



Direct and indirect conservation benefits of religious and spiritual beliefs in traditional Ghanaian communities

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Abstract

Religion and spirituality are often important contributors to social norms in traditional communities. These social norms, manifested through socio-cultural practices, have been accredited with having conservation benefits. This research investigated the motives behind, and potential conservation benefits of such practices, through interviewing indigenous residents and local officials within three regions of Ghana. Strict taboos can contribute directly to conservation, through restricting activities in specific habitats such as sacred groves, and restricting the timing, methods and species of resource harvesting. Ceremonial practices such as festivals, sacrifices and worship, have indirect conservation benefits through reinforcing the relationship between people and nature. This research proposes that habitat protection through social taboos - which maintains the environmental setting - combined with ceremonial behaviours, are fundamental to the continuation of these belief systems. However, the belief systems may be disrupted by increasing pressures from development, which threatens the sacred sites and the longevity of conservation in the region.

Keywords: Conservation, Environmental spirituality, Ghana, Sacred groves, Social norms, Taboos

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1. Introduction

At a global level, the rate of biodiversity loss has failed to decline over recent decades, despite commitment from world leaders to significantly reduce this rate of loss (Butchart et al., 2010). It is therefore critical to utilise all available opportunities to conserve biodiversity, which is increasingly recognised as vital for human well-being (Díaz et al., 2006). Where habitats and biodiversity are under threat, measures for protection and conservation may exist through formal regulations enforced through the state. Additionally, informal institutions often exist in societies, where behaviour is determined by social norms rather than, or as well as, by state laws (Colding and Folke, 2001). In traditional societies in particular, informal institutions such as social norms frequently guide human conduct towards the environment. Social norms become an important mechanism for biodiversity conservation when state capacity for enforcing regulations is limited (de Merode and Cowlshaw, 2006; Jones et al., 2008). As they are self-enforced they provide for low monitoring and low enforcement costs, and therefore may offer an effective mechanism for biodiversity conservation.

Religious and spiritual beliefs often contribute to social norms, acting as a potentially important instrument for environmental protection. This may be achieved through promoting positive religious or spiritual associations with nature protection, which motivate environmental consciousness. For example, tree-ordination ceremonies in Thailand have acted as a socio-political tool to encourage authorities to mitigate environmental degradation (Tannenbaum, 2000). Other norms may achieve environmental protection through prohibiting certain behaviour - such norms may be classed as a social taboo. For example, in the Boabeng-Fiema Monkey Sanctuary in Ghana, a social taboo prohibits the hunting of the ursine black and white colobus, *Colobus vellerosus*, and the Campbell's monkey, *Cercopithecus campbelli lowei*. This social taboo is underlain by religious beliefs as these primate species are considered by the local traditional communities to be children of the gods (Saj et al., 2006).

A developing African nation, Ghana both has limited state capacity for enforcing environmental regulations, and has traditional societies, such as those in the Boabeng-Fiema Monkey Sanctuary, which may be especially guided by social norms and religious beliefs. Additionally, land degradation, coastal erosion, water pollution, deforestation and desertification now constitute major environmental problems in the country, as a result of a growing focus on economic growth and development (Roosbroeck and Amlalo, 2006). Consequently, it is increasingly important to identify and maintain mechanisms such as social norms that may contribute to environmental protection in Ghana. Despite the important role that such practices can play in reducing the rate of biodiversity loss, relatively few studies have specifically explored the role of social norms based around religious and spiritual beliefs in the relationship between traditional communities and conservation principles. Therefore, this paper uses Ghana as a case study to demonstrate how socio-cultural practices based around spiritual and religious beliefs can have the effect of protecting the landscape from destruction and resource depletion. The research identified socio-cultural practices with both direct and indirect conservation benefits. It also explored the religious and spiritual motives behind such practices, because a deeper understanding of how individuals relate to the environment can be used to formulate land use policies that are more in keeping with individuals' preferences. Through this case study analysis, the

study highlights the need to assist traditional communities with protecting their local environment from development pressures, in order to both maintain their traditional belief system and thus contribute to biodiversity conservation.

