



THE PROMINENCE OF TRADITIONAL AND RELIGIOUS BELIEFS AND PRACTICES IN BIODIVERSITY CONSERVATION

Manyam, H.I.¹ and Japheth, H.D.^{2*}

¹. Department of Forest Production and Products, Federal University of Agriculture Makurdi, Nigeria.

². Department of Forestry and Wildlife Technology, Federal University of Technology Owerri, Nigeria.

*Correspondent author: daujaphson@gmail.com; +2348068347777

Abstract

Regarding the conservation of biodiversity in underdeveloped-nations, it is impossible to overstate the importance of cultural and religious beliefs and practices. For decades in Africa, traditional and religious forests have played significant roles in sustaining biodiversity and variety of ecosystem functions. However, a number of reasons, such as urbanization, population growth, and shifts in land use patterns, are presently endangering these forested areas; as a result, there is rise in demand for agricultural land that is much more fruitful for forests production. Majority of the population is now adopting widespread Christianity or Islam as a religion, which could encourage the deterioration of some indigenous traditional and religious beliefs, practices, and values and, consequently, have an impact on ancient times of religious beliefs and biodiversity preservation. Traditional and religious practices have greatly contributed to the conservation of biodiversity in a number of ways, including: preserving some plant and animal species that are listed by the IUCN as vulnerable or near threatened; conserving soil and water in forest estates, thereby preventing soil erosion. Additionally, these sacred forests provide a source of water, medicinal-herbs, and income for daily living. In addition to providing significant ecological, environmental, and social services to their host communities, these sacred forests preserve the local biodiversity. They also improve local hydrological dynamics, mitigating climate change, among other functions. Therefore, in order to raise the level of conservation in these forest areas for climate change mitigation, this study suggests that traditional and religious actors be valued and supported.

Keywords: Beliefs, Biodiversity, Fauna, Forest, Preservation, Sacred.

Introduction

Despite commitments from world leaders to substantially slow this rate of biodiversity loss, the rate of habitat loss at the global level has not declined in recent decades (Butchart *et al.*, 2010). Due to a rising emphasis on economic development and growth, the country today faces serious environmental issues such as land degradation, coastal erosion, water pollution, deforestation, and desertification (Jiboye *et al.*, 2019). Therefore, it is essential to understand and sustain any societal customs or other procedures that might help to preserve or conserve the environment in African countries.

If not all, then the majority of religions and belief systems have a deep connection (direct or otherwise) with nature. These spiritual ties are attested to by the books of the main religions, including the Bible (Christianity), the Qur'an (Islam), and traditions, as well as their practices and rites. The most striking example of the spiritual link may be seen in the landscapes of religious communities all over the world, where there are sacred trees, groves, and woods. In Nigeria, there are many communities and people who are connected to the forest or wildlife on a spiritual, religious, or cultural level. Traditional wisdom and religious doctrine are essential for the conservation of natural resources (forests, water, and agro-ecosystems). Indigenous knowledge plays a significant role in sustainable natural resource management, traditional culture, and livelihoods. It is typically intertwined with local religious beliefs, rituals, folklore, and land use practices (Parrotta *et al.*, 2007; Liu, 2007; Yuan *et al.*, 2012).

Prominence of Traditional and Religious Beliefs and Practices on the Conservation of Biodiversity

Most people consider traditional and religious woodlands to be sacred. Native forest habitats or vegetation that has special spiritual importance to humanity are traditionally safeguarded by traditional councils, priests, and/or local communities using a variety of cultural beliefs and customs. These regions serve as typical illustrations of in-situ biodiversity conservation systems (Onyekwelu and Olusola, 2014; Ray *et al.*, 2014; Daniel *et al.*, 2015; Ray *et al.*, 2015; Daye and Healey, 2015).

Traditional and religious forests have made a significant contribution to the preservation of wildlife and forest resources; this adage is generally acknowledged. As a result, cultural and religious beliefs and practices frequently make a big difference in the preservation of forests, potentially acting as a crucial instrument for environmental protection. For instance, tree-ordination ceremonies in Thailand have been used as a sociopolitical tool to influence the government to slow down environmental devastation (Tannenbaum, 2000). By forbidding a specific conduct, other standards, which could be classified as social taboos, may safeguard the environment. All sacred forest ecosystems (holy groves) share a connection to gods and goddesses (Chandrakanth *et al.*, 2004), which frequently leads to local communities protecting these areas on moral or religious grounds (Onyekwelu and Olusola, 2014). Results from multiple linear regressions, according to Adeyanju (2020), revealed that the respondents who were working and had a monthly income were more likely to concur that religious and cultural advantages are what drive biodiversity protection in sacred groves. Adeyanju report contrasted with a mindset that said more prosperous and financially secure people tend to become less eager to participate actively in religious institutions and more wary of superstitious beliefs (Norris and Inglehart, 2011).

Belief and Practices towards Forest and Products Conservation

Some plant species are held in high esteem, they might not always be destroyed, eaten, or touched. The Akan people of Ghana are one group who practise this, and one instance of this is the "tradition of the totem plant," in which several clans have wild plant species as their totems, from the raffia palm *Raffia hookeri* to the leopard *Panthera leo* (Ntiama-Baidu, 2002). Traditionally, such species are mostly protected by members of the clan. Use of leaves from the *Newbouldia laevis* tree, also known locally as the "Akoko," is a typical Yoruba rite in south-west Nigeria for the crowning of traditional leaders and the awarding of chieftaincy titles (Babalola, 2011). Such trees, among others, are highly safeguarded and kept from going extinct as a result of this significant use, supporting the essential contribution holy groves provide to biodiversity preservation (Babalola, 2011). Local authorities in the Benin Republic prevented the disrespect of sacred trees by strictly enforcing cultural taboos and restrictions among the native and immigrant populations in the riparian settlements (Ceperley *et al.*, 2010).

