



ASSESSING THE SOCIO-ECONOMIC STRESSORS OF GHANA'S ONLY STRICT NATURE RESERVE: KOGYAE

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ABSTRACT

The paper assessed the integrity of Kogyae, Ghana's only Strict Nature Reserve, as a Category Ia protected area, against the backdrop of pressures and threats posed by anthropogenic drivers. Primary data were derived from a combination of approaches namely, Rapid Assessment and Prioritization of Protected Areas Management Methodology, participatory appraisal approach and institutional data gathering. The results identified adjacent land use, poverty in nearby communities, and high population density as the underlying threats facing the reserve. These had fuelled proximate threats including bush fires, logging and poaching. The study revealed also that the recent re-zoning of the reserve by extending its boundaries to enhance its ecological viability has not only strained the relationship between local people and Officials of the Wildlife Division, but become the root cause of most of the underlying threats. Considering the pressure and threats of Kogyae, the study proposes two options for resolving the situation: granting the communities' request to engage in ecologically friendly activities in the 'Special Use Zone' by re-categorizing the zone appropriately according to IUCN definition, or resettlement of the communities elsewhere to free the reserve from human activities.

Key words: Category Ia, protected area, Ghana, communities, threats, pressures, Kogyae Strict Nature Reserve

INTRODUCTION

Protected areas are generally believed to be the cornerstones of biodiversity conservation (Bruner et al., 2001; Mulongoy & Chape, 2004; Chapes et al., 2008). By 2014, there were approximately 209,000 protected areas worldwide covering about 15.4 per cent of the terrestrial and inland water areas and 8.4 per cent of the marine area within national jurisdiction (0-200 nautical miles) (Juffe-Bignoli, 2014). Using the global standard for defining, recording and classifying protected areas, the IUCN recognizes six protected area categories, classified according to their management objectives (Dudley, 2008).

A Strict Nature Reserve is a protected area set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for

scientific research and monitoring (Dudley, 2008). This protected area (Category Ia) category represent the most restricted form of management among the six categories of protected areas, with very minimal human presence.

The Kogyae Strict Nature Reserve in Ghana was established with three main objectives (Wildlife Department, 1994):

- to retain the transitional vegetation and faunal types for scientific research and monitoring;
- to protect the watersheds of the tributaries of Sene and Afram Rivers; and
- to preserve the historical grounds of the Kwaman, Agogo and Kumawu people; where their last victorious battles against the Chumbulus from Northern Ghana were fought.

In spite of the unique importance of the Kogyae Strict Nature Reserve in Ghana's protected area system (Table 1), it is confronted with serious challenges, including

Table 1: Wildlife Protected Areas in Ghana. Source: EPA (1996)

Protected Area	Size km ²
National Parks (NP)	
Bia	78
Bui	1,820.6
Digya	3,478
Mole National Park	4,840.4
Kakum	207
Kyabobo	360
Nini-Suhien	160
Resource Reserves (RR)	
Anksa	343
Assin Attandanso	139.9
Bia (different from Bia NP)	228
Gbele	565.4
Kalakpa	320.2
Shai Hills	48.6
Strict Nature Reserve (SNR)	
Kogyae	385.7
Wildlife Sanctuary (WS)	
Boabeng-Fiema*	4.4
Bomfobiri	53.1
Owabi (also Ramsar site)	13.1
Agumatsa Wildlife Sanctuary*	3
Tafi Atome*	Not available

* PAs without Gazette notification

adjacent landuse, bush burning, poaching and invasive species, particularly *Chromolaena odorata* (Ayivor, 2012). Though information on the reserve remains scanty, these challenges are compounded by the activities of legally established communities in an area within the reserve designated as a 'special use zone' (SUZ) (Oduro-Ofori et al., 2015). The authenticity of the designation of Kogyae as a Category Ia protected area has, therefore, come under public scrutiny as human visitation, use and impacts cannot be said to be strictly controlled or limited. In effect, pressure and threats facing the reserve have tended to undermine its conservation values and ecological integrity, leaving many to question why its definition under the IUCN management categorization should not be reviewed. This paper examined the proximate and underlying causes of threats and pressures that the reserve faces and how these are impacting on its integrity as a Category Ia protected area.

The contemporary paradigm on natural resource management has evolved away from a top-down, regulatory style to a more participatory approach that

features close and diverse partnerships and collaborations between management agencies and end-user stakeholders (Dovers et al., 2015).

According to De Vente et al. (in press), processes that are likely to achieve successful outcomes in participatory resource management include the legitimate representation of stakeholders, professional facilitation and the provision of information and decision-making power to all participants. Dyer et al., (2014) gave a summary of outcome-based components of successful participatory process to include environmental ownership, equity, trust, learning and information exchange, better accepted decisions, better quality decisions, fairness, consensus, aims and outcomes achieved and influence and impact on outcome. Michener (1998) in an earlier study differentiated between 'planner-centred' and 'people-centred' participatory conservation. The planner-centred participation is when outsiders like NGOs, facilitate local people's acceptance of new innovations promoted by them. In this case, indigenous knowledge and local labour are often exploited. In the people-centred perspective, local people are empowered by enhancing local management capacity, increasing confidence in indigenous potential and raising collective consciousness, as well as developing different typologies of participation. Thus, whereas people-centred participation leads to development that is truly empowering, planner-centred participation tends to be nominal with local people acting as the passive recipients of development. Critics of the participatory approach argued that it will not succeed if strong alliances are not built on mutual respect and recognition of each group's particular interests (Chicchon, 2000); and if the local population is heavily dependent on local resources, as in the tropical rainforest of Africa (Terborgh & van Schaik, 2002). Mustalahti and Lund (2009) noted that success of the model may differ from country to country as security of rights and access to benefits by local communities may not be the same among countries. They suggested the need for advocacy groups to assist communities to assert their legal rights and to demand commitment of national governments to ensure equity and accountability.

