Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 2, No. 6, p. 1-11, 2012
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

How are our protected areas doing? management effectiveness of three protected areas in Ghana

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Received: 14 May 2012
Revised: 12 June 2012
Accepted: 14 June 2012

Key words: Biodiversity, conservation, Ghana, protected areas, management effectiveness.

Abstract

The management effectiveness of three protected areas, Mole National Park (MNP) in the Northern Region, and the Shai Hills Resource Reserve (SHRR) and the Densu Delta Ramsar Site (DDRS) both in the Greater-Accra Region of Ghana, were assessed. Park managers, wildlife officers and guards, and conservation practitioners were interviewed using the World Bank-WWF Alliance Management Effectiveness Tracking Tool Questionnaire (METT). Management effectiveness varied across the three protected areas (PAs). In general, the PAs were effective in conserving biodiversity, and ecological and cultural values. However, their contribution to improving standards of living of fringe communities remained a major management challenge, even though livelihood support programme existed in some communities surrounding the MNP and SHRR. A total of 21 threat factors were recorded for the PAs, with five of them, poaching, livestock grazing, bushfire, erosion and flooding being common to all the three PAs. The most severe and persistent threats varied from site to site. In all the PAs, management were constrained by inadequate funding, trained field personnel, and equipment and facilities. Addressing these constraints, therefore, may enhance the management effectiveness of these PAs.

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Introduction

The establishment of protected areas (PAs) worldwide was aimed at protecting biodiversity, safeguarding ecosystem health, and providing an array of ecosystem services like provision of fresh drinking water, storage for genetic materials, and acting as reservoirs of wild plants and animals (Ervin, 2003; Hockings, 2003; Chape *et al*., 2005; Wilson *et al*., 2005). Generally, protected areas are thought to provide better protection of both indigenous and exotic biodiversity from human disturbances (Bruner *et al*., 2001; Lu *et al*., 2003; Struhsaker *et al*., 2005).

The geographical location and spatial extent of protected areas have been well-documented, with currently over 100,000 protected areas worldwide covering more than 12% of the Earth's surface (Chape *et al*., 2005). The extent to which these areas maintain the features and values, as well as achieve the goals for which they were established, however, remains uncertain, especially in developing countries where management effectiveness assessments are largely neglected (Lu *et al*., 2003).

Protected area management effectiveness assessment evaluates the extent to which PA values and features are protected and set goals and objectives are achieved (Hockings *et al*., 2006). The primary aim of assessment is to improve the management effectiveness of PAs for individual sites and protected area systems (Hockings *et al*., 2006; TWMEAACWA, 2009). Scarce conservation funds could be used judiciously, and with greater transparency and accountability if the strengths and weaknesses of PA management and the threats PAs face are better understood (Hockings, 2003). For this reason, the evaluation of management effectiveness of PAs has become an essential tool at local, national and regional levels for park management (Hockings, 2000; Ferraro and Pattanayak, 2006).

The process of assessing management effectiveness of PAs in West Africa was launched in 2006 during a workshop held in Burkina Faso for French-speaking countries, and in 2009 in Accra, Ghana, for Anglophone countries (TWMEAACWA, 2009). The global objective of these workshops were to organise thoughts on the processes to develop for the evaluation of PA management effectiveness, and to provide training on the tools developed by the World Commission on Protected Areas (WCPA) for evaluating management effectiveness (TWMEAACWA, 2009).

Ghana has an excellent network of protected areas that fairly represent all the ecological zones and ecosystems (Guinea savanna woodland, transition between dry forest and guinea savanna, dry semi-deciduous forest, moist evergreen forest, transitional zone between moist evergreen and moist semi-deciduous forest types, and dry evergreen forest) of the country. These include National Parks, Strict Nature Reserves, Wildlife Sanctuaries, Resource Reserves, Forest Reserves and Ramsar sites. Currently, there are about 321 PAs covering about 15.4% of the country's total land area (Earth Trends, 2003). The number and extent of PAs in the country, however, only provide a unidirectional indicator of Ghana's political commitment to biodiversity conservation, and do not provide information on the key determinant for meeting global biodiversity targets- "effectiveness" in conserving biodiversity (Chape *et al*., 2005). The potential of the country's PAs may be maximized, and their management processes improved if the strengths and weaknesses of their management, and the threats that the PAs face are well understood.

