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Indigenous vs. Introduced Biodiversity Conservation Strategies: The Case of Protected Area Systems in Ghana

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Introduction

Many countries in Africa have undergone rapid population growth; this, unfortunately, has not been matched with an equally rapid rate of development of appropriate technologies and management of natural resources that cater for the increasing demands on the resources. Concurrently, the traditional strategies for biodiversity conservation that have existed in African communities have gradually eroded. The result is extensive habitat destruction, degradation, and severe depletion of wildlife, with serious consequences for biodiversity conservation on the continent. Biodiversity is defined here as variety of life forms, measured in terms of biomes, ecosystems, species, and genetic varieties and the interactions between them.

In the early 1900s, concern over rapid destruction of forests and dwindling wild animal populations in Ghana and other African countries led colonial administrators to introduce protected area systems based on western knowledge and values. Introduced protected area systems in Ghana comprise forest reserves and wildlife conservation areas (national parks, game production reserves, wildlife sanctuaries, and strict nature reserves). Control of these areas is vested in central government. A policy of externally enforced exclusion is pursued and no serious attempts are made to involve the local communities in the management of the protected areas. This situation, naturally, generates antagonism and often results in conflicts between local communities and wildlife/forestry officers.

Sacred groves in Ghana and other West African countries provide a good example of indigenous protected area systems within rural communities. Ntiamo-Baidu (1991a) identified three categories of indigenous strategies that advertently or inadvertently conserve biodiversity in Ghana. These are strategies that:

- 1) Protect particular ecosystems or habitats (such as sacred groves, royal burial grounds, sacred rivers)
- 2) Protect particular animal or plant species (such as totem and tabooed species)
- 3) Regulate exploitation of natural resources (such as close seasons for harvesting or hunting).

These strategies are often enshrined in religious or cultural beliefs and superstitions and enforced by taboos. The taboos have no legal backing, but the beliefs have been strong enough in the past to make people obey the regulations.

This paper analyzes indigenous and introduced protected area systems in Ghana, threats to the systems, and factors causing those threats. It then proposes mechanisms through which the two systems could be integrated to evolve a structure that promotes, empowers, and enables—rather than alienates—local communities in the conservation of their biological resources.

Protected Area Systems in Ghana

Indigenous Protected Area Systems

In the past, small patches of forest were set aside, normally close to settlements, as sacred lands that could not be touched. These lands were strictly protected by customary laws. Such areas still exist in rural Ghana and are known as Abosompow/Asoneyeso (shrine), Mpanyinpow (ancestral forests), and Nsamanpow (burial grounds). Collectively they are known as sacred or fetish groves. A number of sacred groves have been destroyed as a result of urban and infrastructure development, but many still survive.

Several categories of groves exist (Dickson, 1969; EPC, 1976; Dwomoh, 1990). Many are small (less than one hectare), often comprising an object (such as a tree, stone, or rock) considered to be a god and its immediate surroundings. One example is the Malshegu sacred grove near Tamale in northern Ghana (Dorm-Adzobu *et al.*, 1991; Ntiama-Baidu *et al.*, 1992). Such small areas may be insignificant in terms of biodiversity conservation.

More commonly, the patch of forest in which the royals of a particular village were buried was protected because of respect for the dead and the belief that the ancestral spirits lived there. Entry into such forests was prohibited, and only a limited class of people (such as members of the royal family, village elders, and clan heads) were allowed access for the burial purposes.

Many rivers and streams that provided the main source of drinking water for a village were also considered sacred. The surrounding forest lands were protected on the basis that the spirit of the river resided in the forest. Taboos associated with such sites included: prohibition of cultivation of forest lands on the river banks, prohibition of use of fisheries resources within the river and restrictions on access to the river on certain days. These taboos prevented defilement of the river. Although protection of the forests along river banks was based on religious and cultural beliefs, it served as river corridor management.