The challenges of Kogyae Strict Nature Reserve in Ghana from the perspective of the local people relate to land expropriation without wider stakeholder involvement, local exclusion in decision making and government's unwillingness to grant local demands to avoid compromising on the principles of a strict nature reserve. Though several studies exist on Ghana's protected area system (e.g. Hagan, 1998; Attuquayefio & Fobil, 2005; Jachmann, 2007, 2008; Ayivor et al., 2013; Kyerematen

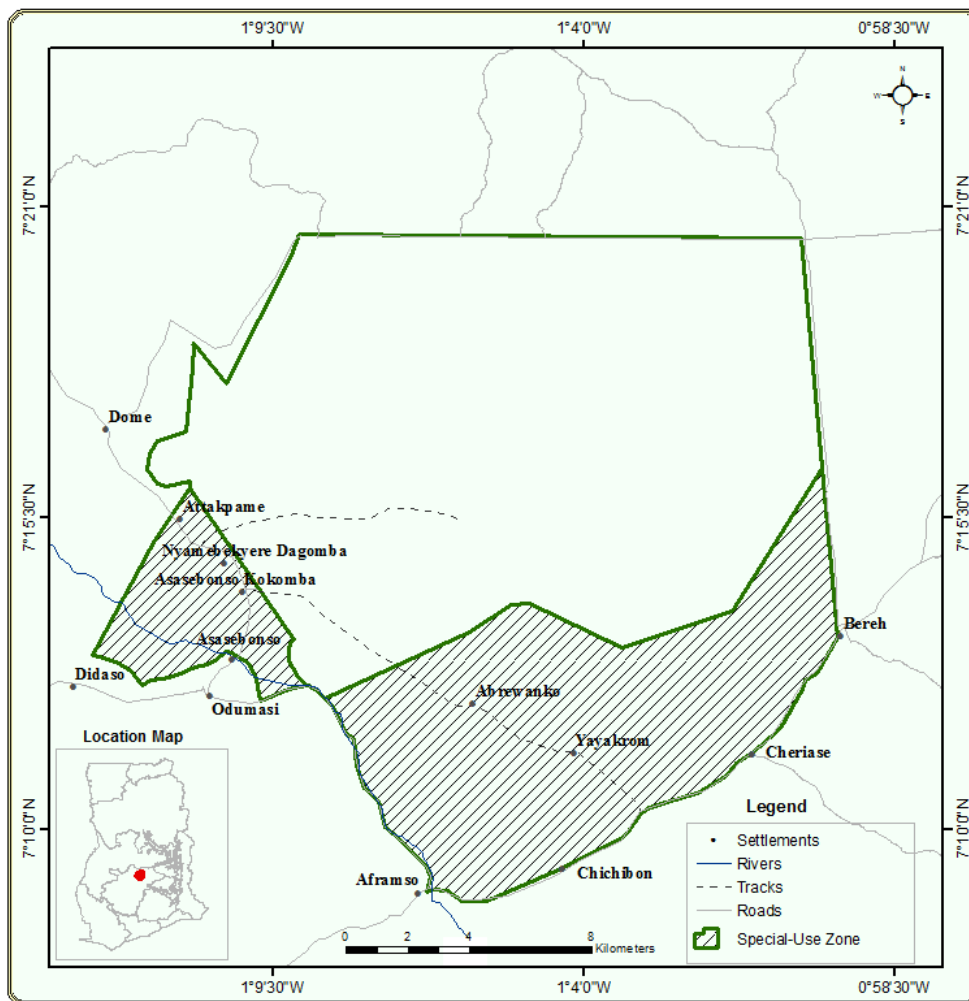


Figure 1. Map of the Kogyae Strict Nature

et al., 2014; Oduro-Ofori et al., 2015) there is paucity of information on the socio-economic stressors facing the Kogyae Strict Nature Reserve, the only one of its kind in Ghana, hence this study.

MATERIALS AND METHODS

Geographical Setting

The Kogyae Strict Nature Reserve lies in the transition zone between the Guinea Savannah and forest zones of Ghana, and covers an area of approximately 386 km². Kogyae is shared by the Kwamang and Kumawu traditional areas in Sekyere West and East districts of the Ashanti Region respectively. Before the establishment of Kogyae as a protected area, the core zone within the reserve served as a cultural heritage site for the two traditional areas, in recognition of its role as meeting grounds for militants from both areas to recruit, join forces and repel invading enemies. In 1952, the colonial Gold Coast government designated the site as the Kujani Bush Forest Reserve under the administration of the Forestry Department. In 1971, the reserve was designated as a Strict Nature Reserve under the Wildlife Reservation Regulations L.I. 710 of 1971 under the then Game and Wildlife Department (Ofori et al., 2014).

In order for the Strict Nature Reserve to maintain a viable ecological unit, the original forest reserve was extended southwards to include the sites of six communities (Figure 1) after some consultations with the traditional heads. The extension included also the Afram River, which flows along the southern portion of the reserve, to ensure constant water supply to wild animals (Wildlife Division, 2002). The six communities within the extended boundaries were Asasebonso, Atakpame, Nyamebekyere Dagomba, Yahayakura, Aberewanko and Asasebonso Konkomba. In addition to these six, four other communities, namely Aframso, Birem, Chichibon and Kyeiase are now located along the immediate fringes of the reserve as a result of the extension. These communities have continued to agitate and protest against the extended area from the time of its implementation (Wildlife Division, 2002).