It is also common in many rural African communities to find small patches of forest set aside as sacred and accorded strict protection under customary laws (Figure 1). Others instances of these religious forest areas include: Obibagwa, Ohuma, Oyinyi-Oyeche, and Ebonda Ipenu-Igede forest in Benue state (Nigeria); Akai Mbiam, Akai Anwalbok, Akai Uya all in Akwa Ibom state (Nigeria) (Daniel *et al.*, 2016); Umuojima-Efere Umuogwo, Mgbedeala in Abia State (Nigeria) (Chima and Nuga, 2011); Idanre Hills at Oke-Idanre, Ondo State (Nigeria) (Adeyanju *et al.*, 2022); Igbo-Ile sacred grove at Ibere Ogo Oluwa Oyo State (Oyelowo *et al.*, 2014), and Igbo-Oba at Oba Ile Olorunda in Osun State (Oyelowo *et al.*, 2014).

Number of studies have shown that even in heavily humanised landscapes, traditional and religious forest areas are significant refuges for biodiversity and fauna, including edible plants, medicinal plants, and vegetables that contribute to household income (Udoakpan *et al.*, 2013; Ray *et al.*, 2014; Balachandran *et al.*, 2015; Daye and Healey, 2015). There are many different reasons for this status, including forests that serve as royal burial grounds, forests along the banks of significant rivers that provide water to a village community, forests with historical significance in a particular people group's culture, or patches of forest that are home to totem species (Soutter, 2003).



Figure 1: Sacred Tree (*Ficus polita*) around a Posurban Shrine in South Ghana

Source: (Britt and Tinde, 2011).

Table 1: Most Sacred Tree Species in Ghana

S/N	Family	Species name
1	Bignoniaceae	<i>Newbouldia laevis</i>
2	Santalaceae	<i>Okoubaka aubrevillei</i>
3	Fabaceae	<i>Dalbergia sp.</i>
4	Fabaceae	<i>Daniellia ogea</i>
5	Leguminoseae	<i>Distemonanthus benthamianus</i>
6	Lamiaceae	<i>Ocimum americanum</i>
7	Euphorbiaceae	<i>Croton gratissimus</i>
8	Cucurbitaceae	<i>Momordica charantia</i>
9	Asteraceae	<i>Ageratum conyzoides</i>
10	Malvaceae	<i>Ceiba pentandra</i>
11	Fabaceae	<i>Dalbergia sp.</i>
12	Santalaceae	<i>Okoubaka aubrevillei</i>
13	Fabaceae	<i>Daniellia ogea</i>
14	Leguminoseae	<i>Distemonanthus benthamianus</i>
15	Malvaceae	<i>Ceiba pentandra</i>
16	Fabaceae	<i>Dalbergia saxatilis</i>
17	Moraceae	<i>Milicia excelsa</i>
18	Combretaceae	<i>Combretum comosum</i>
19	Passifloraceae	<i>Adenia dinklagei</i>
20	Fabaceae	<i>Baphia nitida</i>

Source: (Britt and Tinde, 2011).

At Akai Ekpe, (Forest of the Masquerade), is a traditional and religious forest area at Amamong-Okobo in Akwa Ibom state, which is the exclusive meeting place for members of the Ekpe cult; all uninitiated, including visitors, are not allowed access (Daniel *et al.*, 2016). Other strict traditional and religious forests in the area include - Iso Idim Ekpo and Owuk Ntuk-enyen, among others (Table 2).

Table 2: Sacred Forests that Studies are not allowed by the Communities due its sanctity/sacredness

Traditional/religious forests	Category of uses	Explanation
Iso Idim Ekpo	Water source	The grove provides water for the community all year round.
Owuk	Children burial	Used primarily for burying Children who die below the age of 7years, often believed to belong to 'transitory' group.
Ntuk-enyen	Ground	An abode for 'Ekpo' diety where the Ekpe cult members meet and where
Akai Ekpe	Meeting/worship/ Sacrifice	'Ekpe host' are consulted to avenge rivals or assist in war.

Source: Daniel *et al.* (2016).

Belief and Practices towards Fauna Species Conservation

In most rural places, where choices about the exploitation of regional natural resources are greatly influenced by traditional authorities, traditional knowledge is still highly prevalent. In some instances, it is common practice to regulate the exploitation of species that have a connection to the community on a material or spiritual level (Etiendem *et al.*, 2011). Forests that are traditionally used for religious purposes serve as an example of African heritage that protects both the physical and non - physical values of the populace. Relationships between nature and communities are primarily shaped by cultural values and social conceptions of nature and the environment. While culture may favor biodiversity protection in the short term, if the authorities ignore the significance of simultaneously encouraging active local community engagement in protected areas, such an approach may fail to sustain biodiversity in the long run (Adeyemi and Ayinloye, 2020).