Often, patches of forests were protected because they supported sacred, totem or tabooed species that were believed to have special spiritual or cultural values and associations. Many clans in Ghana have a wild animal or plant species as their symbol. For example, the leopard (*Panthera pardus*) is the symbol of the Bretuo clan of the Akan people (Azanwule clan in Nzema); that of the Oyoko (Alonwoba) clan is the raffia palm (*Raffia hookeri*). Traditionally, such species were strictly protected. In some cases, even touching the species was forbidden. The Boabeng-Fiema Monkey Sanctuary is an example of a grove protected because the forest supports black and white *Colobus polykomos* and *Cercopithecus mona* monkeys, considered sacred by the people of Boabeng and Fiema villages (Akowuah *et al.*, 1975; Ntiama-Baidu, 1987; Fargey 1991; Ntiama-Baidu *et al.*, 1992).

Some sacred forests originate from historical events. For example, the Pinkwae grove (near Katamanso), a 1.2 square kilometer forest, is the battleground of a war between the people of Katamanso and the Ashantis in 1826. It is believed to be the abode of the spirits of ancestors who died in the war and of the Afiye god whose powers enabled the Katamanso people to defeat the Ashantis (Lieberman, 1979; Dorm-Adzobu, 1990; Ntiama-Baidu *et al.*, 1992). The Asantemanso grove (near Esumegya) is believed to contain the cave from which the seven clans of the Ashanti tribe originated (Ntiama-Baidu *et al.*, 1992).

The total number of sacred groves in Ghana is unknown. A survey by the Ghana Forestry Commission returned a figure of 1,904 groves, of which 79.1 percent were in the south. While many groves are too small to be of biological significance, a number have potential for biodiversity conservation.

Introduced Protected Area Systems

Forest Reserves

The Forestry Department was established in 1909, but forest reserves (areas legally constituted for permanent forestry production) were not established until 1927 when the Forest Ordinance was passed. There are now over 280 forest reserves in Ghana covering approximately 23,729 square kilometers. Although the primary purpose of most forest reserves in Ghana presently appears to be timber production, the maintenance of environmental and ecological stability was a major objective for their establishment in the early days of forest management. Thus, reserves were established along the forest/savanna borders to prevent the advancement of savanna vegetation into the forest zone, hilly areas were reserved to protect the headwaters of major rivers and prevent erosion, and reserves were scattered throughout the forest zone to maintain hydrological and climatic conditions.

Wildlife Conservation Areas

The Department of Wildlife, formerly the Game Branch of the Forestry Department, was established in 1965 with the responsibility of managing Ghana's wildlife resources both within and outside conservation areas. The first six wildlife conservation areas were legally established in 1971 (Legislative Instrument 701). In 1974, the Ghana Wildlife Conservation Policy was adopted. The policy aims at reserving representative assemblages of Ghana's fauna and flora. There are currently sixteen legally constituted and two proposed wildlife conservation areas (one strict nature reserve, seven national parks, six game production reserves, four wildlife sanctuaries) covering 14,333 square kilometers.

Most of the wildlife reserves within the forest zone were former forest reserves or parts of forest reserves. Bia National Park and Game Production Reserve, for example, were converted to their present status from the Bia Tributaries South Forest Reserve.

Protection Techniques

Sacred Groves

Sacred groves are controlled by traditional authority (usually the fetish priest in charge of the god of the grove, the chief of the village, and heads of relevant clans). The responsibility for protection of the grove is vested in the entire community, but a select group of people or family normally has the duty to enforce the rules. The conservation strategy, which is one of preservation, is enshrined in taboos and numerous cultural and religious rites and is maintained through reverence for the gods and ancestral spirits.