Kogyae is located in the Afram Plains physiological region of Ghana, and is underlain by the Voltaian geological system. The site is generally low-lying with average heights of about 120m above mean sea level. A few areas within the reserve have higher elevation, attaining heights of between 215m and 230m. These



Participants at a focus group discussion © Jesse Ayivor

areas serve as the watershed for a network of streams dominated by tributaries of the Afram and Sene rivers, most of which dry up in the dry season (Hagan, 1998).

The climate of the area exhibits characteristics of the forest-savannah transition zone. The flora is reported to include about 105 vascular plant species comprising 57 trees, 10 shrubs, nine climbers, 17 herbs and 12 grasses. The main habitat types are transitional forest, riparian woodland, Guinea savannah and boval vegetation with open areas of short grassland found in areas with shallow soils and iron pans (Wildlife Department, 1994).

According to the records held by the Wildlife Division, the reserve used to support a small population of Elephants (*Loxodonta africana africana*), which migrated seasonally from Digya National Park but have stopped in recent times. Mammalian species of conservation importance reported to occur in the reserve include the Burron's kob (*Kobus kob*), Bushbuck (*Tragelaphus scriptus*), Waterbuck (*Kobus ellipsiprymnus*), Maxwell Duiker (*Cephalophus maxwelli*) and Grey Duiker (*Sylvicapra grimmia*). The reserve is reported to support also a number of primate species including Spot-nosed Monkey (*Cercopithecus petaurista*), Black and White Colobus (*Colobus polykomos*), the Olive Baboon (*Papio anubis*) and Patas Monkey (*Erythrocebus patas*), as well as uncommon species such as the Aardvark (*Orycteropus afer*) and Red River Hog (*Potamochoerus porcus*) (Wildlife Department, 1994).

The reserve is surrounded by farming communities with a complexity of issues concerning livelihood challenges, ethnicity and tenure rights. The people are predominantly farmers who engage in traditional rain fed agriculture, employing a slash and burn method of land clearing. Farm sizes averaged less than one hectare. A variety of crops including yam, maize, paddy rice, groundnuts, cassava, cowpeas and vegetables, are cultivated for subsistence, with the surplus sold at nearby urban markets.

The fringe communities were ethnically diverse, comprising indigenous Asante and a high migrant population originating mostly from northern savannah areas of West Africa. The influx of a high migrant population over the past decades, coupled with natural increase in the population of the indigenes has led to a high rise in the population of major settlements in the area. Population data from Ghana Statistical Service indicate that between 1960 and 2010, the population of fringe communities increased by 600 percent on the average (GSS, 1984, 2014). The migrants are most widespread in the northern fringes of the reserve whilst the indigenous Asante dominate the southern fringes. The migrants engage in leasehold agreements and make payments to their landlords. The traditional Heads of Kwamang and Kumawu (two of several sub-divisions of ethnic Asante) each laid claim to the area before the establishment of the reserve. The issue of who should receive compensation from the government of Ghana for the expropriation of the land for the reservation has

Table 2: The Rapid Assessment and Prioritization of Protected Areas Management Methodology Scoring System

		score			
		1	2	3	4
Activity	Extent	Localised (1)	Scattered (2)	Widespread (3)	Throughout (4)
	Impact	Mild (1)	Moderate (2)	High (3)	Severe (4)
	Permanence	short-term (1)	medium term (2)	long-term (3)	Permanent (4)
	Highest score ¹	1	8	27	64

¹ Highest score arrived at by multiplication of individual scores

therefore remained unresolved, thus fuelling local opposition (Ofori et al., 2014).

Methods

Primary data were derived from a combination of approaches namely the Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) methodology (Ervin, 2003), participatory rural appraisal approach and institutional data gathering.

The RAPPAM methodology is based on the IUCN WCPA management effectiveness framework, designed as a tool for developing assessment systems for protected areas (Ervin, 2003; Hockings et al., 2006). The methodology was employed at a fact-finding participatory workshop organized by the authors from 16 to 17 January 2012 at the University of Ghana, Accra. The assessment, which involved seven other protected areas, provided data for the management effectiveness evaluation of these protected areas (Ayivor, 2012). However, for the purpose of this study, only the results on pressures and threats for the Kogyae Strict Nature Reserve were considered relevant and used for the current analysis.

In the IUCN WCPA management effectiveness framework, pressure refers to processes, actions or events that have already had detrimental impact on the integrity of the protected area. Threats on the other hand are potential activities, processes or events that are impacting or likely to have detrimental impact in future. A total of 25 participants, comprising protected area managers and administrators, academic staff and representatives from non-governmental organizations, attended the workshop. The questions format consisted of statements with four options and different scoring systems. For pressures and threats, which was an aspect of the 'context' component, activities were assessed on the basis of extent, impact and permanence. The degree of intensity, 'extent' can be 'localized' with a score of one (1); 'scattered' a score of two (2); widespread (3); and throughout (4). The 'impact' was assessed as mild with a score of one (1); 'moderate' a score of two (2); 'high' a

score of three (3) or 'severe' a score of four (4). 'Permanence' also has four scoring levels as follows: short-term (1), medium term (2), long-term (3), permanent (4). The overall score was derived at by multiplication of individual scores (see Table 2).

