiling Boiling	Sore eyes & stomach ache Menstrual pain, deworming
Azadirachta indica	Leaves	Boiling	High fever
Cyperus articulates	Rhizome	Boiling	Nasal problem & stomach ache
Detarium microcarpum	Roots Roots & leaves	Boiling Boiling	Stomach ache Mental ailment
Diosperos mespiliformes	Bark & roots	Boiling	Epilepsy/convulsion
Khaya senegalensis	Bark & leaves	Boiling	Stomach ache & diarrhoea
Mangifera indica	Bark & leaves	Boiling	Piles
Nauclea latifolia	Roots & leaves	Boiling Powder mixed with water	Stomach ache Whitlow
Parkia biglobosa	Roots, leaves & bark Bark	Boiling/powder Boiling	Wounds and piles Sore mouth
Piliostigma thonningii	Bark, leaves & roots	Boil/powder	Headache, pains & leprosy
Vitellaria paradoxa	Bark & leaves	Boiling	Stomach ache & body pains
Vitex doniana	Bark & young leaves	Burn and ground	"Malam's" ink use by Muslims to write a wish on a special slate, wash into a cup and drink for wish fulfilment
"Zanga" (grass)	Rhizome	Boiling	Nose bleeding & headache

Table 4 above shows fourteen plant species that are used as medicine for the treatment of the different diseases and other health related problems. Some of the plants treat more than one disease and can be used singly or in combination with other plants. The method of preparation of the medicine is by boiling, which is the most common method, but others are pounded into powdered form for application on wounds.

The *tindanas* also said that a mixture of the leaves and fruits of *Detarium microcarpum*, *Parkia biglobosa* and *Vitellaria paradoxa* is burnt in the sacred grove, combined with some divinations or incantations by the traditional "rain maker" to the ancestors or gods, to help bring rainfall in times of drought.

The *tindanas* explained that before the medicine is given to the patient, the gods and ancestors are consulted for them to tell them what plant(s) to use and that there are certain taboos or rules that the patient must strictly follow in order for the medicine to work effectively. For example, a patient may be asked to use the medicine at midnight when no one will see him or her, not greet or respond to greetings, not to use the medicine when the moon is at its initial stage of emerging, etc. Failure to comply with these rules will result in the medicine not working well, or in serious breach of the agreement, in death.

The parts used were the roots, leaves, fruits and bark, either singly or in a combination of two or more parts. In the three communities, the roots, leaves and bark were the common parts used for the extraction of medicines. The methods of harvesting these plants include digging to remove the roots, debarking and cutting of small branches and leaves. People in all three communities agreed that these methods of harvesting are not sustainable because when the roots are cut and trees debarked, it hinders plant growth.

Wild animals found in or around the sacred groves are not killed. They are considered to be the ancestors of the people because it is believed that an ancestral spirit can turn into an animal in or around the grove. However, these same animals can be killed and eaten when found far away from the groves in the bush.

There is a pond in the Klusikya sacred grove which does not dry up in the dry season (Fig. 12, left). Another pond is found in the Gazali sacred grove which dries up in the dry season (Fig. 5 &12 right). Fishing in the Gazali sacred grove is allowed for only children and the fish caught are roasted with wood from the grove and eaten within the grove.

Women are allowed to fetch water from these groves using a specific calabash. This calabash, according to the *tindana* of Kukpehi, has been blessed by the ancestors for use. Figure 9 below shows the calabash of the gods used at the Klusikya sacred grove. The calabash is usually cut longitudinally after some recitations and sacrifice has been made to the gods by the *tindana*.

Figure 12. Water in pond of Klusikya grove (left) and dried-out pond of Gazali grove (right). (Photo taken by research assistants in June 2014.)

Figure 13. The *magazia* of Kukpehi holding the calabash of the gods. (Photo taken by research assistants in June 2014.)

4.4 Ownership and management of sacred groves

All three focus groups of elders from the communities, the *magazia* and women's group revealed that the sacred groves are owned by the people and held in trust by the chief. There is thus no individual ownership of sacred groves and therefore every member of the community can access them. This was confirmed by the chiefs and *tindanas* of the three communities. The chief and *tindana* of Tolon community also stated that their sacred groves, as well as all other sacred groves in the Tolon traditional area, are descendants of Jaagbo (the father of all the sacred groves) and therefore similar rituals take place in all the other groves with little variation. The chief of the Tolon community revealed that "all Dagombas are from one ancestor and our culture is a homogeneous one, the only differences are individual practices, that is what is said or done by the individual ritualist."