The protection of faunal species has benefited enormously from traditional and religious practices in a variety of ways. The significance of the sacred grove (Osun-osogbo, Nigeria) to sustainable biodiversity management in Nigeria was revealed by Adeyemi and Ayinloye in 2020. According to their findings, there are serious penalties for violators of the laws against poaching, tree cutting, farming, fishing, chemical water pollution, and the construction of unauthorised constructions (Table 3). "Regardless of gender or color, anyone who breaks the ancient rules faces death, the goddess' wrath or inundation, imbecility or insanity, and unproductiveness; however, consequences based on conventional laws are less severe and do not prevent future offenders from committing the crime" (Adeyemi and Ayinloye, 2020).

A finding about the conservation of Cross River Gorillas (totem gorilla) was published in 2011 by Etiendem *et al.* According to their survey, the majority of their respondents (56 percent) were aware that gorilla hunting and eating were banned in their tribe

(Bechati, Fossimondi, Besali, Cameroon). Traditional councils are the major means by which the taboos are enforced. Defaulters are either penalized by arbitrary spiritual sanctions, such as sickness and/or death, or by other sanctions imposed by the head or elite members of the traditional council. People who shoot gorillas or chimpanzees in Cameroon may be punished by being barred from participating in community activities, banished from the area, made to perform certain rites, or compelled to pay a fine. For instance, the IUCN has classed Cross River gorillas as severely endangered since 2007, and their remaining habitats are dispersed widely (Etiendem *et al.*, 2011).

Conservationists have emphasized that the participation of nearby local communities will ultimately determine whether populations outside of protected areas (like the Bechati-Fossimondi-Besali population) survive (Oates *et al.* 2007). Traditional knowledge of wildlife is essential in such places where the conservation of endangered animals urgently requires the support of local communities, and until these belief systems completely disappear, incorporating them into conservation strategies is vital to the ongoing survival of the species they protect.

According to Daniel *et al.* (2016), there are groves for certain purposes, some of which have few trees, such as the "Iso Idim Ekpo" (Akwa ibom-Nigeria), which translates to "the head from whence Ekpo's stream runs." As long as the ancient cultural ceremonies are carried out and the related divine commandments are obeyed by the people, it is apparent that these sacred activities have promoted biodiversity and wildlife conservation and will do so in the future.

Depending on the community, a given fauna species may have a different religious meaning. For instance, the Luhya of Kenya's Busia District practise religion in which particular animals are frequently used in purification rites or to bind people to oaths (Gumo, 1993). Some people, like the Luo, believe snakes to be sacred, especially pythons, which are protected species. The "Omweri," which was situated in Nyakach, Nyanza, Kenya, is a recent illustration. Many cultures link snakes to the afterlife or other human spirits; as a result, when these snakes visit people's homes, they are fed and watered.

Table 3: Taboos associated with Sacred Grove in Nigeria

Offences	Punishment	
Hunting/Killing of animals	Death	Payment of fine or one-month jail term
Felling of trees	Wrath of the Osun goddess/ Flood	Payment of fine or one-month jail term
Farming	Unproductiveness	Payment of fine or Jailed for one month
Fishing	Insanity	Payment of fine or one-month jail term
Water pollution	Wrath of the Osun goddess	Payment of fine or one-month jail term
Building of unauthorized structures	Wrath of the Osun goddess	Payment of fine or one-month jail term

Adeyemi and Ayinloye (2020)

Due to the high rate of tree felling and poaching of fauna species around some traditional and religious belief areas, there is a high decline in biodiversity in both the outer and buffer zones of such areas. As obtained from our findings in Osun Osogbo sacred grove, the core zone of the grove contributed greatly to the conservation of some fauna species in the area (Table 4), which indicated a higher density of fauna than the outer and buffer zones. The area also plays a role in conserving some plant and fauna species that are tagged as vulnerable or near threatened by IUCN lists (Table 5). The values obtained indicate high values, which confirm that the study area (Core zone) is of rich tree and fauna species diversity. Due to high anthropogenic activity and encroachment, the buffer zone and outer zone of the grove had a low diversity index, species richness, and evenness for trees and fauna species.

Table 4: Fauna Population Estimate and Density in the Study Area

Locations	Population Estimate	Density(Pop/ha)
Core	0.39	0.06
Buffer	0.26	0.005
Outer	0.21	0.003

Source: Kuje and Ugbe (2022).

Table 5: Some Vulnerable Plant and Fauna Species Conserved by Religious Practices in Osun Osogbo Sacred Grove, Nigeria

Scientific name	Families	IUNC status	Type
<i>Soricidae spp</i>	Mammalia	Vulnerable	Fauna
<i>Phataginus tricuspis</i>	Mammalia	Vulnerable	Fauna
<i>Cercopithecus erythrogaster</i>	Mammalia	Vulnerable	Fauna
<i>Lannea welwitschii</i>	Anacardiaceae	Near threatened	Plant
<i>Milicia excels</i>	Moraceae	Near threatened	Plant

Scientific name	Families	IUNC status	Type
<i>Afzelia Africana</i>	Fabaceae	Vulnerable	Plant
<i>Nesogordonia papaverifera</i>	Malvaceae	Vulnerable	Plant
<i>Terminalia ivorensis</i>	Combretaceae	Vulnerable	Plant

Source: Kuje and Ugbe (2022)