The participatory rural appraisal approach (Chambers, 1994), with a focus on group discussions and individual interviews, was employed by a three member research team. This involved the engagement of both community members and Officials of the Wildlife Division in separate focus group discussions in an interactive manner with the help of a checklist to solicit participants' views on key issues relating to the management of the reserve. The group discussions took place in May 2013 and covered 13 fringe communities selected on the basis of their proximity to the reserve and geographical spread (Figure 1). Each group comprised seven (7) to 25 adult participants aged 18 to 75 years. Community leaders, namely local assemblymen and agents of traditional chiefs, helped in the selection of participants. Males constituted 54 per cent of the participants while females made up 46 per cent. Pertinent issues that provoked interesting discussions among the participants such as land tenure issues, inter-relationship between Wildlife Division officials and local communities, and sources, nature and impacts of threats to the protected area were considered. At the end of each discussion, the participants were asked to make their own recommendations as to the way forward. In total, 120 participants were involved including 10 Officials of the Wildlife Division. Separate interviews were also conducted with the Protected Area Manager and his Deputy.

Data on animal sightings were derived from field records at the District Office of the Wildlife Division at Ejura. The data comprised monthly records of animals sighted from 2005 to 2012 by the patrol staff of the Wildlife Division. The animal sightings are based on a standard method prescribed by the Wildlife Division, whereby their patrol staff routinely keep records of all species of wild animals that they encounter randomly as they carry out daily



An interactive meeting with Officials of the Wildlife Division at Dome Base Camp © Jesse Ayivor

patrol of the reserve. The method provides only rough estimates of species occurrence and abundance in a protected area as it does not rule out the tendency for double counting.

RESULTS AND DISCUSSIONS

Results of management effectiveness evaluation

The results from the evaluation of management effectiveness of the Kogyae Strict Nature Reserve showed that nine processes, actions or events constituted pressures and threats facing the reserve. These were annual bush fires, adjacent land use, agricultural encroachment, invasive species, poverty in nearby communities, settlement establishment, human population density, poaching, and infrastructure development (Figure 2). In terms of pressures, adjacent land use and poverty in nearby communities were the most serious, followed by invasive species, illegal entry including poaching and high human population density. With regard to threats, annual bush fires was identified as the most severe, followed by adjacent land use, agricultural encroachment, invasive species, poverty in nearby communities and settlement establishment (Figure 2).

Studies have shown that the major underlying threats to PAs are the affluence of the richest quarter of the world population and poverty among the poorest proportion of

the world's population. These in turn are related to other underlying issues including international debt and the flow of resources from the poor to the rich, pressure for trade and development, land tenure, population pressure, social relations, corruption, inequality, lack of capacity, lack of education and war and conflict (IUCN, 1999).

A critical assessment of the list of pressures and threats from the management effectiveness evaluation results suggests that they could be categorized into underlying and proximate pressures and threats or both. As illustrated in Figure 3, the underlying threats and pressures include: adjacent land use, poverty in nearby communities, and high population density. These are classified as such because they are predisposing factors that tend to fuel or promote human activities which negatively undermine the integrity of the reserve. Whilst the remaining list of six threats and pressures may be described as proximate or causal factors because they all have direct impact on habitats, species richness and composition, four out of the six have the tendency to fuel the occurrence of others. Thus, poaching, grazing, agricultural encroachment and settlement establishment may either impact on each other as underlying pressures and threats, or may promote bush fires and invasive species, which ultimately have direct impacts on habitat fragmentation or biodiversity loss.