The chief of the Tolon community revealed that the *tindana*, with the help of the chiefs and elders, oversee the management of all the sacred groves in the Tolon community and the same

practices apply to all sacred groves in the Tolon traditional area because all practices must be the same as the father sacred grove, the Jaagbo.

The focus groups, as well as the *tindanas* and *magazias* from the three communities said the functions of the *tindana*, the chief and elders in managing the sacred groves are to enact bye-laws to protect the sacred grove. The management strategies in use are the following:

- non-burning of bush
- tree planting
- fire belt creation
- early prescribed burning around the sacred grove
- days of non-entry to sacred groves
- sacred status of all animals in the sacred grove, not farming too close to the grove, control of harvesting of resources from the groves and in recent times planting of trees as a buffer in the case of the Dakurgli and Klusikya sacred groves.

The chief and elders of Tolon and Kukpehi added that the *tindana*, in addition, is responsible for selecting the people who help in forming the fire belt, tree planting, and in the case of the Kukpehi sacred grove, de-silting of ponds or streams within the groves.

The *tindana* is the spiritual leader of the community and is regarded as the head manager of these sacred groves. The *tindanas* are usually the first settlers or descendants of the first settlers of the land. They are the only people who know the spirits and are also known by the spirits. The chiefs and elders of the studied communities said the *tindanas* because of their roles are therefore in a better position to manage resources belonging to the spirits than any other person in the community. The *tindanas* in the study communities have more authority over land resources in their respective villages than all other persons. The land and first fruits of the land belong to the spirit world and the *tindana*, who acts as intermediary, has the first user right of these resources and is obliged by tradition to perform certain ritual offerings to the spirits. The *tindana* is therefore seen as an embodiment of the ancestral spirits.

The Tolon *gbanlana* (chief linguist) revealed that on the day the work is to be carried out in the sacred grove, the chief sends the *wulana* or *gbanlana* to announce to the community and especially those who have been selected by the *tindana* to be ready for the assignment very early in the morning. The people will then come to the chief's palace in the morning before proceeding to the sacred grove.

The chief and *tindana* of Kpasogu said that the people in charge of managing the sacred grove in Kpasogu have not received any form of training. They said they grew up to see the sacred groves and have learned from their parents to protect them. However, the chiefs of Tolon (Major retired from the Ghana armed forces, Sulemani) and Kukpehi have some knowledge of how to plant trees, even though they have not received formal training in tree planting. With their personal initiatives they have been able to organize their people to plant *Tectona grandis* and *Senna siamea* around the Dakurgli and Klusikya sacred groves, respectively.

4.5 Women's involvement in sacred grove management

The *tindana* of Tolon revealed that women are not involved in managing these sacred groves because they are not appointed by the ancestors. He added that if even though there are some women spiritualists in some villages, they are not *tindanas*. They only treat diseases and solve

some spiritual problems. The *tindanas* believe the ancestral spirits are men and will not allow a 'weaker sex' to be their mouthpiece and therefore cannot defend the community. They also believe that women would not be able to perform the task because of their menstrual cycle, and would defile the ancestors if they did. This was also corroborated by the *tindana* of Kpasogu and Kukpehi. The *magazias* of Kukpehi and Kpasogu also confirmed that spiritual matters of the sacred groves management are for the chiefs and the *tindanas*.

Discussions held with the *magazias* in Kukpehi, Tolon and Kpasogu, as well as the focus group discussion with women in the communities, indicated that women are not involved in the management of these sacred groves. The *magazia* in Kukpehi said "when it comes to the issues of tradition and ancestral matters, customs demand that the men take charge"; therefore all decisions about the sacred groves are taken by the men. One elderly woman from the group said: "We cannot consult the gods directly; we have to pass our problems to the gods through our husbands or elders." The *magazia* of Tolon added: "Our husbands and ancestors are supposed to protect us, therefore it is right for them to seek help on our behalf."

4.6 Access by different groups

The *tindana*, chief, elders and women of the three communities said that members of the community can access the sacred groves at any time except on Fridays. However, non-members of the community are prohibited by the ancestors from accessing the groves without permission from the *tindana*. Such a visitor must be accompanied by the *tindana* after sacrifices have been offered to the ancestors for permission to enter the grove. The kind of sacrifice includes a fowl (pure black, white or any colour), a sheep or a cow, depending on the kind of problem or help being sought.

