

Review of biodiversity in sacred groves in Ghana and implications on conservation

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ABSTRACT

Sacred groves are small patches or islands of remaining original habitat or forests of various dimensions partially or fully protected by local religious and/or cultural agents. They are maintained through complex traditional institutions that sometimes do not require governmental involvement. In Ghana, there are estimated to be 2,000-3,200 sacred groves, about 80% of which occur in the southern half of the country. Sacred groves serve important ecological and socio-cultural functions by preserving virgin forests, being important refuge for rare and useful local biodiversity, and sources of herbs for medicinal, social and religious purposes. In this review, we present evidence that sacred groves in Ghana act as reservoirs in the conservation of some important fauna groups and/or species across a landscape matrix that is largely devoid of forest habitat. Current threats to sacred groves that need to be addressed through sustainable management approaches are also discussed. It is recommended that more research on the insect diversity and socio-economic mechanisms in sacred groves should be carried out at several locations in Ghana in order to better understand their effectiveness in biodiversity conservation. Such an approach

would hopefully create public awareness on the importance of these sacred sites in mitigating loss of biodiversity in Ghana, and may prompt government and other practitioners to promote their explicit integration into the Protected Area Networks.

KEYWORDS: sacred groves, biodiversity conservation, protected areas

INTRODUCTION

Sacred groves are small patches of forests set aside as sacred for spiritual and cultural purposes [1]. They have been reported all over Africa ranging from a few square meters to several hectares. In Ghana, [2] reported that almost all 240 forest reserves have close links with sacred groves and/or socio-cultural ties with the local community. In Ghana, [3] reported that there are estimated to be 2,000-3,200 sacred groves with about 80% found in the southern half of the country. Traditionally, many chiefs, communities or individuals have preserved these sacred forests for religious and cultural purposes such as royal burial grounds, preservation of water courses and sacred plants/animals/trees as abodes for traditional deities. Many have been allocated special dwelling places that are strictly protected by customary laws and/or beliefs, enforced by taboos and only occasionally visited for important ceremonies and religious rituals [4]. Failure to adhere to these traditional customs attracts severe sanctions for

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culprits, and high prices of atonement, including making sacrifices and performing certain rites to avert any ill-health and death [5]. These restrictions have contributed to the protection of rivers, streams, and rare/endangered species of plants and animals [6].

There is an expanding body of research demonstrating the role of sacred groves in biodiversity conservation in Ghana [7, 8, 9]. However, currently, these traditional belief systems that have strongly preserved sacred groves and therefore contributed to the conservation of biological resources found therein are weakened in Ghana [6, 10, 1]. According to [7], the beliefs are considered mere superstitions with the rituals now known to very few people, mostly of the older generation. Human activities around the groves such as hunting, gathering of woods, and farming that were formerly taboos are presently affecting the ecology of sacred groves. According to [11], this situation could be attributed to (i) rapid population growth and its attendant problems of urbanization, migration, and resettlement, (ii) increased dependence on western technology, and (iii) the growing influence of foreign religions and beliefs.

In the face of the degradation of sacred groves, a number of international organisations, researchers, and Non Governmental Organisations (NGOs) have acknowledged the need to revive community based approach to conservation and incorporate them into Protected Area Network [12]. This is because there has been an increasing recognition that rather than destroying nature, local people have actually enriched biodiversity and landscapes in many areas. It is in this respect that some collaboration now exists between traditional authorities, NGOs, government institutions, academic and research institutions in Ghana to conserve biodiversity in sacred groves [12].

Management of sacred groves in Ghana through traditional systems alone will not be effective if we neglect other challenges such as socio-economic issues that local communities are facing. In addition, the need for education and poverty alleviation are being tackled to enhance the effectiveness of sacred groves in biodiversity conservation. Furthermore, the ecological and biological importance of sacred groves needs to

be highlighted. However, [13] reported that despite recent interest in sacred groves as remnant forests, few studies have investigated their sustainability and conservation role in West Africa. In Ghana, some works have been done in this respect [14, 15, 16, 8]. However, in the case of sacred groves, most surveys have focused on their botanical, ethno-botanical or socio-cultural functions in Ghana [17, 16]. Very few attempts have been made in Ghana to assess insect diversity in sacred groves although promising results have been reported from few studies carried out by researchers and students of the University of Ghana, Legon.