2. Methodology

Ghana, located in West Africa and on the Gulf of Guinea, consists of 10 regions, three of which were selected for this study. These were: (i) the *Greater Accra region* which is a low sandy shore along the coast and intersected by several rivers and streams; (ii) the *Ashanti region* in the southwest and south central Ghana, which is made up of a forested plateau region consisting of the Ashanti uplands and the Kwahu Plateau; and (iii) the *Eastern region*, the hilly Akuapim-Togo ranges found along the country's eastern border. These three regions were selected because of their wide range of vegetation types, ranging from the coastal savannah areas (comprising shrublands and grasslands) to natural forests and plantations. A sample of 16 traditional communities in three regions was selected for investigation. The dominant ethnicity within these communities included Ga, Adangme, Asante, Akwapem and Kwawu (Table 1). A purposive sampling technique was adopted for the selection of the communities. Purposive sampling, which is non-probability, focuses on selecting certain categories of respondents relevant to the aims of the study (Leedy and Ormrod, 2005). Therefore communities were chosen that were known to maintain traditional religious practices. The selection of the study areas and communities was also based on travel logistics - geographical and operational - and interviewee availability. The 16 communities in which the interviews were undertaken were Accra Metropolitan Area, Tema, Kweiman and Ada (all in Greater Accra region); Kumasi, Ejisu, Bekwai, Mampong, Obuasi, Akrokerrri, Konongo and Bosomtwe (all in Ashanti region); Aburi, Koforidua, Nkawkaw and Asiakwa (all in the Eastern region) (Table 1).

Data for this study were derived from qualitative research methods, principally interviewing and direct observation in the specific study areas. Purposive sampling was used to identify suitable respondents within the communities. Data were gathered through semi-structured interviewing of 12 officials from the Environmental Protection Agency (EPA) in Accra and Kumasi, three officials of Friends of Rivers and Water Bodies (a non-governmental organisation advocacy group with the aim of protecting water bodies), and unstructured interviewing of 82 inhabitants from the three regions. Unstructured interviewing was used in the communities as it was considered more appropriate to the cultural surroundings, acting as a less intimidating approach than a structured interview. The objective of the interviews was to identify socio-cultural practices, particularly those related to religious principles, which help protect the environment in those localities, and to identify the spiritual or religious motives behind such practices. Additionally, the interviews were used to help determine to what extent, if any, individuals gained aesthetic appreciation or other cultural benefits from the surrounding landscape. The interviews were characterized by open-ended questions to allow the respondents to express, in their own words, their thoughts and knowledge about their socio-cultural practices and the effect of these on the surrounding environment. One of the strengths of this research method is that it allows concentrated amounts of data to be produced on a precise topic of interest

and allows greater insights into certain opinions and beliefs held by respondents (Asbury, 1995; Morgan, 1997; McIntyre et al., 2008). This insight can be difficult to achieve with quantitative research methods.

Table 1. Communities interviewed in the Greater Accra, Ashanti and Eastern regions of Ghana

| Region | Community | Dominant ethnic group | No. of interviewees |
|---------------|-------------------------|-----------------------|---------------------|
| Greater Accra | Accra Metropolitan Area | Ga | 7* |
| | Tema | Ga | 6 |
| | Kweiman | Ga | 8 |
| | Ada | Adangme | 6 |
| Ashanti | Kumasi | Asante | 9* |
| | Ejisu | Asante | 7 |
| | Bekwai | Asante | 6 |
| | Mampong | Asante | 5 |
| | Obuasi | Asante | 4 |
| | Akrokkerri | Asante | 6 |
| | Konongo | Asante | 7 |
| | Bosomtwe | Asante | 3 |
| Eastern | Aburi | Akwapem | 7 |
| | Koforidua | Akwapem | 5 |
| | Nkawkaw/Abetifi | Kwawu | 5 |
| | Asiakwa | Akwapem | 6 |

* All of those interviewed in the Accra Metropolitan Area and eight of those interviewed in Kumasi were Environmental Protection Agency officials or Friends of Rivers and Water Bodies representatives.