The Nkodurom grove, approximately 5 kilometers square of primary forest that has been preserved by traditional beliefs for about 300 years, provides a typical example of the mechanisms protecting sacred groves. The grove and its associated shrine, Anokye Kumaam, are located on the outskirts of Paakoso village (6°45'N, 1°30'W), 3 kilometers east of Fumesua, off the Accra-Kumasi road. Paakoso derives its name from the main stream in the village, Pekoo, (literally translated as "interested in war"). Nkodurom means "a source of war medicine" or a place where such medicines are prepared. The importance of the grove is linked with the war between the Ashantis and Denkyeras during the reign of the King Osei Tutu, the founder of the Asante empire. It is believed that the spiritual powers of his fetish priest, Okomfo Anokye, and herbal preparations from the Nkodurom sacred grove gave the Ashantis victory in war.

The final authority, ownership, and control of Nkodurom lies with the Asantehene (king of the Ashantis). This authority is exercised through the chief of Paakoso, representing the Agona clan (the royal family of the village). The high priest of the fetish (Anokye Boabeduro) is selected from the Asene clan (the clan to which Okomfo Anokye belonged). On appointment, the high priest remains in office for life and leads the people in the performance of all purification rites at the grove.

The taboos governing the grove include prohibition of:

- All forms of use, including farming, hunting, and collection of any plant material
- Access, except to traditional authorities for the performance of customary rites, or persons authorized after performance of certain purification rites and pouring of libation
- Access to all persons on Thursdays (believed to be Okomfo Anokye's day of rest when he communed with the gods and spirits)
- Access to menstruating women

The grove was held in such high esteem that in the past, if an offender for any crime in any part of the Asante kingdom sought refuge in Paakoso village, he could not be punished. The people of Paakoso strongly believe that the presence of the grove and the fetish protect them from various ills such as outbreaks of epidemics and infant and maternal mortality.

The responsibility of ensuring that the regulations governing the grove are strictly adhered to is rested in the descendants of the Atabriso family. These traditional guards regularly patrol the periphery of the grove and arrest intruders, who are sent to the Paakoso chief for the necessary customary sanctions. The sanctions, which are exacted for the purpose of pacifying and purifying the gods and spirits, vary depending on the gravity of the offense. However, they usually consist of a cash fine, several bottles of schnapps, and a sheep for slaughter to the gods. A culprit who refuses to honor the summons of the Paakoso chief or to accept and pay the penalty imposed upon him is sent to the Asantehene's court, where he is given a much heavier punishment.

The grove was not demarcated and the rules governing access and usage were unwritten and had no legal backing. They were strictly observed, however, and most people believed that something dreadful would happen to them if they disregarded any of the rules or refused to offer sacrifices to pacify the gods and purify

themselves. The traditional guards received no remuneration for their work but considered it their honorable duty.

That sacred groves have survived so far is purely because of the strong traditional beliefs upheld by the local people and the spiritual, religious and cultural attachments to the groves. The major virtue of this strong culture-based practice is that it encourages community participation in natural resource conservation and sustains positive awareness of nature and the linkages between man and nature.

Wildlife Conservation Areas and Forest Reserves

Wildlife conservation areas and forest reserves are normally clearly demarcated with boundary pillars and have staff paid by government to maintain the boundaries, enforce the laws governing use and access, and carry out prescribed management activities. Each reserve has a warden conservator or an officer of junior rank in charge of the routine administration of the reserve, who is assisted by an appropriate number of support staff.

The annual expenditure (comprising administrative costs, personal emoluments, travel, protection and management costs) for two typical forest districts (Kumasi West and Takoradi) in 1991 were 47,340 million and 9,596 million Cedis¹ respectively. The revenue accruing from timber and other forest products were 36,590 million and 16,771 million Cedis respectively.

Hunting, capturing, or destruction of any animal, as well as the collection or destruction of any plant, is legally prohibited in all wildlife conservation areas. The law gives the chief wildlife officer authority to grant permission for collection of flora and fauna from reserves, but this authority has so far been exercised only for scientific collections.