The present study assessed the management effectiveness of three protected areas in Ghana, Mole National Park (MNP) in the Northern Region, Shai Hills Resource Reserve (SHRR), and Densu Delta Ramsar Site (DDRS) in the Greater Accra Region. The study objectives were to (i) identify and quantify the threats facing the selected protected areas, (ii) determine the effectiveness of management initiatives, and (iii) making recommendations for

improvement using the PA management effectiveness assessment framework presented in Fig. 1.

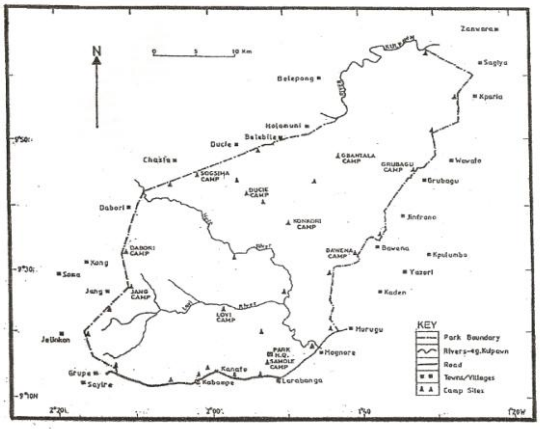

Fig. 2. Map of the Mole National Park (MNP)

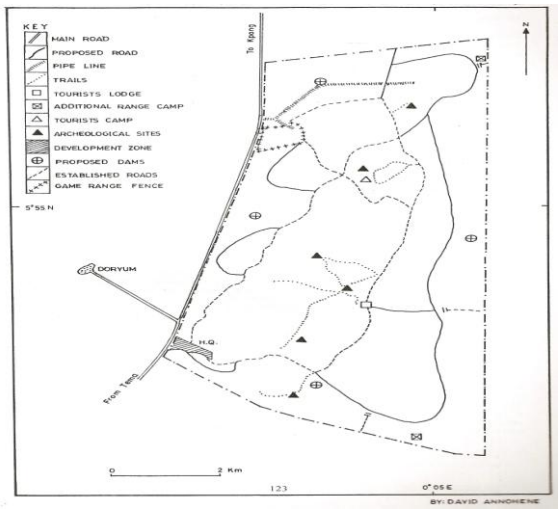

Fig. 3. Map of Shai Hills Resource Reserve (SHRR).

Materials and methods

Study Areas

The MNP (9° 12'- 10° 06'N; 10° 25'- 2° 17'W) (Fig.2) is located within the West Gonja District of the Northern Region of Ghana. With an area of about 4,840 km², it is the largest and most prestigious (in terms of its visitor attraction potential and facilities for tourism) of the six national parks in Ghana (MNPMP, 1994). The SHRR (5° 55'N and 0° 05'E) (fig. 3), has an area of about 50 km² and is located on the Accra Plains in the Dangme West District, approximately 50 km northeast of Accra, the capital of Ghana (SHRRMP, 1992). The DDRS (5° 31' N; 0° 20W) (Fig. 4) is located south of the Accra-Winneba/Cape Coast trunk road and bounded on the south by the Atlantic Ocean coastline. It covers an area of about 34 km², made up of 21km² of lagoon and freshwater marsh, 11 km² of salt pans, 2.4 km² of scrub and 0.25 km² ° of coastal sand dune (Oteng-Yeboah, 1999).

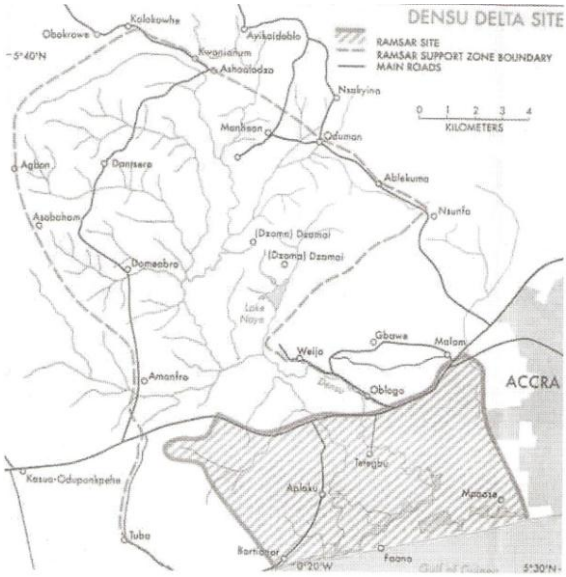

Fig. 4. Map of Densu Delta Ramsar Site (DDRS).