The field survey was conducted between May and August 2012. To maximise consistency in survey administration, all interviews were conducted personally. While the official language of Ghana is English, and almost all the interviews were conducted in English, occasionally the indigenous local languages (*Twi* and *Ga*) were used when necessary. The interviews were recorded and transcribed, and analysed using principles of grounded theory, which involves identifying themes that emerge from the data, rather than starting with hypothesised categories (Strauss and Corbin, 1990; Bryman, 2008).

3. Results

The analysis revealed a number of socio-cultural practices which can be considered as social norms within the study communities. Table 2 summarises these practices and the motives behind them, which stem from religious and spiritual beliefs. Some of these practices the study identified to have direct potential conservation benefits (e.g. prohibition of resource use), while other practices have indirect benefits (for example by reinforcing the communities' connection with nature). Here, the study firstly describes the relationship between the respondents' religious and spiritual beliefs with the environment. Secondly, the research provides specific examples of ceremonial practices reported by the respondents. Thirdly, the study reports on the prohibitive practices - social taboos - in the communities and how this can act as a conservation measure. This includes the designation of sacred sites, taboos relating to harvesting and agriculture, and the creation of shrines. The study uses the typology devised by Colding and Folke (2001) to categorise these prohibitive practices (see Table 2). Fourthly, the analysis also revealed other cultural values, such as aesthetic appreciation, that the communities derive from the environment. Finally, the research describes challenges for maintaining these social norms and the risks that this poses for biodiversity conservation in Ghana.

3.1. The relationship between traditional religious beliefs and the environment

Respondents generally regarded the natural environment not just as a resource to be exploited, but as something with an autonomous and worthy existence in itself. Individuals from a young age are often taught that their existence depends largely on the environment, stemming from a belief that their god pours a universal life-force in all created things, both animate and inanimate. Specifically, the interviewees reported that indigenous Ghanaians believe in a host of spirits existing in the universe (and everywhere in the environment), and these spirits possess significant powers that may be used to the advantage of man or to his detriment. Respondents from the traditional communities believe that the spiritual world manifests itself in the surrounding landscape such as in rocks, trees and animals. For example, one respondent stated: "Those trees, water bodies, mountains and forests are homes for our gods and spirits of our cherished ancestors. We need to protect and worship them so that the spirits will not be angry with us". This means that wild animal and plant life are both revered and feared. Furthermore, the communities attribute what most people in Western societies regard as natural events such as rainfall, and bush and land fires, to the spiritual machinations of their gods and ancestors (Fontein, 2006). It is evident that not only is religion an essential aspect of the lives of the traditional communities in Ghana, but that nature is an integral part of this religion.

3.2. Ceremonial practices

Many village communities in Ghana have given a special status to natural sites, including mountains, rivers, lakes, caves, forest groves, coastal waters and ponds. The development of these sacred natural sites is based on the belief that these particular sites serve as abodes of several spiritual forces that are harnessed for their safety and continuity of life. For example, among the Asante, the largest ethnic group occupying the central

part of Ghana, it is believed that trees and plants are homes to certain spirits (e.g. sacred grove located at Pakoso). It is believed by community members that ceremonial practices need to be performed on special occasions in order to appease these spirits (Hageneder, 2005; Heaven, 2008). This includes various religious rituals and sacrifices, such as pouring of libation and sprinkling of food at shrines and at the foot of sacred groves and trees. Various other rituals are also performed which act to strengthen the relationship between the people and nature. For example, the *yeve* cult, a secret society among the *Ewe* of the Volta region of Ghana, builds their sacred "bush school" in the forest and the devotees appear in public fully adorned in apparels made of leaves signifying the people's spiritual connection with nature.