The *magazias* and women focus groups said they are allowed to access the sacred groves at all times, except during their menstrual period, when they cannot enter the grove because they are considered unclean and can defile the gods. Also, when rituals are being performed they cannot enter.

4.7 Taboos

The taboos associated with these sacred groves are the same for all the three communities and include the following:

- Totemism: All animals seen in or around the grove are sacred (ancestors) and wholly protected (cannot be killed or eaten).
- Days of non-entry. This day falls on every Friday and is a day to allow the gods to rest. No activities are to be carried out in the sacred grove except to fetch water.
- Women menstruating are prohibited from entry or taking any resource from the grove.
- Fruits and firewood cannot be taken and used at home, except for medicinal use and permission duly granted by the *tindana*.
- It is a taboo to cut down any tree from the sacred grove unless some rituals are performed before the tree can be cut down.
- It is also a taboo to fetch water from the grove with any container other than the calabash of the gods.
- No alcohol is allowed into the sacred grove because it is prohibited by the ancestors. The *tindana* of Kukpehi explained that if one takes alcohol into the grove and the gods

smell the alcohol, they will think the person is intoxicated and will strike such person with sickness, madness or even death.

According to the *tindana*, chief and elders of the Klusikya sacred grove, when a taboo is broken certain signs will take place to tell the people that the gods/ancestors are not happy. A python or a crocodile will appear on a tree in the grove facing the pond, or big black-red ants will surround the pond to prevent people from having access to the water.

When these signs appear, the chief in consultation with the *tindana* will announce to the community through the *wulana* to stop all activities in the grove until the gods are pacified and the offender found and punished according to the prescription of the gods. The pacification process involves the sacrifice of a specific kind and colour of animal(s), usually provided by the culprit or if he/she is not found, then the community will provide the animal.

According to the *tindana*, the punishments for offenders include a fine of animal(s) to be slaughtered to appease the gods/ancestors. The kind of animal depends on the gravity of the offence; it can be a fowl of a specific colour or a "black animal" (sheep or cow) of certain colour and age, cowries, but not money. If the offender continues, he/she can be banished from the community. Sometimes they leave the offender and let the ancestors/gods take their own actions.

4.8 Problems and challenges of sacred grove management

The *tindanas,* chiefs, elders and the women mentioned the following as challenges/problems that they face in protecting these groves.

Bushfires: The chief of the Tolon community mentioned rampant bushfires in the dry season as a problem of managing sacred groves. He said that because of the problems of bush fires he has instituted a bye-law against burning of the bush in his traditional area and has instituted an award scheme for anyone who apprehends and reports any person caught burning the bush. Offenders, when caught, are severely punished by having them pay a fine of a cow(s) or money. He added that even though this bye-law is still in place, fire still invades the area from unknown places.

The *tindana* and elders of Kpasogu and Kukpehi also mentioned bushfire as a problem. According to the *tindana* of Kpasogu, "fire burns trees and grasses from the groves, killing our sacred trees and animals, our medicinal herbs are dying." They added that because of the bushfire problem they make fire belts around the sacred groves every year to prevent fire from entering the groves.

Farming: The *tindanas* and chiefs of Tolon and Kukpehi mentioned farming too close to the groves and use of agro-chemicals as a major problem that encroached on sacred groves (Fig. 14). They said that during the olden days their communities were sparsely populated and there was abundant land for farming, but now the population has increased and people need more land to farm. Therefore they now farm too close to the groves. They also use weedicides to kill the grasses before they plant and that can have an effect on the plants in the groves, according to their account.

Figure 14. Farming activities close to Gazali sacred grove. A field for upland rice to the left. (Photo taken by research assistants in June 2014.)

Growing market for herbal medicine: the *tindanas* of the three communities lamented that traditional beliefs in sacred groves (ancestral spirits) are no longer recognized due to the advent of Christianity and Islam in the area. The *gbanlana* (most senior linguist to the chief of Tolon) recalled that in those days, people of all walks of life, both from near and far, would come to the sacred groves with all kinds of problems for solutions to be found, but now they do not: "People now see consulting the ancestors as evil." However, despite fewer visits to these sacred groves for spiritual consultations, the high demand for traditional medicine, especially in the big cities and even without the spiritual component, has meant that collecting medicinal plants has become a major economic venture for many people. It is putting much pressure on these plants, especially in the sacred groves where these plants are easily found.