The Forestry policy is more flexible regarding use of forest reserves. Production reserves may be given out as timber concessions and are logged under conditions prescribed by the department. In some cases, the original land owners retain rights for hunting and collection of certain forest produce from the reserves.

A deficiency in the protection strategy of both the Forestry Department and Department of Wildlife is the lack of involvement of the local communities. Both departments pursue a policy of externally enforced exclusion of local people. Protective measures adopted invariably marginalize the people, and there has been very little or no attempt to encourage local community participation in the management of the protected areas. Also, very little effort has been put into educating communities around the reserves about the aims and objectives of reserving a particular area and of the benefits that such communities stand to gain from the protection activities (Ntiemoa-Baidu, 1991b).

¹ Approximately 950 Cedis = \$1.00 U.S.

Effectiveness of the Two Systems for Biodiversity Conservation

Resources Protected

Ghana's total land area is estimated to be 23.9 million hectares, of which about 15 percent is under protection (wildlife and forest reserves). Identifiable ecological zones in the country include rain forest (3 percent), moist forest (31 percent), interior savannah (57 percent), coastal savannah (5 percent), and the Volta Lake (4 percent). It is estimated that 70 percent of the original 8.22 million hectares of closed forest in the country has been destroyed (International Institute for Environment and Development, 1992).

Introduced protected areas within the seven forest types found in Ghana cover approximately 1.79 million hectares (Table 1; Hall and Swaine, 1981). This figure is equivalent to as much as 73 percent of the forests remaining in Ghana (based on the estimate that only 30 percent of the country's original 8.2 million hectares of closed forest is left).

The limited data on animal populations in the country indicate that, excepting rodents and invertebrates, the majority of the populations of all other taxa are in protected areas.

The total number and area covered by sacred groves in Ghana is unknown, and the biodiversity of many groves has not been studied. There is, however, some evidence of their botanical value. For example, Hall and Swaine (1981) found the only surviving specimens of the inner zone subtype of the dry semideciduous forest as well as the southern marginal forest types to be present in sacred groves. In many areas, sacred groves constitute the only remnant forest amidst severely degraded forest lands and farmlands. Admittedly, the small sizes of the groves make them far less important than the introduced protected area systems in terms of biodiversity conservation. The groves, however, form a matrix of biotic islands with potential for conservation of remnant communities of flora and fauna.

Threats and Encroachment on Protected Areas

Deforestation is one of the key environmental problems facing Ghana. Protected areas in the forest zones suffer increasing pressure from the demands of agriculture and forest products. Illegal farming is a problem that forestry/wildlife officers have to constantly contend with; for example, approximately 50 percent of Kogyae, the only strict nature reserve, is reported to have been devastated by commercial yam farming.

While illegal felling of trees continues to be a major problem in forest reserves (the 1991 annual report of the Kumasi West Forest district documents ten cases of illegal timber extraction), wildlife populations in all reserves are under constant threat from illegal hunting. Illegal collection of other forest products, like chewing sticks, poles, cane, and snails is also a source of regular conflict between local people and wildlife/forestry officers (Ntiama-Baidu, 1991b). The survival of sacred groves is threatened by the erosion of the traditional beliefs that have sustained the system. A number of sacred groves have been gradually shrunk by surrounding farms and a number have already been lost to development projects (Environmental Protection Council, 1976; Ntiama-Baidu *et al.*, 1992). The breakdown of beliefs can be attributed to western-type education and religion, immigration of people who may have no respect for local traditions, and the lack of modern legislation to reinforce traditional rules (Ntiama-Baidu, 1990; 1991a,b).