According to Kandari et al. (2014), certain parts of India's fauna have traditional beliefs related to them. *Panthera tigris* is reportedly employed in both ceremonies and medicine, according to their study (Table 6). In Hindu mythology, the gods and the demons (Asura) churned the ocean during Sagar Manthan (Milk Sea Churning) in search of the nectar known as "Amrit," which gave them immortality. The "navratnas" (nine jewels) emerged from the churning. White elephants (*Elephas maximus indicus*), trees (*Karpavruksha*), and Kamadhenu are a few of these beauties (holy cow). *Bos taurus* has a unique position in Hindu mythology. Since ancient times, Hinduism has placed a strong emphasis on respecting animals. Lord Shiva's "vehicle" or "vahana" is the Bull. Peacocks (*Pavo cristatus*) are connected to the goddess Saraswati in Hindu mythology (goddess of education and knowledge). Thus, the feathers stand for traits like generosity, tolerance, and luck. In mythology, some snakes are regarded as "protectors," while others are seen as "harmful/destructive." A snake served as jewellery on Lord Shiva. Lord Vishnu rests atop Adishesu, a snake with a thousand heads, in the milky sea (King Cobra).

According to the epic Ramayana, Ravana and the vulture King Jatayu (*Gyps indicus*) engaged in a bloody struggle while attempting to kidnap Sita and bring her to his country of Lanka. The bird's attempt to save Sita from Ravana resulted in fatal injuries (Kandari et al., 2014). In India, squirrels are revered and should not be harmed since they are connected to Lord Rama. Lord Rama and the Vanara Sena built the Adi Sethu (bridge) at Rameshwaram, and a small squirrel (*Ratufa indica*) also made a small contribution. The Indian squirrel has had white stripes on its back ever since Lord Ramas touched its back in appreciation for the critters' devotion, and this is thought to be the mark of Lord Ramas' fingers. Varaha, a pig (*Sus scrofa Linnaeus*), was Lord Vishnu's third avatar. Varaha is frequently shown as having a human body and a wild boar head. The Hindu goddess Durga known as Varahi appears as a wild boar (Kandari et al., 2014).

Table 6 List of some common Fauna and their associated beliefs

Scientific name	Local name	Beliefs/uses
<i>Panthera tigris</i>	Tiger	Used in rituals and medicine.
<i>Elephas maximus Indicus</i>	Elephant	Sacred/sacrifice/ritual
<i>Bos Taurus</i>	Bull	Means of transportation during sacrifice
<i>Antelope cervicapra</i>	Black buck	It is also known as Krishna Mruga in Kannada.
<i>Macaca mulatta</i>	Monkey	Monkey is known to be associated in the army of Hindu god Hanuman hence considered sacred.
<i>Felis catus</i>	Cat	Cats are associated with fertility and the goddess of birth, Shakti.
<i>Pavo cristatus</i>	Peacock	Sacred
<i>Naja naja</i>	Snake	The snake is commonly called ('Nag' in Hindi language) is worshipped by people across the country.
<i>Gyps indicus</i>	Indian vulture	Sacred
<i>Ratufa indica</i>	Squirrel	Sacred
<i>Sus scrofa Linnaeus</i>	Wild Boar	Sacred

Source: Kandari et al. (2014).

Most cases of poaching of fauna species have significantly decreased in communities with stringent traditional and religious views and practises, largely as a result of these traditional values and practises. It has been suggested elsewhere that the existence of taboos against the species' exploitation is a successful local conservation approach (Banjo et al. 2006, Saj et al. 2006). The loss of respect for the ideas and customs that gave rise to the taboo, however, is imminent if they are not renewed. It is not impossible for a fading traditional or religious belief and/or practise system to be revived. For instance, in most developing countries, it is possible to reinstate traditional or religious practises or beliefs that support the protection and conservation of forests and forest resources if modern approaches are combined with traditional or religious councils as a tool for sustainable management.

Belief and Practices towards Ecological Conservation

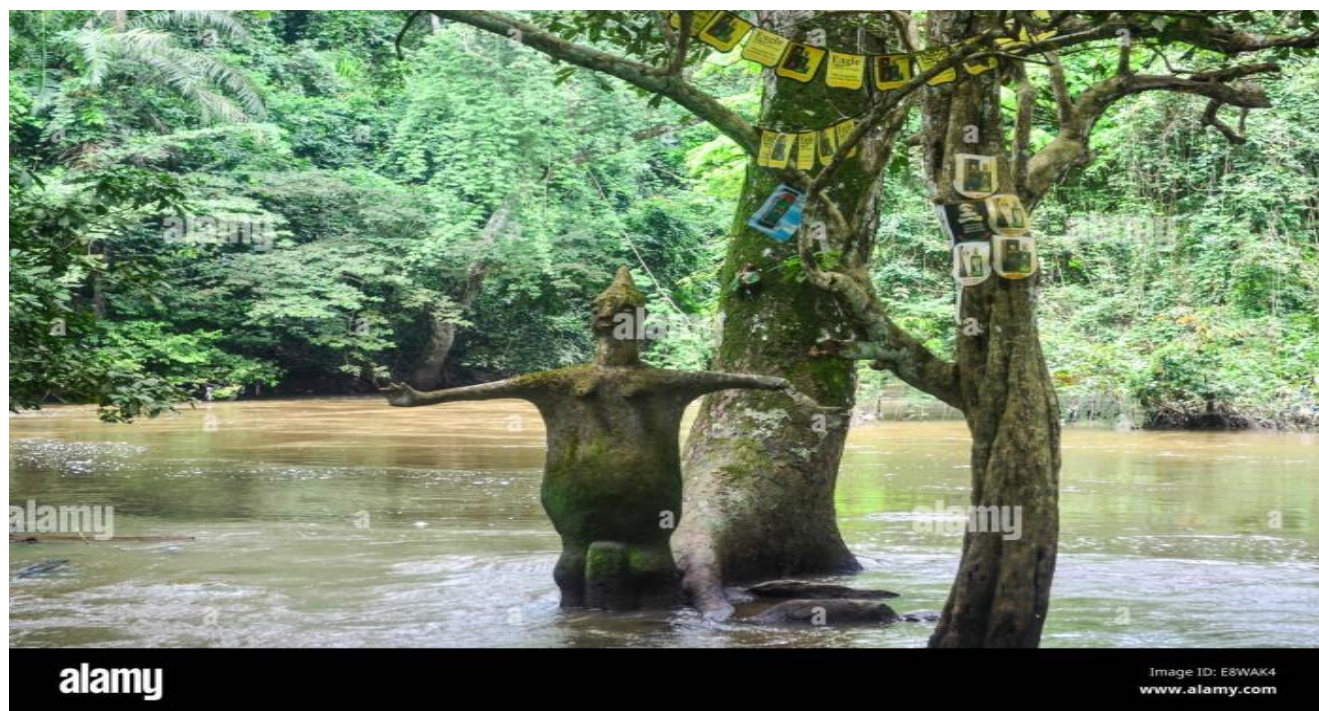
Religious beliefs and practices contribute greatly to ecological conservation, through sacred groves management. Sacred groves offer a range of ecological benefits, including erosion prevention, windbreaks, soil conservation, hydrological cycle management, watershed protection, water filtration, and upkeep (Ormsby, 2012a; Udeagha et al., 2013; Oyelowo et al., 2014). Sacred groves