Illegal harvesting of trees and medicinal plants was also mentioned by the *tindana* in the Klusikya sacred grove as a problem that can affect the trees in the grove. He said "people sometimes go to the grove to harvest plants without asking for permission, especially strangers who are not from our community." The way the harvesting is done is not sustainable, especially the debarking and removal of the roots. "How can the tree survive?" he asked (Fig. 15).

Figure 15. Debarked stems of *Mitragyna inermis* (left) and *Mangifera indica* (right). (Photo taken by research assistants in June 2014.)

Cattle: The chief, *tindana,* elders and women of Kukpehi mentioned the invasion by cattle of the Klusikya sacred grove, especially those from nearby communities and cattle coming from Burkina Faso in the dry season. They acknowledged that because of the water in the pond that

does not dry up, the cattle go there to drink, thereby polluting the water and making it unsafe for drinking.

Road building: The chief and *tindana* of Tolon attributed some development projects such as road construction as destroying their sacred groves. They cited the Jaagbo and Dakurgli sacred groves (Fig. 8) as examples of how roads were constructed (in the 1990s) to pass through the groves. The chief said they were not consulted during the design and construction of the road: "The road should have been diverted to avoid entering the grove." The road construction has divided the Dakurgli grove into two. The *tindana* said when they later realized the road was passing through the grove they performed some rituals to appease the gods before the construction could go on.

Figure 16. Dakurgli sacred grove with road passing through. (Photo taken by research assistants in June 2014.)

5 DISCUSSION

5.1 Location and size of sacred groves in the study communities

The four sacred groves identified showed reduction in size and looked threatened by human encroachment. This is an indication that the traditional management system may be weakening in the area, people no longer fear the gods or believe that the gods have lost their powers.

The location of some the sacred groves, especially the Kpasogu sacred grove (Fig. 2) which is very close to the community (easily accessible) could lead to the overexploitation of its resources by the community people. Also the Klusikya sacred grove (Fig. 7) could be faced with threats from chemicals from the SARI farms. It therefore means that the sacred grove located closest to communities may be more exploited than those farther away, even though poachers may have easy access to far away groves.

The population is rising in the district, which puts pressure on land for cultivation and development to meet the increasing number of people. This confirms the findings of Ntiamoa-Baidoo (2008) and Bandana & Sanjay (2013) that losses of biodiversity in sacred groves have been due to the population increase and the consequent high demand for cultivated land to feed

the people. Partly the increase is due to immigration to the Tolon District, where developments attract people to the area. The immigrants bring their cultures, which may not value the local traditions on management of the sacred groves. Campell (2005) suggested that the main factors accounting for the decline in the sacred groves in the coastal savannah of Ghana were western culture, education, local urbanization and the advent of Christianity and Islam.

The accounts given by the people as to the loss of biodiversity in the four sacred groves support the findings by Ntiamoa-Baidoo (2008) that biodiversity conservation in sacred groves is now faced with many setbacks due to modernization, increasing population and high demand for agricultural lands for cultivation leading to the loss of biodiversity and reduction in size.

The threats faced by the conservation of the sacred groves such as overexploitation, clear cutting, bushfires and the introduction of exotic species confirmed the findings of Sarfo-Mensah et al. (2010) on sacred groves in four selected communities in the transitional agro-ecological zone of Ghana who also mentioned the reduction in size of sacred groves due to anthropogenic effects. The findings also concur with those of Decher (1997) who found that the dangers faced by most sacred groves in Ghana are overexploitation of resources, clear cutting, bushfires, and the introduction of exotic species of flora. Fires often result in biodiversity loss leading to habitat fragmentation and destruction of hiding places for wildlife. Bandana and Sanjay (2013) attributed the reduction in size of sacred groves in the Rajouri remote areas in India to pressure on land for agriculture, development, low rainfall, education and literacy brought to the tribal people, which agree with findings from this study (Fig. 7, 14 & 16). Once people become educated they do away with traditions and adopt a different way of life.