In this paper, we present evidence that sacred groves in Ghana can play a valuable role in the conservation of some important faunal groups and/or species. We also argue that by documenting and doing an inventory of faunal diversity and socio-economic mechanisms in sacred groves in Ghana, their effectiveness both in achieving conservation objectives and helping in designing conservation measures by the relevant agencies or department can be determined.

Sacred groves and biodiversity conservation

Sacred groves exist throughout Ghana [18]. They range from a few square meters to several hectares [19]. Many are small, often comprising an object (such as a tree, stone, or rock) considered a god and its immediate surroundings. They form the majority of the forest cover that has not been fragmented apart from the reserved areas [20]. Estimates suggest that there might be between 2,000 and 3,200 sacred groves throughout the country, about 80% of which occur in the southern half of the country [3]. So far, there is no documentation on the number of sacred groves in each region in Ghana along with the area covered by them. Furthermore, data on the total geographic area covered by them in Ghana is not known. Some of the major sacred groves in Ghana, their distribution and size are shown in Table 1.

Many traditional folks in Ghana have protected tracts of land as sacred because they are believed to be the abode of local gods, ancestral spirits and other natural beings [4]. In order to scare people from infringing the taboos, local communities

Table 1. Sacred groves distributed in different parts of Ghana along with the area covered by them.

Region	Name of sacred grove	District	Area (ha.)	Reference
Brong Ahafo	Buoyem	Nkoranza	36.5	Fargey (1991)
	Asuonyima	Nkoranza	2.4	Sarfo-Mensah <i>et al.</i> (2010)
	Ghonno	Wenchi	100	
	Brabo	Wenchi	-	
	Ntwokom	Wenchi	-	
	Boten	Wenchi	-	
	Worobo	Wenchi	-	
Northern	Malshegu	Tamale	1	Dorm-Adzobu <i>et al.</i> (1991)
	Jaagbo	Tolon-kumbungu	-	Corbin (2008)
Eastern	Anwean	Kwaebibirem	2,000	Amoako-Atta (1998)
	Abiriw	Akuapim North	0.04	Kangah-Kesse <i>et al.</i> (2007)
Volta Region	Tafi Atome	Hohoe	-	Arhin (2008)
Ashanti	Nkoduroom	Kumasi	500	Ntiamoa-baidu (1995)
	Gyakye	Kumasi	11.5	Bossart <i>et al.</i> (2006)
	Asantemanso	Kumasi	259	Bossart <i>et al.</i> (2006)
	Bonwire	Kumasi	8	Bossart <i>et al.</i> (2006)
	Kajease	Kumasi	6	Bossart <i>et al.</i> (2006)
	Pinkwae	-	-	Ntiamoa-baidu (2008)
Greater Accra	Pokuase	Ga West Municipal	-	Appiah (2009)
Central	Nanamon Mpow	-	-	Arhin (2008)

establish rules that vary from grove to grove. For example, [21] found in the village of Nanhini in the south west of Ghana, which has the Numafoa and Kobri sacred groves, that the Numafoa grove cannot be farmed or used for hunting, nor can snails be collected. However, the palms can be tapped for wine and medicines gathered. In addition, lands adjacent to sacred groves with streams in them are not supposed to be used on the sacred days of the deities associated with the groves. These traditional rules have no legal backing, but have been strong enough in the past to make people obey the regulations [6]. As a result of these restrictions, such sites are preserved over many generations and become important reservoirs of biodiversity.