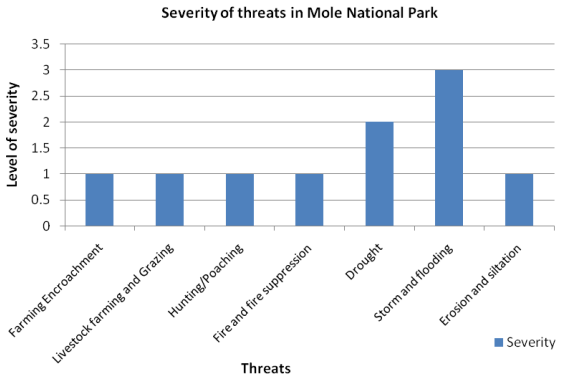

Fig. 5. Severity of Threats Facing the Mole National Park (MNP).

The climate of the MNP is distinctly seasonal, with a rainfall pattern characteristic of Guinea Savanna with more than 90% of the annual rainfall of 1,104 mm during the single rainy season from April to October, with peaks occurring in July and September. The dry season lasts for five months from November to March. The mean annual temperature of 27.8°C varies little throughout the year (26.1°C to 30.5°C). The harmattan, a cold dry dust-laden wind from the Sahara, blows from the northeast from December to

February (MNPMP, 1994). The mean annual temperature of the SSHRR varies from 25°C to 28°C and there are two distinct rainy seasons, a major season from April to June, and a minor one from October to November. Mean annual rainfall in the area is 810 mm (SHRRMP, 1992). The DDRS falls within the Coastal Savanna Zone of Ghana with annual bimodal rainfall regime of about 672 mm. The main wet season occurs from mid-March to the end of July peaking in June, followed by a minor wet season from early September to the end of November with peak in October. The average annual temperature is about 26°C (Oteng-Yeboah, 1999).

The MNP represents a fairly undisturbed Guinea savanna ecosystem, with the dominant vegetation type being open savanna woodland and narrow bands of riverine forest along most of the streams (MNPMP, 1994). The vegetation of Shai Hills is dominated by short-grass savanna with shrubs and trees and dry evergreen forests and thickets. There are about 397 species of vascular plants including endemic species. At the DDRS, the dominant plant species include *Ipomoea pescaprae, Sporobolus virginicus, Cyperus maritimus*, *Sesuvium portulacastrum*, *Rhizophora* sp., *Laguncularia* sp., and *Avicennia* sp. A total of 136 plant species belonging to 50 flowering plant families have been identified in the flood plains and elevated ground of the Densu Delta (Oteng-Yeboah, 1999).

The geology of the western part of the MNP consists mainly of the Lower Birimian System andMiddle Precambian schists which are more than two billion years old and forming a gentle undulating terrain. Precambian rocks in the eastern part of the park are overlain by sandstones, shales and mudstones of the Voltaian System (MNPMP, 1994). The Park forms part of the White Volta catchment with numerous rivers draining into the White Volta. The Kulpawn, Mole and Lovi are the major rivers draining the north, central and southern respectively, while several smaller rivers drain the back slope of the scarp to the east (MNPMP, 1994).

The SHRR consists of basic Precambrian gneisses, deep seated intrusive igneous rocks of great age. The inselbergs are made of hornblende gneiss. Two major soil consociations are vertisols, which form the soil of most of the reserve, and leptosols. The major drainage systems are concentrated to the west of the reserve where the Yiribi, Miagu and Flkonya streams flow southwards (SHRRMP, 1992). The DDRS catchment area is rimmed on the north and west by the western extremity of the Akwapim-Togo range. The geology of the Densu Delta catchment area is predominantly Precambrian quartzite schist with smaller amounts of phyllite, sericite schist, sandstone and shale. Densu, the main river that drains into the wetland, takes its source from the Atewa mountain range near Kibi. Three short streams on the eastern slopes of the Aplaku-Bortianor hill also drain into the Densu Delta and wetlands. (Oteng-Yeboah, 1999).