5.2 Plants and wild animals identified and IUCN threat status

Sacred groves harbour important plants and animals which are important for food, medicine and many other uses. This makes them distinct from surrounding areas which are degraded. Sacred groves are easily identifiable from the savannah ecosystem by their cluster of trees. The findings confirmed what was found by Barre et al. (2009) in the Tallensi-Nabdam District in the Upper East Region of Ghana where locals described sacred groves as places with thick, dark, moist and green vegetation as compared to the dry and degraded surrounding areas. This makes sacred groves a home for different species of plants and animals. This further confirmed the findings of Barre et al. (2009) by its findings of 29 plants and 23 animal species in the studied sacred groves which support them as habitat. However, the overexploitation for medicinal and economic gains, coupled with encroachment of the sacred groves can have an effect on some species of plants and animals. *Khaya senegalensis* and *Vitellaria paradoxa,* which were the two vulnerable species of plants from the studied sacred groves, have also been reported by Ofori et al. (2011) that they are among the top ten threatened medicinal plants in Ghana due to overexploitation for medicine, use of their wood for timber and carving, and habitat destruction.

In spite of pressures put on sacred groves for the exploitation of their resources, they still protect many plant and wildlife species which might otherwise have been exterminated. The groves protect wild crops and endemic and endangered species of flora and fauna (Swamy 1997). This was confirmed in this study. The sacred groves that were studied contained four vulnerable species of plants (*Parkia biglobosa*, *Vitellaria paradoxa*, *Khaya senegalensis* and *Balanites aegyptica*) and one bird species (*Sagittarius serpentarius*) (Tables 2 & 3).

The four sacred groves studied harboured a total of 14 medicinal plants that are used for the treatment of many diseases. This confirms the study by Joshi and Gadgil (1991) that sacred groves are places of refuge for threatened and rare species of both plants and animals. Also, according to Ramakrishnan (1998), sacred groves provide protection to plants and animals that serve as food and medicine as well as other uses, without which most of these species would have been extinct. The study also confirmed the findings by Millar (2004) that sacred groves are the only places where plants and animals can grow without any disturbance from poachers or interference by man. Sacred groves located on farmlands cleared of their vegetation usually act as critical habitat for refuge. This study agrees with Decher (1997) and Wadley and Colfer (2004) who found that the presence of sacred groves in cultivated fields can provide habitat and act as corridors for the free movement of different organisms.

5.3 Benefits/uses derived from sacred groves

Different kinds of benefits are derived from sacred groves such as material and spiritual benefits as has been revealed by the findings from the studied communities. With increasing population and fewer health facilities and health personnel (Nyonator et al. 2005), coupled with fewer jobs, many people have resorted to the use and sale of herbal medicinal products in Ghana. Most medicinal herbs, either singly or in combination with other herbs can treat one or more diseases as has been shown by the findings from this study (Table 4). The reliance on herbal medicine in Ghana is increasing rapidly, which has led to the formation of the Ghana Federation of Traditional Medicine Practioners Association (GHAFTRAM) who train and licence herbal practitioners (Esenam et al. 2007). The World Health Organization (2008) gave an estimate of about 80% of Ghanaians who use herbal medicines for the treatment of diseases.

The methods of extracting plant parts for medicine such as roots, debarking and taking young leaves and branches as found in the studied sacred groves can seriously affect the survival of the plants. The findings from this study agree with Ofori et al. (2011) that overexploitation of these medicinal plants has let to reduction in numbers and that the parts of the plants harvested are usually those parts that provide support to the plant (roots), help in nutrient uptake (bark), photosynthesis (leaves) and regeneration. Once these parts are affected the plant will lose its ability to survive.

People also obtain water from sacred groves as some of them contain ponds, rivers and springs. The Jaagbo sacred grove is one such example in the Tolon District were water is drawn for domestic usage and for use by animals. In India, the use of water from sacred groves for domestic purposes has been reported by Swamy et al. (2003) that sacred groves that harbour water often act as a local-area micro-watershed that helps to meet local water demands and in some cases, large sacred groves with large reservoirs in drier climates are used for irrigation. This adds value to the findings by this study that the Klusikya sacred grove serves the purpose of domestic water source and for watering animals during periods of water scarcity in the area.