Respondents also revealed that the communities recognise a close association between nature, land management and food production. This motivates ceremonial practices aimed at encouraging the gods to maintain their food security. For example, one interviewee described how they "perform sacrifices before tilling the land", and an additional respondent commented how they "celebrate various festivals to pay homage to the gods that protect the environment in order to give us food". Such performance, sacrifices and festivals play an important role in reinforcing this connection between the people, nature and their gods. Therefore, while not providing direct conservation benefit, these norms and socio-cultural practices underlie those practices which do have direct benefits for biodiversity.

3.3. Prohibitive practices

Respondents reported that the spiritual connections associated with the sacred sites, and the belief that they represent the homes of the gods, compel people to revere and protect the natural environment, particularly at these sites. The indigenous Ghanaians believe that the natural environment is in the care of these spirits, therefore their permission is sought before the trees, plants, river bodies and animals are touched. One interviewee described how: "If I start farming in those 'virgin' forests, the gods will be angry and leave, and the environment will no longer be appealing to us". Consequently, these sacred natural sites are one of the most important practices by the indigenous people of Ghana to ensure the protection of the environment, by preventing land use conversion to agriculture, and through prohibition of harvesting of natural resources. This practice can be described as a *habitat taboo* (Colding and Folke, 2001) and can result in sanctuaries for wildlife, thus helping to conserve biodiversity as well as the other ecosystem services provided by the habitat. Indigenous communities also hold water bodies as sacred and as such strict taboos are often instituted to protect water resources from pollution. For instance, it is a taboo to defecate near water bodies.

Respondents also described a number of other taboos restricting harvesting and agriculture. This includes methods of harvesting, termed *method taboos*. For example, it is also a taboo to use poisonous chemicals to fish in some rivers as fish are often regarded as children of the river deity thus also protecting the rivers from pollution. As another example, Lake Bosomtwi is considered sacred by the Ashanti, with fishing only allowed through certain methods, namely using wooden boards. Certain animal species are also held to be sacred by certain clans and as such are protected from hunting as it is believed they provide spiritual inspiration. Similarly, community members are prohibited or restricted from harvesting some plant species, including *Okoubaka aubrevillei*, *Baphia nitida* (camwood), *Momordica charantia* (bitter melon), *Quercus spp.* (oak trees)

and *Ceiba pentandra* (kapok). Some taboos are temporal (Colding and Folke, 2001), for example one respondent stated: "Our community places a ban on fishing in the lagoons for several months so that the river gods can have enough time to rest", and another stated: "We don't go to the farm during certain days and seasons so that the gods can protect the land and give us more food." These taboos have religious underpinnings compelling individuals to strictly obey certain rules in order not to incur the wrath of the gods. They have direct benefits for biodiversity conservation through protecting or restricting harvesting of some species, maintaining water quality, and allowing natural resources time to replenish.

The communities also build various shrines to protect forest groves and water bodies. The shrines are created in their communities for specific spirits (especially spirits of the dead), which are domiciled in natural places and objects such as rivers, forests, rocks, mountains and the sea. These "residential areas" where the shrines are located are used to induce fear and reverence. They demand worship and obedience, and thereby a level of protection, from the inhabitants, in default of which they inflict punishment (Ntiamoa-Badu, 1995; Milton, 1996). Ceremonial behaviours such as worship at shrines therefore play an important role in maintaining the prohibitive practices that help to protect the environment.