The MNP is home to 93 species of mammals belonging to 11 orders, 304 species of birds, nine species of amphibians and 33 species of reptiles. Species of conservation interest include elephants, buffalo, Buffon's kob, western hartebeest, roan, oribi and red flanked duikers. Leopard, lions and hyenas are important large carnivores in the park (MNPMP, 1994). At the SHRR, there are 31 mammal species including four bats, three primates, 10 rodents and seven antelopes. There are also 13 reptile species and 175 bird species. The dominant faunal elements are the antelopes, notably kob (*Kobus kob*) and bushbuck (*Tragelaphus scriptus*) which are of major management interest (SHRRMP, 1992). The DDRS contain a total of 15 finfish species belonging to 14 genera and nine families, 57 species of birds including seven species of terns. There are also 21 species of waders, herons, cormorants, little egret and others have been identified. The wetland is also home to a number of small mammals, reptiles and amphibians (Oteng-Yeboah, 1999).

Methods

Interviews and *Questionnaires*

Information was gathered from a total of 11 site managers and field officers who are involved in the day-to-day management of the PAs. We interviewed the site managers of the three PAs and three field officers each for the MNP and the SHRR, and two field officers for the DDRS. The respondents were deemed knowledgeable enough in view of their long experience with management of their respective PAs. The respondents were made to respond to specific management question using the WWF/World Bank Management Effectiveness Tracking Tool (METT). The METT employs a rapid assessment procedure based on scorecard questionnaire that assesses all six elements of good management (context, planning, process, inputs, outputs and outcomes) identified by the IUCN-WCPA framework, but with emphasis on context, planning, inputs and processes (Stolton *et al*., 2007).

There were 30 questions in the main assessment form, each with a four point scale:

0 = no or negligible progress;

1 = some progress;

2 = quite good but has room for improvement; and

3 = approaching ideal situation.

The scale required respondents to determine the acceptability or otherwise of certain situations. Additionally, three groups of supplementary questions elaborated key themes in the previous questions and provided additional information and points. The respondents were asked to ignore questions that were not relevant to their respective protected areas. They were also asked to list all the threat factors facing their respective PAs, and to rank the severity of each threat factor on a four point scale as follows:

1 = mild;

2 = moderate;

3= high;

4 = very high.

Scoring for each element of management on an ordinal scale by the respondents was considered adequate for the purpose of this study.

Analysis of data

The scores for each protected area were totalled and the percentage of the possible score calculated. A balance between the responses obtained for each protected area was used in the computation of management effectiveness. The final percentage values were interpreted in management effectiveness terms from "Unsatisfactory" to "Very Satisfactory" as follows:

0 - 35% = Unsatisfactory (US);

36 - 50% = Marginally Satisfactory (MaS);

51 - 75% = Moderately Satisfactory (MoS);

76 - 90% = Satisfactory (S);

91 - 100% = Very Satisfactory (VS).

Results

Threats

Overall, a total of 21 threat factors were recorded for the three PAs: seven for the MNP (Fig. 5), 11 for the SHRR (Fig. 6) and 19 for the DDRS (Fig.7), with five of the threat factors, poaching, livestock grazing, bushfire, and erosion and flooding being common to all the three protected areas. The most severe and pervasive threats which were scored as "very high", varied between PAs. Encroachment for housing and settlement was considered the most severe and pervasive threat for the DDRS (Fig. 7), while isolation from other natural habitats, and storms/flooding were the major threats for the SHRR (Fig. 6) and MNP (Fig. 5), respectively. Five of the threat factors facing the MNP were considered by respondents to be mild whiles one was considered to be moderate (Fig. 5). Of the 11 threat factors recorded for the SHRR, seven were said to be mild, two moderate and one high (Fig. 6), whilst for the DDRS six threat factors were said to mild, another six to be moderate and the rest to be high (Fig. 7).

Management effectiveness

Context

The siting of all the three PAs is consistent with the major objectives for which each was established-conservation of biodiversity and their habitats. They all have been legally gazetted, with long term legally binding protection, and boundaries appropriately demarcated and recognized by all stakeholders including the local people.