Sacred groves serve the spiritual needs of traditional societies in northern Ghana. For example, Telly (2006) reported that ritual sacrifices are performed annually at the Jaagbo sacred grove to pacify the gods and ask for their blessings. Oku (2013) reported that during the enskinment of chiefs sacrifices are sometimes performed in groves in northern Ghana to fortify and bless the chief and his subjects. Failure to perform these sacrifices could bring misfortune and failure to the chief and the whole community. This confirms the report by the *tindana* of the Tolon community (pers. comm. November 2013) that the paramount chief of Tolon cannot ascend the Tolon skin (become chief of Tolon) unless he has been sent to the Jaagbo sacred grove for ritual

performance and oath taking. Sacrifices are also performed in the four sacred groves during enskinments of the community chiefs and for the fortification of people against enemies. The studied communities also consult their ancestral spirits in the groves for direction and also offer sacrifices for the appeasement of the ancestors.

5.4 Ownership, management and taboos in sacred groves

The findings on ownership and management of sacred groves confirmed that of Abu and Millar (2004) that the ownership, utilization, management and conservation of natural resources, including sacred groves, in northern Ghana are vested in traditional institutions (chiefs, *tindana* and elders). The chief holds these natural resources in trust for his people and he is supported with management by the *tindana* and elders. Bonye and Millar (2011) asserted that chiefs in northern Ghana as custodians of lands are customarily responsible for regulating access to land and its resources, mediating disputes over land, maintaining peace and mobilizing community members in close collaboration with the *tindanas*.

According to Ormsby (2012) ownership and management of groves varies by site, within and between countries. For example, the *tindana* as earth priest operates as spiritual leader of a community in the Tolon traditional area; whilst in the Upper West and East regions of Ghana he has control over land and natural resources (Bonye and Millar, 2004). However, among the Dagombas in the Northern Region, even though the *tindanas* are the first settlers, the chiefs have more authority over land than they do. The result revealed that the management of sacred groves as well as offering of sacrifices is the responsibility of the *tindanas* as this confirms the findings by Abu and Millar (2004) that, in northern Ghana the first fruits of the land belong to the spirits and therefore the *tindanas* who represent the spirits are the first to take the fruits and make sacrifices to the spirits before anyone else is permitted to eat.

In managing the sacred groves the chief, *tindana* and elders enact bye-laws combined with taboos, prohibition or restrictive measures to protect the groves. These measures sometimes scare people from entering the groves (Telly 2006). The chiefs of the Tolon and Kukpehi communities have planted trees around the sacred groves as buffer to protect and prevent further encroachment on the groves. A fire belt is also created every year around the Dakurgli and Gazali sacred groves, and the Klusikya pond is ritually desilted every year as a sign of purity of the ancestors.

The taboos, rituals and beliefs associated with sacred groves have been the motivating factor for conserving the sacred groves. Rituals are offered annually to the ancestors through the killing of animals in the sacred grove for the atonement of their sins and for peace and prosperity in the studied communities. Telly (2006) similarly reported that rituals are offered annually in the Jaagbo sacred grove, usually at night with the slaughtering of animals, as thanksgiving amidst dancing to the ancestors and to ask for blessings. These rituals can only be witnessed by selected people. This therefore scares people from the grove for fear of the unseen and therefore can be used to keep people from illegal activities in the grove.

Awedora (2002) argued that certain animals and natural objects are considered as relatives, or ancestors of their respective social units. Therefore, killing some kinds of animals who are believed to be totems is a taboo. The result from the study showed that all animals around the four studied groves have been given sacred status (totems) and cannot be killed. This concurs with the findings by (Tengan 1994; Awedora 2002; Aalangdong et al. 2010) that in the northern region, the killing and eating of certain animals is considered a taboo as they are considered

totems. In the Upper West Region of Ghana, different clans hold it a taboo to kill and eat specific animals because they are considered as their brothers and sisters. For example, among the Dagara tribe, the Gane clan regards the leopard as their totem and the animal cannot be killed or eaten (Tengan 1994 and Aalangdong et al. 2010). However, the result from the three communities indicated that all animals in or within the vicinity of the sacred groves are taboo and cannot be killed and eaten. This is similar to the findings of Telly (2006) that any animal found in, around, or which runs into the Jaagbo sacred grove is automatically protected, because the animal could be the spirit of an ancestor. It is believed that these animals may be the ancestors who turned themselves into animals. However, if seen far away in the bush these animals can be killed and eaten.