Studies have demonstrated that some sacred groves in Ghana support higher levels of biodiversity than the surrounding areas. However, it has been reported that recent efforts to enumerate and

assess biodiversity value of sacred groves in Ghana and elsewhere have focused mainly on botanical, ethno-botanical, or socio-cultural aspects [17, 16, 9]. For example, studies conducted by [9] demonstrated that cultural practices alone can help promote conservation of endangered animal species in sacred groves in an atmosphere of coexistence with human beings in Ghana. From a socio-cultural perspective, [15] demonstrated that due to the establishment and enforcement of land use rules and practices designed to protect the abode of the Malshegu guardian fetish in Northern Ghana, the Malshegu sacred grove which was originally an open-canopy forest has developed into a partially closed canopy forest probably harbouring a higher biodiversity than the former. This grove of nearly 1 hectare in Tamale in Northern Ghana is a small refuge for a large variety of fauna and flora, and a repository of numerous native species found nowhere else in the region [15].

The botanical value of some groves in the country has also been reported. Preliminary research indicated that the Jaagbo sacred grove in Northern Tolon-Kumbungu district and its buffer zone had approximately 220 plant species in comparison to 60 in outlying areas, and 60% of those plants were used as sources of medicines [22]. Similarly, [14] found that the only surviving specimens of the inner zone subtype of the dry semi-deciduous forest and the southern marginal forest types were in sacred groves in Ghana. Studies conducted in the Anweam sacred grove subsumed into the Esukawkaw forest reserve in the Eastern region of Ghana revealed that this grove has the highest level of medicinal plants compared to any other area sampled [2].

Some researchers and scientists in Ghana have attempted to document the wildlife, Aves and mammals diversity values in sacred forests. For example, the Nkodurom and Pinkwae sacred groves, preserved through beliefs enforced by a range of restrictions and taboos along the Ghana coast, have higher numbers of mollusc (*Tympanotonus fuscatus*), 3 species of turtles (Green, dive Ridley, Leatherback) and the black heron than in areas where these species are not protected by traditional belief systems [8]. On the Accra plains in Southern Ghana, [16] found that sacred groves contained higher small mammal biomass (insectivores, bats and rodents) than the surrounding areas. A previous study of small mammal ecology and conservation on the Accra Plains in Southern Ghana indicated that sacred groves contained higher small mammal biomass than surrounding areas and that they function as refuges to some small mammal species no longer found anywhere else [23]. Studies conducted by [7] in the Abiriw sacred grove in the Akwapim North District in the Eastern Region of Ghana showed that the grove has a total of 411 individual birds belonging to 22 families and 66 species, out of which 211 individuals of 41 species occurred in the forest-cultivated land boundary, 111 (36 species) in pristine forest, and 89 (40 species) in secondary forest. They also reported that a significant proportion of species in the grove were savannah specialists.

In some cases, specific species of both plants and animals survive exclusively in sacred natural sites.

For example, the only remaining Ghanaian population of the true Mona monkey subspecies *Cercopithecus mona mona*, lives in a small sacred grove at Tafi Atome, in the Volta region [24]. The Boabeng-Fiema Monkey Sanctuary in the Brong Ahafo Region in Ghana provides a refuge for wildlife (the ursine black and white colobus, *Colobus vellerosus*, and the Campbell's monkey, *Cercopithecus campbelli lowei*) which have been exterminated in nearby areas [22]. In Northern Ghana, sacred groves contained tree species that have largely disappeared in the surrounding savannah vegetation [18].

Concerning the insect diversity value in sacred groves, few attempts have been made in Ghana. [20] conducted a year-long survey of the fruit feeding butterfly fauna of four sacred groves and two forest reserves to characterize resident species diversity and complementarity among communities in Kumasi in the Ashanti Region. The purpose of their study was to assess the extent to which sacred groves in Ghana might contribute to the preservation of the country's forest endemic species. Through this study, they reported that despite their small sizes, sacred groves conceal a number of less common endemic butterfly species, and also help to foster persistence of these forest species across a landscape matrix that is largely devoid of forest habitat. They therefore advocated that these indigenous reserves should be integrated into conservation practice in order to mitigate the loss of biodiversity in degraded landscapes. Short term studies conducted by students of the University of Ghana, Legon demonstrated the importance of sacred forests in the conservation of important insect species. Unpublished studies conducted by [25] and [26] showed that the Abiriw sacred grove in the Eastern Region of Ghana has a high diversity of Chironomids. The species of chironomids found in this grove belong to the genera *Kiefferulus*, *Polypedilum*, and the new genera *Manisetula* and *Capillolus*. [27] revealed that the same grove has a high diversity of aerial insects. All of these examples demonstrate that a scientific study of the insect diversity in sacred groves in Ghana might also increase public awareness and trigger necessary control measures to prevent the loss of biodiversity in these sacred sites. Ghana's sacred