among other totem improve soil stability of a region and act as soil binders. In sacred areas, tree plants such as vetiver grass (Vetiveria zizanioides) and Eucalyptus spp. are maintained to bind the soil, thereby preventing soil erosion (Kandari et al., 2014). The North Pare natives of Tanzania acknowledged the ecological services that the sacred groves of Mpungi and Mshitu provided for the conservation of soil and water (Sheridan, 2009). Most communities and areas that settled on the banks of rivers around sacred or traditional areas are not only considered sacred but are also a source of water use for house chores. Small natural water bodies are maintained, near sacred and/or traditional areas to take care of drinking water problems during drought. Villagers are now improving the surrounding areas of water bodies with concrete structures to conserve natural flowing water bodies and maintain them in a hygienic condition.

Traditional and religious forests vary widely in their size and functions; some of them are small fragments of forest (less than 1 hectare), while others are more extensive, spanning well above 100 hectares (Udoakpan *et al.*, 2013; Bhagwat *et al.*, 2014; Daniel *et al.*, 2015). Despite the size limitations and functions, these forests conserve local biodiversity and offer important ecological, environmental and social services to their host communities and also enhance local hydrological dynamics (Chandran *et al.*, 2010; Hu *et al.*, 2011; Udeagha *et al.*, 2013; Daye and Healey, 2015; Balachandran *et al.*, 2015; Ray *et al.*, 2015).

There are many different traditional and religious rivers and bodies of water located in different locations. For instance (Figure 2): The Osun Sacred Grove On the outskirts of the city of Osogbo, is one of the last remnants of primary high forest in southern Nigeria. Regarded as the abode of the goddess of fertility, Osun, one of the pantheon of Yoruba gods, the landscape of the grove and its meandering river (Borokini 2016) is dotted with sanctuaries and shrines, sculptures and art works in honour of Osun and other deities. Erin Ayonigba River in Erinjyan Ekiti, Ekiti West Local Government Area of Ekiti State, is a river with strange kind of fish. The river is said to heal various ailments. Other international sacred streams or rivers include (Arthur Griffin/Encyclopædia Britannica, Inc., 2020):

The Urubamba River flows through the Andes of southern Peru. The Jordan River, which connects the Dead Sea with the Mediterranean, passes through Israel, Jordan, Lebanon, and Syria. It's sacred in both Judaism and Christianity for different reasons. Whanganui River New Zealand's Whanganui River has long been sacred to the local Māori, who view it as a living, breathing ancestor, and last year it became the first river in the world to be granted the same legal rights as a human being (Arthur Griffin/Encyclopædia Britannica, Inc. 2020).



a. Osun Sacred Grove Nigeria



b. Otamiri River (Sacred) in Imo, Nigeria

Source: (Encyclopedia, 2022-https://en.wikipedia.org/wiki/Otamiri_River; accessed 6/8/2022)



(c). Erin Ayonigba River in Ekiti Nigeria.

Source: Priscilla Ediare (2020).

Economic Benefits of Biodiversity Conservation by Traditional and Religious Beliefs and Practices

A sacred grove's level of care and protection is typically determined by the value given to it (Aniah and Yelfaanibe, 2016). The celebration of traditional festivals and the worship of gods, whether privately or publicly, are common practises in numerous sacred groves in south-west Nigeria. For instance, one of the major events observed on the hills in Idanre is the Orosun festival (Adebayo, 2016). The grove is home to the annual Osun Osogbo festival, which draws thousands of guests, tourists, and pilgrims each year

(Probst, 2013). In Southern Nigeria, sacred trees are used as gathering spots by distinctive groups of people to make significant decisions (Daniel *et al.*, 2016).