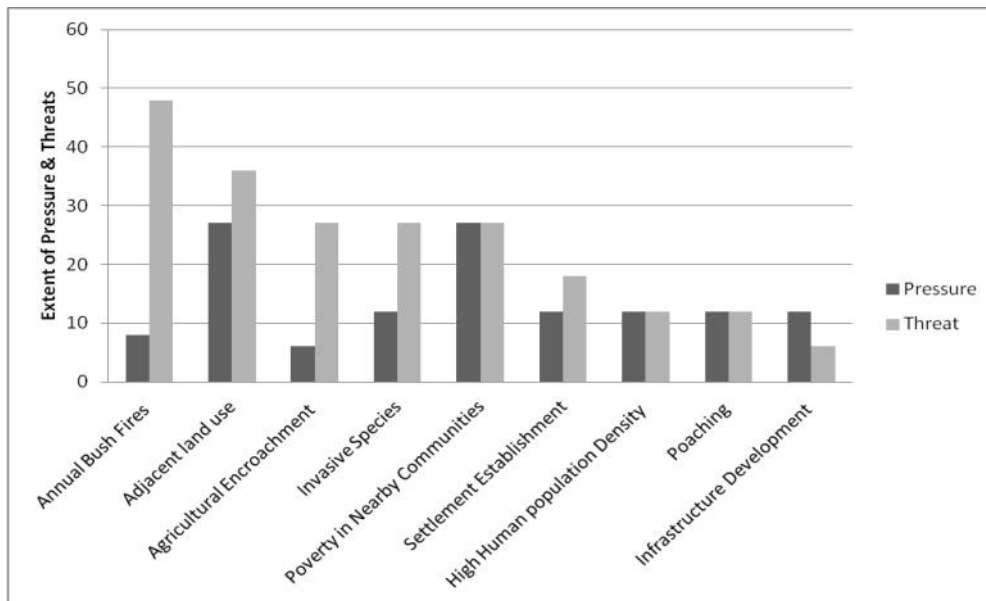


Figure 2: Pressure and threats facing the Kogyae Strict Nature Reserve

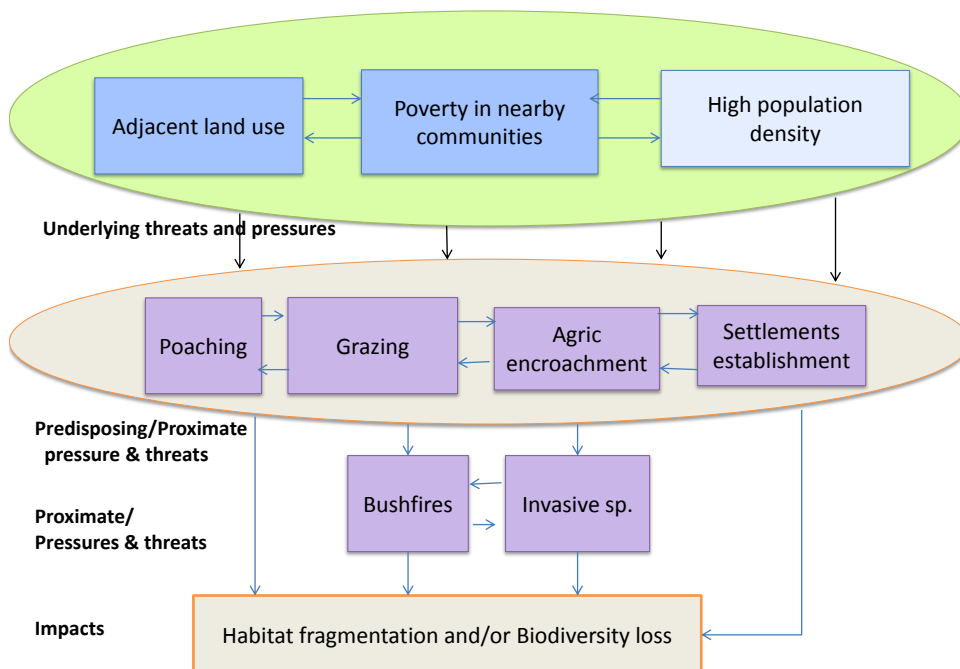


Figure 3: Proximate and underlying threats facing the Kogyae Strict Nature Reserve

With regard to adjacent land use as a pressure, official data from the Statistics, Research and Information Directorate of the Ministry of Food and Agriculture indicated that cropped area for major crops cultivated in Ejura Sekyedumase District within the vicinity of Kogyae Strict Nature Reserve, had been on an increasing trend over the years. The records showed that the percentage increase in cropped area from 2005 to 2014 for maize was 30 per cent, rice 94 per cent, cassava 12 per cent and yam 17 per cent (SRID/MOFA, 2014) (Figure 4).

Socio-economic context and associated pressures and threats

Field data indicated that net farming incomes in the area were low because of low productivity resulting from short fallow periods, dependence on natural nutrient

replenishment, impoverished soils, and changing climatic conditions, manifested in prolonged droughts and variations in rainfall amounts, seasonality and intensity. Available data from Ejura Sekyedumase District revealed that the percentage increase in crop yield in MT/Ha did not commensurate the percentage increase in cropped area (Figure 4). Apart from cassava, which according to Okogbenin et al. (2013) can tolerate harsh natural conditions such as drought, the percentage increase in cropped area for all the major crops far exceeded the yield in MT/Ha.

One observation worthy of note was the closeness of crop farms and settlements to the strict nature reserve. This would account for the relatively higher score for 'adjacent land use' both as a pressure and threat in the management effectiveness evaluation.

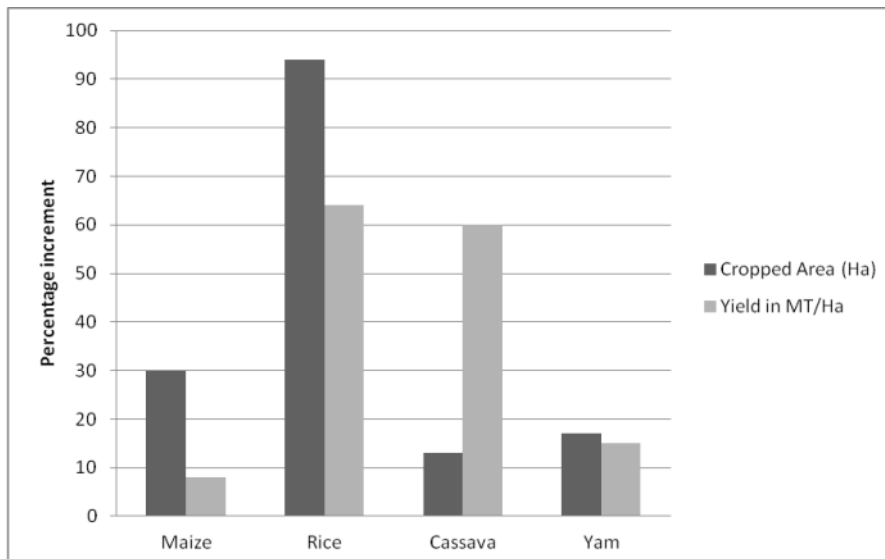


Figure 4: Percentage increment in cropped area/Ha as against yield MT/Ha from 2005 to 2014



Maize farm sited close to Kogyae Strict Nature Reserve border along the Oko Junction – Dome road © Jesse Ayivor

As a result of disagreements over the land on which the reserve is located between the two traditional groups claiming ownership (Kwamang and Kumawu), there has been no compensation payment by the Government of Ghana to any of the parties since the reserve was established. In addition to this, the area designated as a Special Use Zone (SUZ) was also under contention between the local people and the Wildlife Division. This raises questions of legal insecurity and had triggered apprehension and resentment among a section of the local people.

Special Use Zone (SUZ)

Most of the socio-economic stressors of the reserve emanate from SUZ, whose creation was the outcome of a conflict resolution process initiated by World Vision International (an NGO) in 1994. The process was to resolve the land ownership disagreements between local

communities and the Wildlife Division. The SUZ was established after a series of consultative meetings between 1993 and 1994 organized by stakeholders to mediate between the local people and the Wildlife Division. During the negotiations, the extended portion was to be designated, *de jure*, as SUZ, but with a catalogue of responsibilities and restrictions. The communities agreed to the proposals in principle but on condition that their expectations would be met. Paramount among these was that the SUZ should be de-gazetted to allow for the cultivation of tree crops such as cashew, oil palm, citrus and teak in the area. They also wanted access to dead and dying trees on their farms for charcoal or timber production because according to them, the government had once granted a private company a licence to do same.