Table 1. Area (km²) of forest and wildlife reserves in the various forest types (Adapted from Hall and Swaine, 1981)

Forest type or subtype	Area of sub-type entirely included in reserves	Area partly included in reserves	Total reserved area in type	Total area of type	Percentage of type reserved
WE	1375	536	1910	6570	29
ME	4400	1131	5531	17770	31
UE	0	292	292	292	100
MSSE	1859	632	2491	18460	13
MSNW	3567	474	4041	14430	28
DSIZ	136	557	693	8630	8
DSFZ	2592	290	2882	12810	23
SM	62	31	93	2360	4
SO	0.8	5.0	5.8	20	29
TOTAL	13991	3948	17939	81341	22

Abbreviations for forest-types: WE=Wet Evergreen; ME=Moist Evergreen; UE=Upland Evergreen; MSNW=Moist semi-deciduous Northwest subtype; MSSE=Moist semi-deciduous Southeast subtype; DSFZ=Dry semi-deciduous fire zone subtype; DSIZ=Dry semi-deciduous Inner Zone subtype; SM=Southern Marginal; SO=Southeast Outlier

The Way Ahead

Local People's Perception and Value of Forests and Wildlife

The importance of forests and wildlife to West Africans is well documented. Forest products and wild animals provide valuable sources of income, food, building materials, and many household tools (Asibey, 1974; Falconer, 1992; Ntiamao-Baidu, 1987; Sale, 1981). In Ghana, the timber industry is the third most important foreign exchange earner, after cocoa and gold, accounting for 4.5 percent of the total Gross Domestic Product (International Institute for Environment and Development, 1992).

A study of perceptions and values of forests and wildlife to four villages around forest/wildlife reserves in western Ghana recorded a wide range of values including food resource, income, and maintenance of ecological stability (Tables 2 and 3). Several species of wild animals were reported to be symbols of the people's cultural identity, and a number of animal and plant species were used in medicines for a variety of diseases (Ntiamao-Baidu, 1991b). Over 90 percent of the respondents considered establishment of protected areas by central government to be useful and contended that there would be no primary forests left if the government had not established the reserves.

There is no doubt, therefore, that wildlife resources are of immense importance to the rural Ghanaian and that people appreciate both the need for protection and the role of protected areas. Despite this, communities living around reserves continue to show antagonism to the protective activities of government agencies. Relationships between the people in the communities studied in western Ghana and wildlife staff were particularly strained.

The question that emerges is: Why do people continue to destroy forests and overexploit forest resources that are so vital to their own survival, yet remain antagonistic to a system that seeks to conserve those resources?

Six main factors can be identified as militating against protected area management and which underline the continued pressure on forest

resources and the antagonism and conflicts between local people and conservation authorities:

- 1) Poverty (the lack of basic necessities of life and the struggle for survival)
- 2) Alienation of local communities in the management of protected areas and the resources they contain, which the people consider to be theirs by birthright
- 3) Ignorance and lack of comprehension of the limited rate of renewability of natural resources, coupled with the fact that populations of most wild animal species are so low that the current rate of exploitation is unsustainable
- 4) Low public awareness of general conservation issues and regulations
- 5) Misunderstanding of the policies and functions of the government conservation agencies
- 6) Poor public relations on the part of the conservation officers

These basic issues must be addressed in evolving a sustainable protected area system acceptable to the people.

Who Benefits from Protected Areas?

In the western world, resources conserved are those for which people have no immediate need. In Africa, people are being asked to conserve resources that they depend on for their everyday needs. Protective efforts are purported to be in the interest of the people, but who really benefits from forest and wildlife reserves? Is it the local person who has lost his land to conservation and has neither access to the resources of his land to support his traditional way of life nor access to modern developments to improve his quality of life? Is it the forestry/wildlife officer whose livelihood depends on the maintenance of conservation departments? Is it the government who requires foreign exchange earnings to provide amenities, most of which is consumed by the city or town dweller? Or is it for the benefit of the western world, where natural resources have

Table 2. Value of wild animals to communities living in the vicinity of forest/ wildlife reserves in Western Ghana. (Source: Ntiamoah-Baidu 1991b)