groves, however, remain largely undocumented, unexplored and underappreciated as refugia for forest biodiversity, and despite their cultural and biological significance, few have received active protection [20]. Many sacred groves have come under various threats as traditional protective measures have eroded [28].

Threats to sacred groves in Ghana

The degradation of sacred groves in Ghana is eminent [6]. In the past, these natural sacred sites have been protected, conserved and maintained through a combination of taboos, prohibitions, beliefs and restrictions [15] that vary between and within communities [29]. These traditional belief systems upheld by the local people because of spiritual, religious and cultural attachments to the grove are responsible for the survival of the groves. Traditional respect for the environment and access restrictions to sacred sites has led to the conservation of areas with high biological diversity within degraded environments. Unfortunately, it has been reported in several studies that the erosion of traditional beliefs and associated taboos threaten sacred groves in the country [30, 6, 19]. The breakdown of traditional beliefs and the associated taboos have been identified as the greatest threats to the conservation of traditional natural resources through sacred groves [30]. This has consequently led to over-exploitation and degradation of the local natural resource base of several communities. [12] reported that the breakdown of beliefs that protect these sacred areas can be attributed to rapid population growth, urbanization, human migration, resettlement, influence of western technology, foreign religion and beliefs, encroachment, deforestation etc. [6] reported that the lack of modern legislation to reinforce traditional rules is also responsible for the breakdown or disrespect of traditional belief systems. She also observed that as a result of the uneven impact of these factors, human activities such as farming, residential development and degradation through consumption of forest products and bush fires which were formerly taboo are affecting the ecology of the sacred groves. For example, the Pokuase sacred grove at Pokuase in the Ga West Municipal Assembly of the Greater Accra Region

of Ghana is succumbing to the activities of some developers [31].

In addition, local communities are facing economic and social challenges posed by the modern world. Some regions in Ghana are facing alarming population growth and increasing immigration, and the resulting need for land puts some sacred groves under severe pressure. Furthermore, immigrants often retain their own cultures and customs, which might not include the values underlying the maintenance of sacred groves. [18] observed that economic change in the Upper East region of Ghana has accelerated demand for non-renewable products such as charcoal. As a consequence, immigrants who are not part of the system of prohibitions are exploiting woodland with little fear of sanctions in sacred groves. Similarly, [22] reported that in some areas such as in the Eastern Region in Ghana, new settlers who are not part of the system of prohibition are growing crops such as tomatoes, plantains, maize, cassava etc., which are not indigenous to the sacred groves thereby putting a high strain on the soil. Poverty affects the existence of the majority of local communities thereby limiting their capacity to exploit sustainably their forest resources. [2] reported that lack of supportive education rooted in the modern concept of conservation and eco-development explains the situation. For example, [22] reported that with the rising cost of health in Ghana, traditional medicinal plants are becoming big business and as a result, people from outside the groves are collecting large quantities of these plants from the groves at an unsustainable rate. Sometimes, local communities help people to exploit forest resources illegally because of poverty and lack of respect for government regulations stemming from the fact that they have been unjustly denied the means to support themselves on their traditional lands [22].

It is quite clear that measures such as the protection of biodiversity and life forms through sacred groves should be taken seriously to ensure that biological resources are used in ways that neither diminish the variety of genes and species nor destroy important habitats and ecosystems. This is because the loss of each species comes with the loss of potential economic benefits

(example: natural products that increase world food supply and the medicines humans depend on), as well as a loss of ecosystem balance. It is therefore important for human society to manage our biological resources so as to enhance sustainable growth and development worldwide.