Regular visits to the groves by domestic and foreign tourists directly support host communities, although the scale varies from grove to grove (Ormsby, 2012b; Udeagha *et al.*, 2013; Oyelowo *et al.*, 2014; Adigun *et al.*, 2016). Hotels, restaurants, tour guides, transportation services, and other service providers are examples of local businesses found in sacred sites. They make a good living, as do outside businesses that are only open for the festivals. With the support of the governmental and non - governmental organizations, this worldwide festival has grown to be a multi-million dollar event (Onyekwelu and Olusola, 2014). A crucial justification for preserving the groves is the fact that they have boosted the reputation and popularity of the various villages that surround the sacred trees where they are located.

Communities in Ghanaian, Nigerian, among other countries are motivated to safeguard and sustain sacred groves by economic incentives brought on by jobs, tourism, and revenue generating (Ormsby, 2012b; Onyekwelu and Olusola, 2014). Ecotourism development was suggested as a substitute strategy to encourage local residents in Zanzibar, Tanzania, to preserve the last few sections of sacred forests (Madeweya *et al.*, 2004). Ecotourism revenue lessens the impact of local economic challenges, which in turn deters the destruction of sacred forests (Nyamweru and Kimaru, 2008). Successful ecotourism implementation in Kenya's sacred Kaya woodland was founded on a strong institutional structure, backing from outside organisations, and full local community participation (Nyamweru and Kimaru, 2008). Even though tourism benefits the economy, if it is not properly controlled, mass tourist could endanger sacred trees. Increased pressure from visitor numbers could have detrimental effects on the environment, problems with solid waste management, and loss of cultural integrity (Adeyanju, 2020).

Conclusion

Most local people are now embracing widespread Christianity or Islam as an alternative religious belief with little or no interest in forest conservation through religious practices, while gradually abandoning traditional and cultural beliefs and practices. Traditional and religious practises have greatly contributed to the conservation of plant and fauna species in a number of ways, including: preserving some plant and fauna species that are listed by the IUCN as vulnerable or near threatened; conserving soil and water in forest estates, thereby preventing soil erosion; conservation of water catchment areas which serve as sources of drinking water and other sources of medicinal herbs; and revenue for daily living. In addition to providing significant ecological, environmental, and social services to their host communities, these traditional and religious forests preserve the local biodiversity. Traditional beliefs and practises help to improve local hydrological dynamics, mitigating climate change among other functions. Therefore, in order to raise the level of conservation in these forest areas for climate change mitigation, this study recommends that Christianity and/or Islam can conserve forest estates by carrying out some key holy practises in the forest estate as practised by traditional priests. Also, traditional and religious actors should be valued and supported in order to increase the level of traditional and religious biodiversity conservation. Most lost taboo systems can be brought back through the influence of local conservation organizations, such as Christians, Islam, and traditional councils or religious authorities.

References

- Adebayo, A. (2016): Sustainable tourism and cultural landscape management: the case of Idanre Hill, Ondo State, Nigeria. *Tourism Today*.
- Adesoji Akinwumi Adeyemi, Tolulope Hannah Oyinloye (2020): Effectiveness of Alternative Conservation Means in Protecting the Osun-osogbo Sacred Grove in South-West, Nigeria. *Plant*. Vol. 8, No. 1, 2020, pp. 1-9. doi: 10.11648/j.plant.20200801.11
- Adeyanju, S. O. (2020). *Drivers of biodiversity conservation in sacred groves : a comparative study of three sacred groves in South-west Nigeria* (T). University of British Columbia. Retrieved from <https://open.library.ubc.ca/collections/ubctheses/24/items/1.0389686>.
- Adeyanju, S. O., Bulkan, J., Onyekwelu, J. C., Peterson St-Laurent, G., Kozak, R., Sunderland, T., & Stimm, B. (2022). Drivers of Biodiversity Conservation in Sacred Groves: A Comparative Study of Three Sacred Groves in Southwest Nigeria. *International Journal of the Commons*, 16(1), 94–107. DOI: <http://doi.org/10.5334/ijc.1143>
- Adigun, F. O., Abolade, F., & Adegboye, D. I. (2016): Patronage Pattern of Idanre Hills as Eco-Tourism Centre. *Research on Humanities and Social Sciences*, 6(12), 35–42. Retrieved from www.iiste.org
- Aniah, P., & Yelfaanibe, A. (2016): Learning from the past: the role of sacred groves and shrines in environmental management in the Bongo District of Ghana. *Environmental Earth Sciences*, 75(75), 916. <https://doi.org/10.1007/s12665-016-5706-2>
- Babalola, F. D. (2011): Roles of and Threats to Yoruba Traditional Beliefs in Wilderness Conservation in Southwest Nigeria. *Science and Stewardship To Protect and Sustain Wilderness Values: Ninth World Wilderness Congress Symposium*, 64, 125–129. Meridá, Yucatán, Mexico.
- Balachandran, C., Dinakaran, S., Chandran, M.D.S and Ramachandra, T.V. (2015). Stream Insect Diversity in a Sacred and Non-Sacred Forest of Ankola Taluk, Uttara Kannada, Karanataka. Lake 2014:Conference on Conservation and sustainable Management of Wetland Ecosystem in Western Ghats, 13-15 November, 2014, Sahyadri Conservation Series 47, ET 87. 8p.