Value	Score	Percent Total
Source of food	257	53
Direct income generation	92	19
Cultural	48	10
Recreational/aesthetic	38	8
Maintenance of environmental/ ecological stability	17	4
Medicinal	17	4
Educational/ Scientific	12	2
Total	481	100

Table 3. Value of forests to communities living in the vicinity of forest/ wildlife reserves in Western Ghana. (Source: Ntiamoah-Baidu 1991b)

Value	Score	Percent Total
Maintenance of environmental/ ecological stability	173	27
Source of timber	171	27
Source of land for cultivation	118	18
Source of food	76	12
Source of household utilities	57	9
Medicinal	26	4
Direct Income generation	17	3
Cultural	1	
Total	481	100

(Continued from page 8)

been destroyed in the process of development, and where forest products are required to maintain the overconsumptive way of life, but also where conservation of tropical forests in the interest of global environmental health and biodiversity conservation are vehemently advocated?

Protected areas in Ghana and Africa as a whole will survive only if they provide benefits that are substantial enough for the local communities to want to maintain such areas. There is therefore an urgent need to address the question of equitable distribution of the benefits from protected areas. Alternatives for the local communities and development options that will increase protected area benefits must be found. These might include:

- development of appropriate agricultural technologies and facilities to increase productivity through increasing yield per unit area rather than increasing acreage of arable land;
- promotion of agricultural practices that encourage forest conservation and farming of favorite or useful wild animal or plant species, such as grasscutters (*Thryonomys swinderianus*) and chewing sticks in Ghana.

Involving Local People in Protected Area Management

It is clear that the externally enforced exclusion of local communities from reserves and alienation of the people from the management of protected areas do not promote good relations and do not encourage local support for conservation. Mechanisms for the participation of local communities in the management of natural resources in their area must be explored and instituted. This will help to eliminate the feeling of reserves being for "the government" and the general antipathy towards such reserves.

Areas that local communities can be involved in include law enforcement and education. A simple representation of relevant local groups on site management committees and advisory boards of reserves can greatly facilitate communication of project aims and objectives and activities to the people, promote a participatory feeling, and eliminate unnecessary misunderstandings (Ntiamo-Baidu, 1991c).

Another area worth exploring is whether some protected areas that are currently closed to any form of use can sustain some measure of it, at least at the local subsistence levels. Protected area management policies and strategies must be reassessed for the evolution of an integrated approach that incorporates local needs and promotes efficient resource use. Collection of minor forest products like snails and medicinal plants that are currently prohibited in wildlife reserves and protection of species that are considered pests are some of the issues that require review.

Coordination of Conservation Efforts

To maximize biodiversity conservation both within and outside protected areas, there is urgent need to coordinate conservation efforts and integrate traditional knowledge and practices in modern conservation strategies. Very little attempt has been made beyond the local level to explore and develop the potential of sacred groves for biodiversity conservation. Ntiamo-Baidu *et al.* (1992) outline a management strategy for Ghana's sacred groves that advocates:

- Nationwide inventory of the groves and the biological resources they contain
- Legislation to reinforce the traditional regulations regarding use and access and
- Provision of resources to improve local people's capability to manage their groves

It is hoped that the requisite financial resources can be found for the adoption of this strategy to ensure the survival of the groves.

In the recent past, forest reserves in Ghana found to contain significant populations of wild animals have been converted to wildlife conservation areas and placed under the administration of the Department of Wildlife on the grounds that the Forestry Department's policy does not adequately protect wildlife. In theory, this may seem laudable. In practical terms, it is difficult to envisage any real gains in terms of protection efficiency in view of the inadequate staffing levels of the Department of Wildlife. Moreover, the greater part of the intact forests remaining in the country (and most likely the best wildlife habitats) are within forest reserves under the administration of the Forestry Department. Under

such circumstances it would be more productive to evolve a system that incorporates wildlife management into forest management practices in all forest reserves, than to shift a few reserves to the administration of another department that is struggling to maintain the few areas already under its control.