3.4. Other cultural relationships with the environment

While members of traditional communities engage in these practices for religious purposes they also appeared to strongly value other cultural services that nature provides, such as the aesthetic benefits. Specifically, respondents indicated that they "love" the physical appearance of trees, flowers blossoming, calmness and coolness of rivers, serenity of the forests and groves as well as the creatures that inhabit them. The degree to which some parts of the surrounding landscape have been unaltered by development was frequently reported as an important facet of its value. As one respondent stated, "Those forests that we do not 'touch' are rich and beautiful". As stated by another respondent: "Ooh, having sight-seeing along the bank of water-bodies early in the morning and before darkness falls in the evening is beautiful". Respondents also reported that the natural environment, if experienced in its natural state, can help to alleviate stress. For instance, one respondent commented how: "I love going to the countryside to enjoy the sight of the natural environment to enable us shed some stress". These aesthetic, recreational and health benefits derived from the natural environment are not directly related to religion, however spirituality may be enhanced through such benefits, for example one respondent stated "We admire the thick foliage of the trees under which we rest. This gives us the opportunity to think deeply about life". Sacred natural sites are also thought to protect the spiritual connections between people and their environment (Ntiamoa-Badu, 1995). As one survey respondent stated, "those thick forests were places where our forefathers received their protection from the gods." The sacred sites are therefore an important part of the communities' cultural heritage and provide sense of place, or place attachment, to that site. Such cultural benefits – environmental setting, sense of place, cultural heritage, health, recreation and aesthetic benefits- may contribute to conservation through providing additional motive for the communities to protect the environment.

Table 2. Socio-cultural practices relating to religious and spiritual beliefs and potential conservation benefits derived from these practices

| Socio-cultural practice (and motive) | Categorisation of socio-cultural practice | Potential conservation benefit | Direct/ indirect benefit |
|---|--|---|---------------------------------|
| Designation of sacred sites- <i>to protect the home of the gods and spirits and to prevent angering and driving away the gods</i> | Habitat taboo | Permission is sought before sacred sites are entered or utilised- providing habitat and resource protection; also reinforces connection with nature | Direct Indirect |
| Rituals and sacrifices performed at entrance of sacred sites- <i>to appease the spirits living in the sites</i> | Ceremony | Re-enforcement of the significance of sacred sites | Indirect |
| Building of shrines- <i>to domicile spirits(especially of the dead) in natural places</i> | Habitat taboo | Shrines represent protected areas, thereby protecting the sites from human disturbance | Direct |
| Worship at shrines (e.g. pouring of libation and sprinkling of food) – <i>to appease the gods</i> | Ceremony | Shrines are feared and must be worshipped to avoid punishment - re-enforcing prohibitive practices | Indirect |
| Prohibition of attending farms on particular days/seasons- <i>to allow gods to protect the land and provide more food</i> | Temporal taboo | Allows land to recover; reinforcement of role of nature in food production/ security | Direct Indirect |

| | | | |
|--|-------------------------------|--|----------|
| Prohibition of fishing in lagoons over certain months- <i>to allow gods to rest</i> | Temporal taboo | Allows fish population replenishment | Direct |
| Prohibition of polluting of water bodies (e.g. defecation and use of chemicals to kill fish)- <i>to protect homes of the gods and fish, considered children of the river deity</i> | Method taboo Habitat taboo | Improves water quality and protects habitat | Direct |
| Prohibition of entering sacred water bodies e.g. fishing carried out via wooden boards- <i>to prevent disturbing the souls of the dead</i> | Habitat taboo Method taboo | Improves water quality and protects habitat; reduces harvesting rate | Direct |
| Prohibition of harvesting sacred species- <i>because they provide spiritual inspiration/ contain spirits</i> | Species taboo | Protects specific species from decline through harvesting | Direct |
| Sacrifices before tilling agricultural land- <i>to be provided with food</i> | Ceremony | Reinforcement of role of nature in food production/security | Indirect |
| Worship of surrounding landscape (living and non-living) – <i>to prevent angering the gods</i> | Ceremony | Reinforcement of connection with nature | Indirect |
| Celebrate festivals paying homage to gods that protect the environment- <i>to be provided with food</i> | Ceremony | Reinforcement of role of nature in food production/security | Indirect |