- Banjo, A., G. Otufale, O. Abatan, and E. Banjo (2006): Taboo as a means of plant and animal conservation in southwestern Nigeria: a case study of Ogbe river and its basin. *World Applied Science Journal* 1:34–43.
- Bhagwat, S.A., Nogue, S and Willis, K. J. (2014): Cultural drivers of reforestation in tropical forest groves of the Western Ghat of India. *Forest Ecology and Management* 329: 393-400.
- Borokini, I.T. (2016): Sanctuary of the Spirits: Okwu-muo, Ori Oke and ‘Mammy Water’ in the Veneration of Sacred Natural Sites in Southern Nigeria; *International Journal of Intangible Heritage*; Volume 11: 56-70
- Britannica, The Editors of Encyclopaedia. "Arthur Griffith". *Encyclopedia Britannica*, 27 Mar. 2022, <https://www.britannica.com/biography/Arthur-Griffith>. Accessed 4 July 2022.
- Britt Myren and Tinde van Andel (2011): Magic plants in the south of Ghana; Naturalis Biodiversity Center, Leiden University; 78pp.
- Ceperley, N., Montagnini, F., & Natta, A. (2010): Significance of sacred sites for riparian forest conservation in Central Benin. *Bois et Forets Des Tropiques*, 64(303), 5–23.
- Chandrakanth, M.G., Bhat, M. G and Accavva, M.S. (2004): Socioeconomic changes and sacred groves in South India: protecting a community-based resource management institution. *Natural Resource Forum* 28:102–111.
- Chandran, M.D. S., Rao, G.R., Gururaja, K.V. And Ramachandra, T.V. (2010): Energy of Swampy relic forest of Kathalekan from central Western Ghats, India. *Bioremediation, Biodiversity and Bioavailability* 4(1):54-68.
- Chima, U.D. & Nuga, O.O. (2011): Disappearing Sacred Groves: Causes And Implications For Biodiversity Conservation In Two Local Government Areas Of Abia State Of Nigeria; *International Journal of Science and Nature*; 2(3): 677- 682
- Daniel, K. S., Udeagha, A. U., & Jacob, D. E. (2016): Socio-cultural importance of sacred forests conservation in south southern Nigeria. *African Journal of Sustainable Development*, 6(2), 251–268.
- Daniel, K.S., Y., Udeagha, A.G. Umazi & J.D. Etim (2016): Socio- Cultural Importance of Sacred Forests Conservation in South Southern Nigeria *AJSD Vol. 6 Num. 2:251-268*.
- Daniel, S. K., Jacob, D.E and Udeagha, A.U. (2015): Tree Composition in Selected Sacred Forest in South Eastern, Nigeria. *International Journal of Molecular Ecology and Conservation* 5 (7):1-10.
- Daye, D.D and Healey, J.R. (2015): Impacts of land –use change on sacred forests at the landscape scale. *Global Ecology and Conservation* 3: 349-358.
- Etiendem, D. N., Hens, L. and Pereboom, Z. (2011): Traditional Knowledge Systems and the Conservation of Cross River Gorillas: a Case Study of Bechati, Fossimondi, Besali, Cameroon. *Ecology and Society* 16 (3): 22-36.
- Etiendem, D. N., L. Hens, and Z. Pereboom (2011): Traditional knowledge systems and the conservation of CrossRiver gorillas: a case study of Bechati, Fossimondi, Besali, Cameroon. *Ecology and Society* 16(3): 22.<http://dx.doi.org/10.5751/ES-04182-160322>
- Gumo, S. (1993): The Impact of The Catholic Church on The Abanyala Levirate Marriage. In *Sociology*. Nairobi: University of Nairobi.
- Gumo, Sussy, Simon O. Gisege, Evans Raballah, and Collins Ouma (2012): "Communicating African Spirituality through Ecology: Challenges and Prospects for the 21st Century" *Religions* 3, no. 2: 523-543. <https://doi.org/10.3390/rel3020523>
- Hu, L., Li, Z., Liao, W and Fan, Q. (2011): Values of village Fengshui forest patches in biodiversity conservation in the Pearl River Delta, China. *Biology Conservation* 144:1553–1559.
- Jiboye, J. O., Ikorukpo, C. O. and Olatubara, C. O. (2019): Causes of Environmental Degradation in the Coastal Areas of South West, Nigeria. *European Journal of Sustainable Development Research*, 3(2), em0079. <https://doi.org/10.20897/ejosdr/3969>.
- Kandari, L.S.; Vinod Kumar Bisht, K.V; Bhardwaj, M and Thakur, K.A. (2014): Conservation and management of sacred groves, myths and beliefs of tribal communities: a case study from north-India; *Environmental Systems Research*, 3:16.
- Kandari, S.L, Bisht, K.V, Bhardwaj, M. and Thakur, K.A. (2014): Conservation and management of sacred groves, myths and beliefs of tribal communities: a case study from north-India; *Environmental Systems Research*; 3(16): 10pp.
- Kuje, E.D. and Ugbe, J.A (2022): An Appraisal of Tree and Fauna Species Diversity and Distribution of Osogbo Sacred Grove, Osun State, Nigeria; *MedCrave/ Forestry research and Engineering International Journal*, 2022 (under review).
- Liu, Jinlong, (2007): Traditional knowledge in the eyes of development anthropology and its implication to development practices. *Journal of China's Agriculture University (Social Sciences)* 2, 133–141.
- Madeweya, K. H., Oka, H., & Mat, M. (2004): Sustainable Management of Sacred Forests and Their Potential for Eco-Tourism in Zanzibar. *Bulletin of FFPRI*, 1(390), 33–48. Retrieved 63 from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.556.6674&rep=rep1&type=pdf>
- Ntiamoa-Baidu, Y. (2002): Indigenous vs. Introduced Biodiversity Conservation Strategies: The Case of Protected Area Systems in Ghana. In Weber, W, L. J. T. White, A. Vedder and L. Naughton-Treves eds: *African Rainforest Ecology and Conservation*, Yale University Press, New Haven & London pp 385-396.
- Oates, J., Sunderland-Groves, J., R. D. Bergl, A., A. Nicholas, E. Takang, F. Omeni, I. Imong, R. Fotso, L. Nkembi, and E. Wiliamson. (2007): *Regional action plan for the conservation of the Cross River gorilla* (Gorilla gorilla diehli). IUCN/SSC Primate Specialist Group and Conservation International, Arlington, Virginia, USA.
- Ogunniyi, D. M. (2014): *Extra-mundane Communication: An Ethnographic Study of Visual Symbols at Osun Osogbo Sacred Grove*.