5.5 Access by different people

Local people in the study communities are allowed access to the sacred groves, but non-community members must ask for permission and be accompanied by a community member to the grove after sacrifices are offered. The findings of Sarfo-Mensah et al. (2010) from southern Ghana are different. There only the priests/priestesses and elders of the communities can enter the sacred groves on ceremonial occasions to offer sacrifice and rituals to the gods, but access by all other people is restricted. Menstruating women are also prohibited from entering the grove so as not to defile the gods.

Similar restrictions for women who are in their menstrual period were found by Telly (2006) studying the Jaagbo sacred grove. This corresponds to the findings of this study.

Fridays are days of non-entry into these sacred groves in the study communities to allow the gods to rest or make decisions. Sarfo-Mensah et al. (2010) also found that in the transitional zone of Ghana, Sunday is a taboo day for entry to sacred groves because the gods would not want to be interrupted. The choice of Fridays as the days of non-entry into sacred groves in the study communities might have been influenced by the Islamic religion, which has taken a firm root in the area.

5.6 Problems and challenges in sacred grove management

Grazing by cattle can be a problem in managing the groves. In the Northern Region, large numbers of cattle from neighbouring Burkina Faso invade the area in the dry seasons destroying trees and using up water in water bodies. This could have an effect on biodiversity in sacred groves. This corroborates the findings of Dorm-Adzobu et al. (1991) in the Malshegu sacred grove in Tamale that plants are being destroyed by grazing animals which use the grove in the dry periods.

Also, illegal and unsustainable methods of harvesting of medicinal plants such as debarking, as is evident in the Klusikya sacred grove (Fig. 15) due to availability of markets and the increased use of herbal medicinal products have resulted in the overexploitation of herbs (Malhotra et al. 2001; Esenam et al 2007; WHO 2008).

Road building has destroyed biodiversity in some sacred groves such as the Jaagbo (Telly 2006) and as seen in the Dakurgli sacred grove (Fig. 16).

6 CONCLUSION AND RECOMMENDATIONS

The findings of this study have demonstrated the existence of sacred groves that are rooted in the traditions, beliefs and culture of the people in the four study communities. Local people derive material and spiritual benefits from these sacred groves.

The groves also support many plants and animal life as habitat and places of refuge. They serve the health needs of the people of the communities and beyond and also play an important role in the traditional institution of chiefdom, during the enskinment of chiefs.

The four sacred groves identified show signs of degradation, indicating that traditional protection is becoming weak. This calls for the need to strengthen and motivate traditional conservation efforts to restore the sacred grove system of conservation. Tree buffers need to be encouraged around the groves to serve as protection for the core zones of the groves. Also, pressure from growing human populations and associated anthropogenic activities is impacting negatively on the resources in the sacred groves.

The sacred grove system of conserving biodiversity can still be used for restoring and protecting landscapes in our local communities in Ghana and therefore needs to be encouraged.

The following recommendations are therefore made:

- Further research is carried out in the whole Tolon District to document all sacred groves.
- A study on the abundance or diversity of plants and wild animals is carried out on these sacred groves.
- Education for the district planning authorities on conservation values of sacred groves and the incorporation of sacred sites in their development plans.
- There is the need by government and NGOs to provide material and financial support to help conserve sacred groves.

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APPENDICES

Appendix 1

Questionnaire for data collection

SACRED GROVES AS MEANS OF BIODIVERSITY CONSERVATION: THE CASE OF THE TOLON DISTRICT, NORTHERN REGION.

District:…….
Name of community:……
Name of Sacred Grove:……

Interview guide for key informants and focus groups

I Management of sacred groves

1 Ownership/control and management

1.1 Who is regarded as owner of this sacred grove?
1.2 Who carries out the management practices? (why this people?)
1.3 How is it managed (function/role of different people in management)?
1.4 Are women involved in the management of the sacred grove? (explain why or why not).

1.5 [Questions to people in management position] Have you received any form of training on how to manage sacred groves? If yes: What form of training and by whom?

1.6 What challenges/problems do you face in the management of this sacred grove?

2 Access by different groups

2.1 Who is allowed to use the sacred grove? (Men-women/everyone – or people with specific status/ people living in the village – living elsewhere/with ancestral roots-not roots)
2.2 Are there taboos governing the entry and use of different resources in this sacred grove?

If yes: describe the taboos.
Are people who go against these taboos punished? If yes: what is the punishment?
2.3 Do people need to make any form of sacrifice before entry?
If yes: What form/kind of sacrifice?