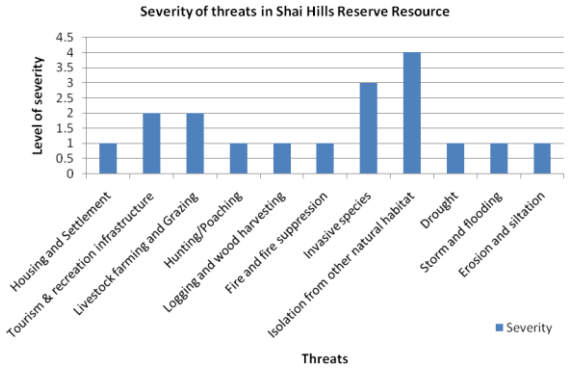

Fig. 6. Severity of Threats Facing the Shai Hills Resource Reserve (SHRR).

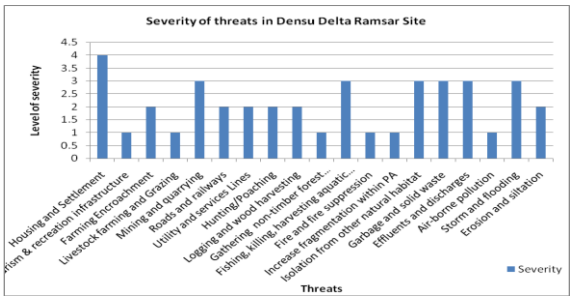

Fig. 7. Severity of Threats Facing the Densu Delta Ramsar Site (DDRS).

Legislation and other mechanisms for checking inappropriate land use practices and other activities that are detrimental to the long term conservation and management of the PAs existed. However, there were problems with effective implementation of such legislation, with the DDRS being the worst affected. These problems arose from inadequate number of personnel to enforce protected area legislation and regulations.

Information on critical habitats, species and cultural features and values of the protected areas were considered sufficient to support planning and decision making. However, necessary survey work was maintained only at the SHRR, with all three PAs lacking well-established systems of monitoring and evaluation.

Planning

The PAs have approved management plans that were being implemented. The MNP and the SHRR in addition had regular work plans which were produced in the 1990's and have since not been revised. This is a direct reflection of the lack of an established schedule and process for periodic review and updating of management plans.

The PAs were being managed to meet their agreed objectives, which were rather too general to enable performance assessment in specific areas. The objectives included (i) conservation of biodiversity and their habitats, (ii) preservation of indigenous features and cultural values, (iii) promotion of sustainable use of biodiversity and (iv) improving the economy and standard of living of rural communities.

The planning process in the three PAs provided adequate room for key stakeholders to influence the management plan to a lesser extent. Protected area design for the three PAs were considered appropriate for achieving set objectives. The MNP was said to be large enough to support viable populations of key-stone species incorporating, buffer zones and corridors that allow for migration of faunal species. The SHRR, however, was said to be too small and isolated to enable local migration of faunal species.

Table 1. Percentage score of the six elements of management effectiveness for the Mole National Park, the Shai Resource Reserve and the Densu Delta Ramsar Site.

Element of Assessment	Max. Possible Score	Mole National Park (MNP)			Shai Hills Resource Reserve (SHRR)			Densu Delta Ramsar Site (DDRS)		
		Total Score	Score (%)	Value	Total Score	Score (%)	Value	Total Score	Score (%)	Value
Context	15	12	80	S	14	93	VS	9	60	MoS
Planning	18	16	89	S	14	78	S	7	39	MaS
Processes	21	12	57	MoS	19	90	VS	9	43	MaS
Inputs	18	10	56	MoS	13	72	MoS	9	50	MoS
Outputs	9	6	67	MoS	7	78	S	0	0	US
Outcomes	15	13	87	S	15	100	VS	7	27	US
Overall	96	**69**	**72**	**MoS**	**82**	**85**	**S**	**41**	**42**	**MaS**

S= Satisfactory; MaS= Marginally Satisfactory; MoS= Moderately Satisfactory; US= Unsatisfactory.