- Onyekwelu, J. C., & Olusola, J. A. (2014): Role of sacred grove in in-situ biodiversity conservation in rainforest zone of south-west Nigeria. *Journal of Tropical Forest Science*, 26(1), 5–15.
- Onyekwelu, J.C. and Olusola, J.A. (2014): Role of sacred grove in in-situ biodiversity conservation in Rainforest zone of south-western Nigeria. *Journal of Tropical forest Science* 26(1): 5-15.
- Ormsby, A. (2012a): Cultural and conservation values of sacred forests in Ghana. In G. Pungetti, G. Oviedo, & D. Hooke (Eds.), *Sacred Species and Sites: Advances in Biocultural Conservation*. Cambridge: Cambridge University Press.
- Ormsby, A. (2012b): Perceptions of Tourism at Sacred Groves in Ghana and India. In *RASAALA* (Vol. 3). Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.864.3722&rep=rep1&type=pdf>
- Oyelowo O. J., Aduradola A. M., Onadeko S. A., Agboola, D. A. (2014): Socio-Economic Contribution of Selected Sacred Groves in South-Western Nigeria; *International Journal of Novel Research in Civil Structural and Earth Sciences*; 1 (1): 36-45.
- Oyelowo OJ, Aduradola AM, Ekpo EN, Ine IE. (2012): Floristic Composition of a Sacred Grove in Igbara-oke, Ondo State, Nigeria; *Journal of forestry research and management*; 9:83-92.
- Oyelowo, O. J., Aduradola, A. M., Onadeko, S. A., & Agboola, D. A. (2014): Socio-Economic Contribution of Selected Sacred Groves in South-west Nigeria. *International Journal of 65 Novel Research in Civil Structural and Earth Sciences*, 1(1), 36–45.
- Parrotta, J.A., Liu, J., Sin, H.-C., (2007): Sustainable forestmanagement and poverty alleviation: roles of traditional forest-related knowledge. IUFRO, Vienna.
- Priscilla Ediare (2020): Ekiti river of strange fish; The Sun National Newspaper; <https://www.sunnewsonline.com/ekiti-river-of-strange-fish/> accessed date: 6/8/2022.
- Ray R, Ramachandra TV (2010) Small sacred groves in local landscape: are they really for conservation. *Curr Sci* 98(9):1178–1180.
- Ray, R., Chandran, M.D.S and Ramachandra, T.V. (2014): Socio-cultural protection of endemic trees in humanised landscape. *Biodiversity and Conservation* 23(8): 1977-1994.
- Ray, R., Chandran, M.D.S. and Ramachandran, T.V. (2015): Hydrology Importance of Sacred Forest Fragments in Central Western Ghats of India. *Tropical Ecology*, 56(1):87-99.
- Saj, T. L., C. Mather, and P. Sicotte (2006): Traditional taboos in biological conservation: the case of *Colobus vellerosus* at the Boabeng-Fiema Monkey Sanctuary, Central Ghana. *Social Science Information* 45:285–307. <http://dx.doi.org/10.1177/0539018406063644>
- Sheridan, M. J. (2009): The Environmental and Social History of African Sacred Groves: A Tanzanian Case Study. *African Studies Review*, 52(01), 73–98. <https://doi.org/10.1353/arw.0.0149>
- Sukumaran S, Jeeva S, Raj ADS, Kannan D (2008) Floristic diversity, conservation status and economic value of miniature sacred groves in Kanyakumari district, Tamil Nadu, Southern Peninsular India. *Turkish J Bot* 32:185–199.
- Tannenbaum, N. (2000): “Protest, tree ordination, and the changing context of political ritual”, *Ethnology*, 39 (2): 109-127.
- Tikkanen, Amy. "Ucayali River". *Encyclopedia Britannica*, 4 May. 2020, <https://www.britannica.com/place/Ucayali-River>. Accessed 2 July 2022.
- Udeagha, U. A., Udofia, I. S., & Jacob, D. E. (2013): Cultural and socio-economic perspectives of the conservation of Asanting Ibiono Sacred Forests in Akwa Ibom State , Nigeria. *International Journal of Biodiversity and Conservation*, 5(11), 696–703. <https://doi.org/10.5897/IJBC2013.0580>.
- Yuan, J.; Wu Quanxin, Liu Jinlong (2012): Understanding indigenous knowledge in sustainable management of natural resources in China Taking two villages from Guizhou Province as a case; *Forest Policy and Economics* 22 (2012) 47–52.