Management of sacred groves in Ghana

Although currently under threat, sacred groves act as strong tradition of conservation of biological natural resource management that has existed for hundreds of years. They are not just cultural monuments; but are conservation areas that can provide a culturally sensitive model for the conservation of biological resources.

[32] outline a management strategy for Ghana's sacred groves that advocates the following: (i) Legislation to reinforce the traditional regulations regarding use and access; (ii) Provision of resources to improve local people's capability to manage their groves; and (iii) Nationwide inventory of the groves and the biological resources they contain. Nevertheless, it is worth noting that in the country, there is no specific approach to sacred grove management due to the challenges that vary from region to region, culture to culture as well as from one grove to another. An integrated approach is, however, used to manage a particular sacred grove depending on the prevailing threats to that grove.

a) Use of legislation to reinforce the traditional regulations regarding use and access to sacred groves

One of the prime agendas for Convention on Biological Diversity (CBD) is to promote community based conservation initiatives for which the sacred groves tradition can be portrayed as role models [33]. Faith communities have well preserved natural biological resources within their sacred groves by making use of traditional institutions. At the international level, the integration of traditional belief systems in biodiversity policy has repeatedly been advocated [19, 34]. Some researchers suggested that it is important to consider and respect the values of traditional communities behind the conservation of such sacred sites for their effective management [35]. Even though these traditional conservation areas

are governed by complex customs and taboos rather than being bound by legal framework as is the case in formal protection [36], it is important for human society to adopt a strategy that is sensitive to local peoples' traditions, than to use an approach that alienates local people. In addition, local people must continue to be involved in the management of their sacred forests.

In Ghana, efforts are made to support traditional institutions of sacred forests management, and incorporate them into conservation policy [22]. International organisations such as United Nations Educational, Scientific and Cultural Organisation (UNESCO), Non Governmental Organisations such as The Ghana Association for the Conservation of Nature (GACON) and the Government of Ghana have taken interest in both the conservation of sacred groves and the future role of communities in the conservation of their sacred forests [37, 31]. In order to counter the current breakdown of traditional institutions that have long preserved the integrity of sacred forests in Ghana, a strong legal backing is needed. With no effective and sustainable protective means and if there should be a future break in traditional beliefs, the richness of the grove will be seriously affected. Furthermore, lack of action will undoubtedly accentuate the extinction process within sacred groves. Such legal protection will be more suitable in protecting sacred natural sites from violation. The Boabeng-Fiema Monkey Sanctuary in the Brong Ahafo Region of Ghana provides an example of a grove that has not only been protected by customary law, but also by modern legislation [38]. When the sacred monkeys at the Boabeng-Fiema Monkey Sanctuary were threatened by religious leaders who supported monkey hunting to undermine traditional belief systems, the community asked for government support for a hunting ban, which was successfully implemented [39]. The Ghana Association for the Conservation of Nature (GACON) developed a successful partnership with the community of Buoyem to conserve and manage their grove [22]. UNESCO South-South Cooperation programme involved local people in the management of the Anwean sacred grove within the Esukwakwa forest reserve in the Eastern Region of Ghana [2].

Such legal recognition for sacred forest management will probably accentuate the conservation of natural biological resources.

b) Provision of resources to improve local people's capability to manage their groves

In some cases, outside support for sacred forests conservation is needed when local communities living near the groves are facing economic and social challenges. Private and corporate organizations can also help alleviate the pressure of poverty in the local communities by providing microcredit finance and other alternative income generating ventures. There are several cases in the country where such external interventions have been successful. The assistance of the GACON in the Buoyem community has helped fortify the reverence the local community have for the grove, and to bring in skills and devices, like fuel-efficient woodstoves, that can help the local people live without destroying the grove [22]. The Tafi Atome Monkey Sanctuary in the Volta region is one of the eco-tourism projects supported by the United States Government [9]. Community members of this region elicited the support of an Accra based Non Governmental Organisation to develop ecotourism to the site and support sacred grove conservation traditions [40].