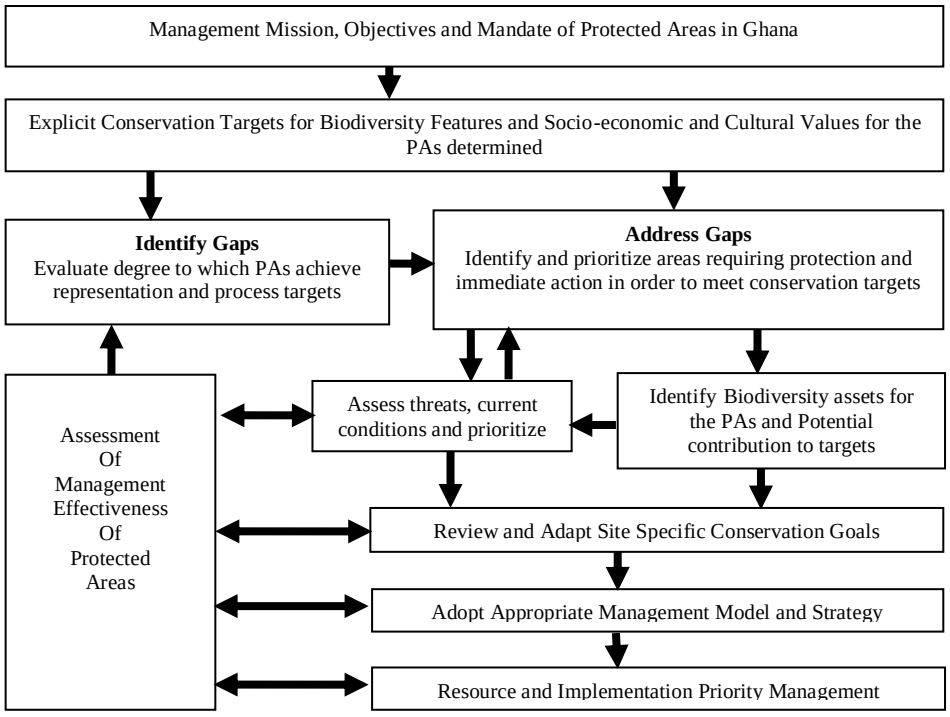

Fig. 1. Protected Area Management Effectiveness Assessment Framework.

The size of the DDRS was said to be just enough for the features, values and objectives for which it was established.

Processes

The results indicated that requirements for active management of critical ecosystems, species and cultural values were being substantially addressed at the MNP and the SHRR, but only partially addressed at the DDRS. Personnel management was considered to be appropriate and adequate at the DDRS. The situation at the SHRR was perceived by the reserve manager and the field officers to be adequate for the achievement of major management objectives but

needed improvement. The MNP, according to the two field officers interviewed, had problems with personnel management, which if not addressed, may constrain the achievement of major management objectives in future.

Budget management was deemed by their respective managers and field officers to be adequate and appropriate for the SHRR and the DDRS but only just adequate for the MNP. The SHRR and the MNP in addition, had good maintenance of their equipment and facilities.

Schedules for education and awareness programmes, and regular contact among managers, corporate land users and neighbouring communities existed but were rarely implemented at the MNP and the DDRS and even for the SHRR, implementation was perceived inadequate by the manager and two field officers.

The level of co-operation between managers and tour operators varied across protected areas, the SHRR having the best cooperation, enhanced visitor experiences, value protection and conflict resolution. There was limited cooperation at the MNP, and at DDRS, cooperation was nonexistent.

Inputs

Permanent staff numbers for the three PAs were 166, 24 and three for MNP, SHRR and DDRS respectively. These numbers were perceived to be below optimal level for critical management activities for the MNP and the SHRR and woefully inadequate for DDRS. Nevertheless, staff training and skills were said to be adequate for the three PAs.

Although this situation could be further improved for effective management, the available budget for SHRR and the MNP (actual figures were undisclosed) were perceived by their respective managers and field officers to be acceptable, with core budget reasonably secured. The managers of these areas however called for budget increases to enhance effective management. The available budget for the DDRS was considered inadequate by the site manager.

Equipment and facilities were inadequate across all three PAs. The MNP and SHRR had on-site management offices, senior staff bungalow, junior staff quarters, museum, and visitor accommodation facilities. The MNP has in addition a restaurant with recreational facilities including a swimming pool, a football pitch and a television room. The DDRS had no on-site management and visitor facilities and it is managed directly from the Head Office of the Wildlife Division (Forestry Commission) in Accra.