The Wildlife Division, however, maintained that the government has no intention to de-gazette the SUZ because doing so will reduce the effective size of the reserve and compromise its ecological integrity. Moreover, investment in permanent tree crops within the SUZ has legal and ownership rights implications which might contradict the Wildlife Regulations Act of 1971.

Following further consultations, the local community representatives signed a memorandum of understanding (MoU) with the Wildlife Division on the creation of the SUZ, which states that:

- the SUZ is still an integral part of the Kogyae Strict Nature Reserve; it has not been de-gazetted and Wildlife Reserves Regulation, 1971 L.I. 710 would be enforced in the zone;
- group hunting is prohibited;
- charcoal burning is forbidden by law;
- logging in the SUP is absolutely prohibited;



Access road constructed through the Kogyae Strict Nature Reserve for residents in the SUZ © Jesse Ayivor

- farming activities close to water bodies (50 metres on both sides of the body) are prohibited;
- no farming beyond the SUZ boundary, any farms made beyond the SUZ would be destroyed and the culprit expelled from the zone;
- by-laws would be made to guide the use of the SUZ;
- use of fire in the area to be restricted to avoid uncontrolled bush fires; and
- distillation of local gin (akpeteshie) is prohibited.

The Wildlife Division and District Assemblies together with other stakeholders were to facilitate and spearhead the modernization of agriculture through mechanization and good soil management techniques in the SUZ. Unfortunately, government reneged on its promise due to budgetary constraints; and this has fuelled local agitations against the creation of the SUZ. Responses in almost all focus group discussions suggested that the reserve contributes nothing to the local socio-economic wellbeing. In the view of one respondent: *'the prohibitions imposed on the SUZ have negated all our efforts at optimizing the economic potential of our God-given land, which is our only resource'*.

Michener (1998) described the approach used in the local consultation for the creation of the SUZ as 'planner-centred' participatory conservation where external agents with other interests facilitate local people's acceptance of new innovations promoted by the agents. The local opposition to the creation of the SUZ also brings into question the legitimacy of representation of stakeholders in the negotiation process, which according

de Vente et al., (in press), is a major determinant of success of the participatory approach. According to Cernea and Schmidt-Soltan (2003) if no strategy is put in place to secure the livelihoods of those who feel aggrieved in protected area establishment, the result will always be aggravated poverty in communities bordering the protected area. Poverty in nearby communities was identified as a major underlying pressure and threat facing Kogyae Strict Nature Reserve, hence any action that further affects the livelihoods of the people negatively will invariably increase the proximate pressure and threats and potentially erode biodiversity in the Strict Nature Reserve.

Another local livelihood-related challenge was the incessant animal raids on farms located close to the reserve. On-site observations revealed that farms were established along the immediate fringes of the reserve and within the SUZ, thus exposing the farms to raids by Patas monkey (*Erythrocebus patas*), red river hog (*Potamochoerus porcus*), bushbuck (*Tragelaphus scriptus*), ground squirrels (*Otospermophilus beecheyi*), crested francolin (*Dendroperdix sephaena*) and grasscutter (*Thryonomys swinderianus*). The respondents in the focus group discussions estimated that between one quarter and half of their farm produce was destroyed through animal raids on an annual basis. Most of the respondents intimated that they killed animals which raided their farms for bushmeat with snares and other hunting techniques. This confirms the results of the management effectiveness evaluation exercise which indicated that 'adjacent land use' was both a serious pressure and threat.



Annual bush burning in the SUZ is a major cause of habitat degradation in Kgogayae Strict Nature Reserve © Jesse Ayivor

Officials of the Wildlife Division admitted that it was difficult to convince the local people to collaborate because the Strict Nature Reserve was not enhancing local livelihoods. Though this problem was anticipated, they thought that decline in soil fertility through human population pressure and lack of social amenities would make the area unattractive for continuous settlement and compel the residents to vacate the area voluntarily. This did not happen because some of the hitherto deprived communities were later provided with good access roads, potable water and schools either by politicians as fulfilment of campaign promises, or by NGOs who did so on humanitarian grounds. One worrying trend was the inability of the SUZ to support livelihood as a result of soil exhaustion and climate variability, leading to a shift to farming in wetlands. One of the respondents had this to say: *'Access to land in this area has become very difficult compelling us to farm on the same piece of land on an annual basis. I have been cultivating the plot allocated to me over 10 years now, and have noticed a drastic reduction in yield. Seasonality of rainfall has also changed whilst most of our lands outside the reserve are very rocky. This has prompted me to move into wetland areas to start rice farming.'*

It is clear from the findings that the design of the SUZ and the way it is used, to sustain total livelihoods rather than supplementing them, constitutes a major underlying pressure and threat to the reserve. Under the design, the zone serves as a hub where most of the illegal human activities were initiated.

Bush Fires

Both Officials of the Wildlife Division and local residents claimed that there had been a change in the frequency, seasonality and intensity of rainfall in the area over the past decades. This observation is substantiated by the observation by Owusu and Waylen (2009) that between 1950 and 2000, annual rainfall totals for Ejura (nearest station to Kgogayae) had dropped from 1800mm to about 1600mm. Presently, rainfall variability has resulted in the occurrence of prolonged droughts which, together with other factors, make the area susceptible to bush fires.