3.5. Future challenges

Despite the presence of strong socio-cultural practices aimed at protecting the natural environment, interviewees reported that in recent times a range of development pressures such as mining, road construction and stone quarrying have had a negative impact on many cultural sites and nature reserves in Ghana. Respondents explained that all human activities in sacred sites should be restricted, according to the beliefs of indigenous people of Ghana. However, due to an increase in developmental pressures, coupled with a decline in the reverence to traditional religious practices, respondents report that many previous uncultivated or sacred lands are coming under increasing threat. For example, mining has occurred around streams that have customarily been considered sacred by the traditional communities. In addition, respondents reported that increasing popularity of other religions, such as Christianity, has eroded the effect of social taboos that have previously protected sacred sites.

4. Discussion

In this study, this research identified both direct and indirect benefits to conservation of socio-cultural practices motivated by religious and spiritual beliefs. Direct benefits include prohibition of resource extraction and pollution through social taboos. Using categorisation from Colding and Folke (2001), this study identified *habitat taboos*, which restrict access and use of resources in a specific location, such as sacred groves. This research identified method taboos, which restrict the method of resource extraction, such as using wooden boards to fish from sacred lakes or prohibiting artificial chemicals for the purpose of fishing, and temporal taboos, which prohibit resource use at specific times, for example certain months when fishing is forbidden. Similar to Jones et al. (2007), the study also identified the practice of specific species being banned from being harvested, which the study describes as species taboos. In addition to identifying these taboos, this research also describes what it terms *ceremonial practices*, which include festivals, worship and sacrifices.

The conservation effects of social taboos and sacred groves have been explored in the conservation literature from an ecological perspective to some degree (e.g. Decher, 1997; Mgumia and Oba, 2003; Bhagwat et al., 2005; Salick et al., 2007). The research did not measure conservation or ecological outcomes explicitly, as this was beyond the scope of the study. However, the study is able to infer possible conservation benefits based on the practices described by respondents and the benefits identified in previous studies. Instead of quantifying the ecological outcomes of socio-cultural practices, the study investigated the relationship between people and nature in order to better understand the processes culminating in practices that benefit conservation. These processes the research conceptualises in Figure 1. In this conceptualisation, the study considers that religious and spiritual beliefs result in specific behaviours - socio-cultural practices. These include the ceremonial and prohibitive practices. The importance of ceremonial practice has been less recognised than that of prohibitive practices that lead to more direct conservation benefits. However, ceremonial practices are likely to play an important role in reinforcing the relationship between the people and nature, as emerged in the analysis. Additionally, some ceremonial practices may also constitute an

important part of traditional ecological knowledge transfer through generations, which Berkes et al. (2000) define as “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.” Such knowledge may be transferred through practice, art, dance and song as well as through spoken word.