II Spiritual and material benefits from sacred groves

1 Spiritual benefits and rituals in this sacred grove

1.1 Are there ceremonies/rituals associated with this sacred grove? If yes: List names of ceremonies, when they are celebrated and reasons for celebration?
1.2 Do individuals use the sacred grove for spiritual assistance?
If yes: What kind of problems do individuals bring to the grove?

2 Material benefits from this sacred grove

2.1 What plant species are used/harvested in this sacred grove?
What are they used for? (list specific use for each plant – what disease/problem or other use).
What methods are used in harvesting the plants used?
Are the plants harvested at specific time? If yes: Why this time or restrictions?
2.2 What animal species are used in this sacred grove?

What are they used for?
What methods are used for hunting them?
Are animals hunted at specific time? If yes: Why this time or restrictions?

2.3 Is there water/water body/spring inside this sacred grove? If yes:
Who uses this water? (specific time, restrictions)
Does it dry up in the dry season?

2.4 Do people living in this village only use this secret grove?
If no: Which other groves do they use and for what purposes? [it might be interesting to ask if people visit many groves]

Form for mapping location, size and species in sacred groves (by researcher)

1. Name of village……
2. Name of sacred grove……..
3. GPS coordinates (location of village)……
4. GPS coordinates (location of sacred grove)……..
5. Size of sacred grove (current size)……
6. Has there been any visible change in the size of this grove? (describe)……

List of plants identified

List of animals identified
Appendix 2

Table 4. List of plants and wild animals in the sacred groves with vernacular names.

Scientific name	**Common English name**	**Vernacular name (Dagbani)**
Adansonia digitata	Baobab	Tua
Albizia lebbeck	Woman's tongue	
Anogeissus leiocarpus	Chewing stick tree	Shiila
Azadirachta indica	Neem tree	Neem
Balanites aegytiaca	Desert date	Gabliga
Combretum ghasalense	Bushwillow	Yurinpeli
*Cyperus articulatus (*grass)	Jointed flatsedge	Yobina
Detarium microcarpa	Sweet dattock	Kpariga
Diosperos mespiliformes	Ebony	Gaa
Ficus gnaphalacarpus	Fig tree	Kinkan
Gardenia erubscens		Dazunnasaga
Grewia mollis		Yuelega
Khaya senegalensis	Mahogany	Kogu
Lannea acida		Sinsabiga
Mangifera indica	Mango	Mango
Mimosa pigra	Sensitive tree	
Mitragyna inermis	False abura	Sheigu
Nauclea latifolia	African peach	Gbulungu
Parkia biglobosa	African locust bean	Dua
Piliostigma thonningii	Camel's foot	Bangida
Pterocarpus erinaceus	African rosewood	Nee
Saba senegalensis	Saba tree	Ora
Senna siamea	Cassod tree	
Sterculia setigera	Karaya gum tree	Pulunpung
Tectona grandis	Teak	
Vitellaria paradoxa	Shea tree	Tanga
Vitex doniana	Chaste tree	Daringa

Ximenia americana	Yellow plum	Lienli
		Zanga
Animals		
Aves		
Bubo cinerascens	Spotted eagle owl	
Bubulcus ibis	Cattle egret	
Euplectes franciscanus	Red bishop	
Francolinus bicalcaratus	Double-spurred francolin	Koringa
Numida meleagris	Helmeted guinea fowl	Mukpaanga
Ploceus cucullatus	Village weaver	
Ptilopachus petrosus	Stone partridge	
Sagittarius serpentarius	Secretary bird	
Streptopelia senegalensis	Laughing dove	Mwanmulga
Streptopelia vinacea	Vinaceous dove	Mwanpielga
Amphibia		
Amietophrynus maculatus	Common African frog	Loanga
Amietophrynus regularis	Hallowell's toad	
Arthroleptis sp.		
Mammalia		
Cricetomys gambianus	Giant rat	Dayuga
Eidolon helvum	Fruit bat	Zung
Epomophorus gambianus	Straw-coloured fruit bat	Zung
Lepus microtis	African savannah hare	Sounga
Mus minutoides	African pygmy mouse	
Pisces		
Tilapia zillii	Tilapia	
Clarias anguillaris	Mudfish/catfish	Zunsalga
Reptilia		
Agama agama	Common agama	Banduang
Chamaeleo africanus	Chameleon	
Varanus exanthematicus	Bosc's monitor lizard	