Outputs

Management outputs varied greatly across the three PAs, with visitor facilities and services being adequate for the SHRR, but inadequate for the MNP with its current level of patronage. The DDRS had no visitor facilities and services. There appeared to be open communication and trust between the managements of the MNP and the SHRR and the local communities and indigenous people, even though programmes to enhance local community welfare were said to be partially implemented in these PAs. Active restoration programmes for degraded areas within the PAs have been established and implemented for the SHRR and the MNP, but not the DDRS.

Alternative livelihood activities including apiculture, grasscutter farming and shear butter production, which aim to improve local economy and standard of living of local people, have been established and implemented in communities around the MNP and SHRR. However, programmes and activities that will support and enhance the sustainability of these livelihood activities, although existed on paper, were poorly implemented.

Outcomes

The results indicated that protection systems to check poaching, encroachment and other threat factors were adequate, appropriate and largely effective for the MNP and the SHRR. Accordingly,

biodiversity, ecological and cultural features and values were predominantly intact within these two PAs, but were deemed severely degraded as a result of poor law enforcement at the DDRS.

The flow of economic benefits to local communities from activities in and around the PAs, though minimal, was more in the SHRR than the MNP. Because of the low economic benefits that trickled to surrounding local communities, the PAs and their management have not been able to improve the standard of living of fringe communities as expected.

Overall Management Effectiveness

On the whole, the achievement of management targets and objectives was very satisfactory for the SHRR, satisfactory for the MNP, and unsatisfactory for the DDRS (Table 1).

Discussion

A threat factor is regarded as any human activity that directly or indirectly impairs the integrity and viability of biodiversity, ecological and cultural features and values in a PA (Phillips, 2001). The PAs assessed were faced with major threats such as poaching and encroachment and a series of other lesser threats. According to Phillips (2001), Ervin (2003) and (Hockings, 2003), threats occur in almost every protected area worldwide especially in developing countries where majority of the people depend on forests and their associated resources for their livelihood.

Alternative livelihood activities have been introduced in many rural communities in and around PAs to help minimize the incidence and intensity of threats within such areas. In Ghana, these include among others, apiculture (bee keeping), grasscutter domestication, shea butter processing, and poultry farming. The effects of these activities, however, have been undermined by socio-cultural traditions such as hunting and bushmeat consumption, food gathering, harvest of medicinal plants, grazing and collection of wood and other forest products. Such traditions, are deeply entrenched in local communities, and make it virtually impossible to prevent threats in PAs.

Protected area management in many countries including South Africa, China, Russia and US, have serious gaps in context and planning (Ervin, 2003; Goodman, 2003). For instance, in the United States more than a quarter of PAs are located in areas with the least productive soils, and more than half are at elevations higher than 2400 meters (Ervin, 2003). The situation in the three PAs assessed in this study was however different. Managements were generally strong on issues relating to management context, planning, and processes attributable to the government's commitment to *in situ* biodiversity conservation, but high costs of PA management, coupled with the constraints of a developing economy, make it practically impossible to uniformly sustain the provision of inputs that are needed to implement conservation interventions. Funds for managing natural resources in developing countries are often highly dependent on outside support and subject to the vagaries of international economy and politics. The capacities of governments to manage PAs and natural resources in general, have declined as a result of structural adjustment programmes and cut backs in international aid. The degree of management effectiveness of PAs in Ghana is thus a good reflection of the efficiency with which the available limited resources are used.

Assessment of management effectiveness is useful if it enables managers to strategically allocate limited resources. To maximize gains for biodiversity conservation, it is important to allocate resources strategically and channel funds to areas that have the highest conservation priority and to focus on issues most critical to protecting biodiversity (Goodman, 2003). All three PAs assessed in this study are of local and international significance and thus are equally important. However, the DDRS is seriously threatened by encroachment for housing and settlement and pollution. This site stands to lose its international recognition if immediate measures are

not taken to reverse the current situation. It is recommended that this site is prioritized and given all the needed attention and resources. Intervention programmes should include intensive education and awareness creation and activities to reduce poverty within the surrounding local communities.

Internally generated funds may be a surety for increased and secured budget for all the PAs. Efforts should be made to maximize the fund-raising potential of the sites. A good collaboration between protected area managers and tourism operators and provision of more visitor accommodation facilities may be necessary in this wise.

Deposition of funds generated from the different PAs into a common central fund should be given a second look since it is always difficult and time-consuming to withdraw money from such funds to address urgent issues.

Acknowledgement
IDEA WILD provided equipment support for the study.

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