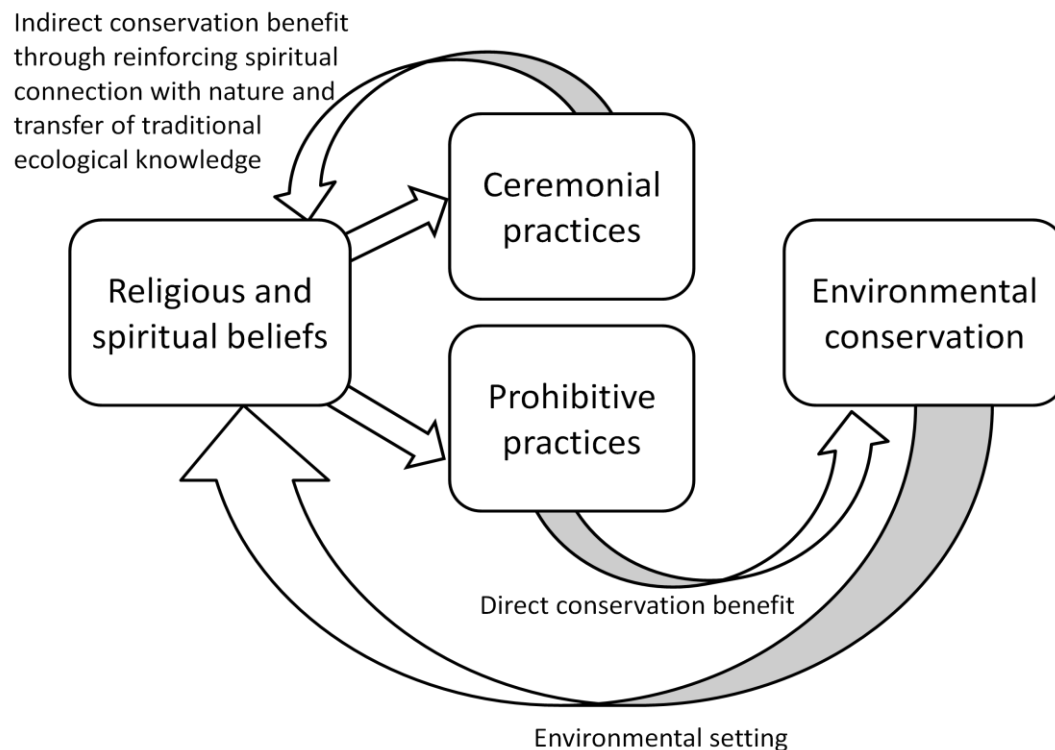


Figure 1. Conceptualisation of the relationship between religious and spiritual beliefs with socio-cultural practices and environmental conservation

In Figure 1, this study also illustrates that prohibitive practices can have direct conservation benefits, through limiting resources extraction and pollution. Bhagwat and Rutte (2006) suggest, with reference to sacred groves, that although the motive behind the practice may not originally have been utilitarian, one of the reasons that such practices were maintained through generations may have been, at least in part, resource sustainability. This supports the notion that spiritual and religious related practices may act, in some circumstances, as a means of traditional ecological knowledge transfer. Previous anthropological research and writing on environmental issues in the field of religion and ecology (e.g. Sarpong, 1974; Ntiamoa-Badu, 1995; Milton, 1996) also support the view that socio-cultural practices can be effective in protecting the environment from degradation. These informal institutions can be more cost-effective than more formal institutions that depend on third-party agencies for their development and enforcement.

However, this study suggests that environmental conservation is not only an outcome of socio-cultural practices, but also an important process in the relationship that the communities have with their environment. In Figure 1, the study refers to this as 'environmental setting'. Environmental settings may be described as providing "the sites for human interactions with nature and others" (UK National Ecosystem Assessment 2011). The significance of environmental settings to human well-being is emerging in the environmental policy scene. For example, within the UK National Ecosystem Assessment (2011), environmental settings are described as a key component of cultural ecosystem services, but it is not yet well understood. Elements of the environment, such as particular locations, plants and animals which are believed to be homes or manifestations of god and spirits, are an integral part of life in traditional communities in Ghana, and constitute an important part of their environmental setting. Figure 1 illustrates environmental conservation, which results from socio-cultural practices, feeding back into the religious and spiritual beliefs of the community. We argue that because of the integral relationship with nature, without such environmental setting the religious and spiritual beliefs of the traditional communities are at risk of deterioration. While from an anthropological perspective this can be considered a loss in itself, from a conservation perspective, this risks losing the very practices that help to maintain the protected sacred sites (Anoliefo et al., 2003).