Bush fires ranked highest as a threat in the results of the assessment of pressures and threats (Figure 2). The problem was very widespread and directly affects species protection and undermines the effectiveness of Kgogayae as

Table 3: Number of Animals sighted in Kogyae (2005 – 2012). Source: Wildlife Division, Ejura.

Animals Sightings	2005	2006	2007	2008	2009	2010	2011	2012
Baboon	30	159	349	502	1655	2249	2323	1074
Bay duiker	0	8	6	32	27	53	36	1
Black and white colobus	4	1	0	0	0	0	0	0
Black duiker	5	11	22	49	704	1004	924	3
Buffalo	0	102	30	16	74	57	78	146
Bushbuck	87	616	757	771	1118	1893	1060	852
Green monkey	79	185	131	97	693	1006	636	61
Hartebeest	0	0	0	0	0	3	0	0
Kob	95	633	405	445	1173	1969	2034	810
Maxwell's duiker	15	55	103	90	426	849	704	173
Mona monkey	10	97	76	23	25	18	11	25
Oribi	5	101	38	49	37	60	7	0
Patas monkey	186	1332	775	614	1402	1555	2282	749
Red flanked duiker	24	90	42	135	193	736	521	218
Red river hog	4	140	136	77	577	1108	736	165
Warthog	21	288	156	111	645	895	1443	27
Waterbuck	0	19	14	6	35	101	63	43
White spot-nosed monkey	4	75	27	34	855	1223	638	0
Total	569	3912	3067	3051	9639	14779	13496	4347

a Strict Nature Reserve. Whereas Officials of the Wildlife Division blamed the origin of the annual wild fires on the residents of the SUZ, the residents, in turn, alleged that the fires were usually initiated from the core zone, a location accessible to only Officials of the Wildlife Division.

Interviews with Officials of the Wildlife Division gave the following reasons as the major causes of the fires:

- Fulani herdsmen who intentionally burn dried grass during the dry season to induce the early sprouting of fresh grass to provide grazing for their cattle;
- hunters who initiate fires to force animals out of their hideouts; and
- careless handling of naked fires by palm wine tappers, local gin distillers, farmers and cigarette smokers.

It was also revealed that the occurrence of intermittent open grassland areas mostly over lateritic and rocky soils surfaces within the reserve, where deep-rooted trees were absent, was a major underlying factor that fuelled the bushfires. During the dry seasons, the grasses dry up quickly and become susceptible to fires. Additionally, several forest gaps created by the fires were taken over by the prolific invasive plant species, *Chromolaena odorata*. This plant produces a lot of flammable litter which increases the risk of fire. One disturbing issue was that

during the fire outbreaks, wild animals from the reserve sought refuge in sheltered areas in and around the communities, thus exposing the animals to human predators. Officials of the Wildlife Division reported that they encountered burnt carcasses of young animals after almost every fire event. One respondent who strongly expressed reservations over the creation of the reserve, particularly the SUZ remarked: *'The forest is an empty forest. Fire sweeps through it every year and causes most of the animals to escape. There is nothing in the reserve to attract tourists. The forest brings no benefits to us. We should be allowed to occupy our lands'*.

All the above explain the gravity of fire impacts on the Strict Nature Reserve and suggest that the reserve was far from meeting the values and objectives for which it was established.

Effects of pressures and threats on animal populations

According to the Officials of the Wildlife Division, the intensification of human activities is having a negative impact on the animal population in the Kogyae Strict Nature Reserve. They indicated that the seasonal migration of elephants from Digya National Park had ceased as a result of habitat degradation. Institutional data obtained from the Division on animal sightings from



Carcass of a white spot-nosed monkey trapped for bushmeat © Jesse Ayivor

2005 to 2012 (Table 3) indicate that whereas the sightings of certain mammalian species fluctuated within the period and showed no regular trend, the sightings of other known species in the area such as Black and White Colobus, Hartebeest and Oribi suggest that they were becoming locally rare. Further studies using a more robust methodology are required to ascertain the current status of wild animals species in order to draw valid conclusions.

Though some authors have argued that protected areas in tropical countries have been effective in protecting ecosystems and species within their borders in the face of inadequate funding and significant land-use pressure (Bruner et al., 2001; Geldmann, et al., 2013; Green et al., 2013), others believe that the common perception of protected areas as cornerstone of biodiversity conservation cannot always be true (Liu et al., 2001, Pfeifer et al., 2012). Using the results of an empirical study in Wolong Strict Nature Reserve in south-western China, Liu et al. (2001) observed ecological degradation of panda habitat inside the reserve, which resulted in a drastic reduction in panda population from 145 in 1974 to 72 in 1986. The study attributed this phenomenon to the activities of the human population inside the reserve which surged from 2,560 in 1975 to 4,260 in 1995. They concluded that in order to understand better the effectiveness of protected areas as a strategy for biodiversity conservation, both ecological and socio-economic factors should be taken into consideration.

Kogyae and Wolong bear several similarities. Apart from the fact that both are Strict Nature Reserves, there are also the activities of increasing human populations inside the reserves which impact negatively on the conservation of species. The general conclusion that both ecological and socio-economic factors may partly be responsible for the effectiveness of protected areas also applies. However, based on the Kogyae experience, the assertion that protected areas as cornerstone of biodiversity conservation is just a common perception and cannot always be true may strongly be refuted. Despite the challenges of Kogyae, it still maintains a fair number of species which cannot be found in the adjacent landscape and other unprotected lands. The issue for Kogyae is more about the questionable designation as a Category Ia protected area than its ability to protect biodiversity.