The role of education, public awareness and understanding of conservation issues in sacred grove management are tackled in rural areas in Ghana [22]. Earlier on, [6] reported that these three factors militate against protected area management in the country. [2] reported that lack of supportive education rooted in the modern concept of conservation is among one of the factors that explains the overexploitation of natural resources within sacred groves by local people. For instance, lack of conservation education has been identified as one of the challenges to sustainable land use in the Anwean grove in the Esukawkaw forest reserve in the Eastern Region of Ghana [22]. UNESCO has also sponsored the Cooperative Integrated Project on Savannah Ecosystems in Ghana (CIPSEG), which undertook an educational program that prepared the Jaagbo sacred grove in the Northern Tolon-Kumbungu district for ecotourism and opportunities for school groups to visit the grove [22].

c) Inventory of the biological resources in sacred groves

Other researchers suggested that for effective conservation management of sacred groves, their biological importance must be highlighted in international fora [37, 41, 35]. This may help the conservation community and policy makers to acknowledge the value of sacred natural sites and consider the need to protect and conserve them. It is, however, encouraging that sacred groves in Ghana are the sites for several international and local projects to document biodiversity [22]. For example, UNESCO has funded the Cooperative Integrated Project on Savannah Ecosystem in Ghana project which studied three sacred groves near Tamale in the Northern Region of Ghana [18]. This project demonstrated that these groves acted as important floristic reserves, and as important sources of medicinal plants. These groves were to be encouraged as part of an environmental recovery process in the Northern Region.

There is evidence that large reserves are the cornerstones of successful conservation strategies because they generally harbour greater forest diversity than smaller forest fragments. [42] reported that it is questionable whether any single grove could have conservation value, in view of the small size of these fragmented forest patches. They believe that patches of forest that are fragmented lose species and have low biodiversity. However, [43] reported that it is their number and spatial distribution in a country that make them so valuable for biodiversity conservation. It therefore means that sacred groves as a network in a country or region can preserve sizeable portions of local biodiversity in areas where it would not be feasible to maintain large tracts of forests. Studies on the fruit feeding butterfly fauna of four sacred groves and two forest reserves in Kumasi in the Ashanti Region of Ghana demonstrated that despite their small size, sacred groves conserved important insect species that do not occur in these large forest reserves [20]. They therefore recommended that sacred groves should be urgently integrated into the Protected Area Network in order to preserve and protect the biological resources found therein. Such studies demonstrate that by increasing our knowledge of

insect diversity in sacred groves in Ghana, we might have an in-depth knowledge of the potential of these sacred sites in mitigating the loss of biodiversity in the country. Such scientific studies will be able to raise public awareness of the biological significance of sacred groves in the country, and hopefully enhance more effectively the integration of sacred groves in the Protected Area Network.

Key research needs

From the review, the following points emerge:

- As yet, we do not have an estimate of the total number, size and geographical area of sacred groves in the different regions of Ghana.
- More research needs to be carried out on the insect diversity in sacred groves in the different regions of Ghana in order to establish their significance for conservation. Such an approach will be useful in creating global awareness of the insect diversity value of sacred groves in Ghana.
- Effective management of sacred natural sites in Ghana should take into account the traditional belief systems governing their existence and the threats faced by sacred forests.

CONCLUSION

Sacred natural sites can play an important role in the conservation of important faunal groups and/or species. Despite their small sizes, these relicts of old growth forest are serving to foster persistence of some forest faunal species across a landscape matrix that is largely devoid of forest habitation. There are indications, however, that with the breakdown of traditional belief systems coupled with rapid socio-economic changes, many sacred groves have been completely destroyed and many others are under imminent threat in Ghana. The nature and extent of this damage in the country varies from region to region as well as from one grove to another. It is therefore urgent to carry out more research on the biodiversity and socio-economic mechanisms of natural sacred sites in order to fully understand and realize the potential of sacred groves for biodiversity conservation in the future. Government, NGOs and international organisations should fund biodiversity research at various locations in

Ghana to enhance the effectiveness of these sacred sites in achieving conservation objectives. This will enhance their effectiveness in promoting the conservation and sustainable use of biodiversity in Ghana, as well as their explicit integration into the Protected Area Network.

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