Education and Public Awareness

Four of the six factors identified as militating against protected area management in Ghana are related to lack of education, public awareness, and understanding of conservation issues. As the World Conservation Strategy clearly acknowledges, it is virtually impossible to expect people to change their attitudes towards forests and wildlife when they do not understand the conservation issues at stake. It is encouraging that several organizations in Ghana—including NGOs like the Ghana Wildlife Society (GWS) and the Green Forum—are working to increase public awareness of wildlife and environmental issues in the country. The role of education and public awareness programs in wildlife conservation cannot be overemphasized. It is anticipated that funding agencies will continue to recognize and support this important component in the quest for sustainable utilization of natural resources in Africa.

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References

- Akowitz, D.K., K. Rice, A. Merz and V.A. Sackey. 1975. The children of the gods. *J. Ghana Wildlife Soc.* 1 (2): 19-22.
- Asibey, E.O.A. 1974. Wildlife as a source of protein in Africa south of the Sahara. *Biol. Conservation*, 6: 32-39.
- Dickson, K.B. 1969. *Historical Geography of Ghana*. Cambridge University Press, London. 344pp.
- Dorm-Adzobu, C. 1990. Pre-assessment of Pinkwae Forest at Katamanso in the Tema District.
- Dorm-Adzobu, C., O. Ampadu-Agyei, and P.G. Veit. 1991. *Religious Beliefs and Environmental Protection: The Malshegu Sacred Grove in No. Ghana*. WRI Washington, DC, USA and Acts Press, Africa Centre for Technology Studies, Kenya.
- Dwomoh, D. 1990. *Forest Conservation: The contribution of sacred groves (A study of Sekyere West District, Ashanti Region)*. B.A (Hons) Dissertation, Geography Dept., Univ. of Ghana, Legon.
- Environmental Protection Council. 1976. *Traditional Approaches to Conservation: Sacred Groves in Ghana*. Mimeo. Report prepared for the Environmental Protection Council, Accra.
- Falconer, J. 1992. *People's uses and trade in nontimber forest products in Southern Ghana: A pilot study*. ODA, Report.
- Fargey, P.J. 1991. *Assessment of the conservation status of the Boabeng Fiema Monkey*.
- Sanctuary. Report submitted to the Flora and Fauna Preservation Society. 73 pp.
- Hall, R.B and M.D. Swaine. 1981. *Geobotany. Distribution and ecology of vascular plants in a tropical rain forest. Forest vegetation in Ghana*. Dr. W. Junk Publishers.
- International Institute for Environment and Development. 1992. *Environmental Synopsis of Ghana*. Overseas Development Administration. 28pp.
- Lieberman, D.D. 1979. *Dynamics of forest and thicket vegetation on the Accra plains, Ghana*. Ph.D Thesis, University of Ghana. 298 pp.
- Ntiamao-Baidu, Y. 1987. *West African Wildlife: a resource in jeopardy*. Unasylva.
- _____. 1991a. Conservation of coastal lagoons in Ghana: the traditional approach. *Landscape and Urban Planning*, 20: 41-46.
- _____. 1991b. Local perceptions and value of wildlife to communities living in the vicinity of Forest National Parks in Western Ghana. In *Protected area development in South West Ghana Report by Environment Development Group*, Oxford, Cambridge.
- _____. 1991c. *Coastal Wetlands Conservation: The Save the Seashore Birds Project*. In: *Living with Wildlife*. A. Kiss (Ed). World Bank Technical Paper 130 p.91-95.
- _____. L.J. Gyamfi-Fenteng and D. Abbiw. 1992. *Management Strategy for Sacred Groves in Ghana* Report prepared for the World Bank and the Environmental Protection Council.
- Sale, J. B. 1981. *The importance and value of wild plants and animals in Africa*. IUCN. 43pp.

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