CONCLUSIONS

The Kogyae Strict Nature Reserve is bedevilled by several socio-economic stressors emanating from increasing livelihood demands, compounded by the extension of the boundaries of the Strict Nature Reserve to include community farm lands. Thus, whereas poverty in fringe communities and adjacent land use may appear as the main sources of pressures and threats facing the Strict Nature Reserve, the root cause was attributed to the southwards extension of the reserve to cover the Afram river channel and beyond. Though the expansion was necessary to maintain an ecologically viable reserve size

and to ensure adequate water supply for wild animals, the 'planner-centred' participatory approach employed in the zoning process failed to involve fully the local stakeholders whose livelihoods were directly affected. The subsequent creation of the SUZ has rather compromised the integrity of the Strict Nature Reserve, as it has now become a hub for illegal activities such as the initiation of bush fires and poaching.

The anticipated benefits of the SUZ are also not being realized since it could not meet the ecological needs of the reserve and livelihood expectations of the people at the same time. This has resulted in intense pressures and threats which have affected habitats, as well as, animal populations. In particular, the occurrence of certain known species in the reserve such as Black and White Colobus and Hartebeest has become very doubtful in recent times. With increasing climatic changes, these challenges, in particular bushfires and dwindling species diversity are likely to be compounded if appropriate measures are not put in place to check them. As a matter of urgency, more stringent measures need to be put in place to control poaching and bush fires if indeed the Forestry Commission of Ghana is truly committed to maintaining the integrity of Ghana's only Strict Nature Reserve. This will require intensification of patrol efforts through staff capacity enhancement and additional funding.

Two medium to long term measures are recommended to address the problem of the SUZ. In the first place, maintaining the status of Kogyae as a 'Strict Nature Reserve' calls for an exclusionary approach that will mean relocating all communities in the SUZ in order to extend the core zone over the Afram River. This would increase the effective size of the core zone, ensure uninterrupted access to water supply for wild animals and reduce the pressures and threats faced by the reserve. For this approach to succeed there will be the need for massive capital injection from central government to implement a comprehensive resettlement programme and to pay adequate compensation to all affected persons. It also calls for the provision of sustainable livelihood activities in the resettlement communities to curtail the adverse effects of resettlement programmes on livelihoods.

The other option is an inclusionary approach that will grant the communities' request to engage in ecologically friendly activities such as cultivation of perennial cash crops in the SUZ while maintaining the core zone. Such an approach will call for a re-categorization of the protected area from Category Ia to Category VI, which encourages the use of natural resources sustainably as a means to achieving nature conservation, according to IUCN definition.

Along with the re-categorization, the establishment of Community Resource Management Area (CREMA) will help to curtail the incidence of bush fires in the area. CREMA is a concept which seeks to build the capacity of local communities and provide them with incentives to sustainably manage and conserve natural resources

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Rocky surfaces of Kogyae are usually covered by grass, which become susceptible to fires during the dry season © Jesse Ayivor

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RESUMEN

El estudio evaluó la integridad de Kogyae, la única Reserva Natural Estricta de Ghana, como un área protegida de categoría Ia, en el contexto de las presiones y amenazas que representan los factores antropogénicos. Los datos primarios se obtuvieron a partir de una combinación de enfoques, a saber, Metodología para la evaluación y priorización rápidas del manejo de áreas protegidas (RAPPAM), enfoque de diagnóstico participativo y recolección de datos institucionales. Los resultados identificaron el uso del suelo adyacente, la pobreza en las comunidades cercanas, y la gran densidad de población como las amenazas subyacentes que afronta la reserva. Estas habían impulsado las amenazas inmediatas, incluyendo los incendios forestales, la tala y la caza furtiva. El estudio reveló también que la reciente rezonificación de la reserva mediante la ampliación de sus fronteras para mejorar su viabilidad ecológica no solo ha dificultado la relación entre los pobladores de la zona y los funcionarios de la División de Vida Silvestre, sino que se ha convertido en la causa fundamental de la mayoría de las amenazas subyacentes. Considerando la presión y las amenazas de Kogyae, el estudio propone dos opciones para resolver la situación: acceder a la solicitud de las comunidades para participar en actividades ecológicamente amigables en la Zona de uso especial mediante la recategorización de la zona de acuerdo a la definición de la UICN, o el reasentamiento de las comunidades en otros lugares para liberar la reserva de las actividades humanas.

RÉSUMÉ

Ce document a évalué l'intégrité de la seule réserve naturelle intégrale au Ghana, Kogyae, en tant qu'aire protégée de catégorie Ia, dans le contexte de pressions et de menaces posées par des facteurs anthropiques. Les données primaires ont été obtenues à partir d'une combinaison d'approches: le RAPPAM (l'évaluation rapide et la hiérarchisation des aires protégées), l'évaluation participative et la collecte de données institutionnelles. Les résultats indiquent que l'utilisation des terres adjacentes, la pauvreté dans les communautés voisines, et la forte densité de population sont des menaces sous-jacentes qui pèsent sur la réserve. Celles-ci alimentent des menaces de proximité, telles des feux de brousse, l'exploitation forestière et le braconnage. L'étude a révélé également que le récent rezonage de la réserve, en étendant ses frontières afin d'améliorer sa viabilité écologique, a non seulement tendu les relations entre les populations locales et les fonctionnaires de la Division de la Faune, mais constitue en fait la cause principale de la plupart des menaces. Compte tenu de la pression et les menaces qui pèsent sur Kogyae, l'étude propose deux solutions: soit l'octroi de la demande des communautés de se livrer à des activités respectueuses de l'environnement dans les « Zone d'Utilisation Spéciales » et la recatégorisation de la zone de façon appropriée selon la définition de l'UICN, ou bien la réinstallation des communautés ailleurs afin de libérer la réserve des activités humaines.