Traditional religious and spiritual beliefs may be more resilient to environmental and socio-economic change than proposed here. Nevertheless, taking a precautionary approach, if encroachment onto sacred sites were to impact the feedback of environmental setting into the beliefs of communities, disenchantment with nature, and the spirits believed to reside in nature, may result. This has implications beyond any immediate threat to the individual sacred site. Our study revealed that threats to traditional sacred sites in Ghana exist, including from pressures such as mining, road construction and stone quarrying, as well as the increasing presence of other religions. Such socio-economic and cultural changes were also reported as threats to sacred groves by Bhagwat and Rutte (2006). Many distinctive characteristics of particular landscapes are in danger of being lost, even though they are highly valued by communities. This study argues that protecting such sites may not only directly help to conserve those sites, but may also contribute to the protection of the broader environment within which traditional communities reside, through helping to maintain traditional religious beliefs.

The study's analysis identifies a number of other cultural services and goods that the traditional Ghanaian communities derive from nature, including stress relief and recreation – for example viewing the sacred water bodies- and related to this, aesthetic appreciation of the lush, natural environment. However, the most significant cultural benefits appeared to be the religious and spiritual beliefs associated with nature. Cultural ecosystem services, which are one of four overarching ecosystem services described by the Millennium Ecosystem Assessment (2005), can be important drivers for ecological protection (Daniel et al., 2012), and have contributed to the formation of many protected areas such as national parks (TEEB, 2010). However, cultural ecosystem services are often considered intangible, subjective and difficult to measure (Daniel et al., 2012), and are therefore often undervalued or overlooked in environmental planning. In this case study, even without considering the other ecosystem services derived from sacred sites (for example provisioning services such as food, fibre and water), the cultural and heritage values derived from these sites and

surrounding environment may alone be considered justifiable reasons for protection in cases where they are under threat (even if their value is social rather than economic in nature).

From a conservation perspective, religion and spirituality has the potential to shape peoples' attitudes towards nature, particularly in traditional communities, and therefore should be given greater consideration as a factor in environmental policy. As described by Jefferson et al. (1974) "for most Africans, land is more than a source of wealth; it is sacred. It gives people life and so people believe they have been entrusted with land and must in return treasure it." However, not all religious and spiritual associations with nature are positive and contribute to protection (Dickman, 2010), for example the aye-aye (*Daubentonia madagascariensis*) is persecuted in Madagascar due to cultural association with disaster and bad luck (Simons and Myers, 2001). Nevertheless, in certain localities social norms may provide the only effective regulations resulting in, albeit indirectly, conservation. Bhagwat and Rutte (2006) suggest that by incorporating sacred sites into conservation networks there is potential to cover a wider variety of habitat, and furthermore, because the communities would be implicitly supportive of continuing the protection of the sites, the effectiveness of biodiversity conservation would be increased.

As Kellert et al. (1996) note, a deeper understanding of cultural attitudes and beliefs, as the study aims to attain, is important in shaping the design of conservation strategies. Conservation strategies are more likely to be successful if they are in keeping with the values and attitudes of the local population. For example, concern surrounding the adverse environmental effects of rapid population growth in Ghana and other African countries has led to the formal designation of protected areas (e.g. the Kakum National park, Aburi botanical gardens, KNUST botanical gardens and Paga crocodile pond), that were designated based on Western knowledge and values (Ntiama-Badu, 1995). In many instances, unlike sacred groves that have survived because of strong traditional beliefs and the spiritual, religious and cultural attachments to the groves, introduced nature reserves based on Western knowledge and values are often indiscriminately encroached upon (Ntiama-Badu, 1995). In the former, the major virtue of this strong culture-based practice is that it encourages community participation in natural resource conservation and promotes linkages between humans and nature. Natural sacred sites have been reported in all continents except Antarctica and are heralded for their conservation potential (Bhagwat and Rutte, 2006). Designating sacred sites as protected areas may provide an additional level of protection necessary for maintaining these traditions and conserving biodiversity (Mgumia and Oba, 2003). This should be combined with empowering communities to manage the sacred sites effectively (Shen et al., 2012). Any state regulation would need to respect the beliefs and practices of traditional communities in order to be effective and maintain longevity, thus acting as an additional supporting regulation, rather than a replacement of traditional informal institutions.

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