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Evaluation of management effectiveness of protected areas in the Volta Basin, Ghana: perspectives on the methodology for evaluation, protected area financing and community participation

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ABSTRACT

Protected areas are widely recognized as an important strategy for biodiversity conservation. Most of the sites are, however, poorly managed as resource exploitation by fringe communities and low government funding, among other things, threaten their management effectiveness. We used the World Commission on Protected Areas framework for designing management effectiveness evaluation systems, with the Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) methodology as a tool, to evaluate six components of the management cycle at six sites in Ghana for their management effectiveness. We examined the robustness of RAPPAM as an evaluation tool in the African context. The results showed that most of the sites evaluated are vulnerable and exposed to various degrees of pressure and threats, including poverty in the nearby communities, adjacent land-use and encroachment. On RAPPAM, we noted that apart from inconsistencies in some of the assessment scores due to the biases associated with the self-assessment approach of the methodology, the management effectiveness framework places little emphasis on financing and community participation, though both play major roles in the management process. We proposed a modification of the framework within the African context, to address effectively the underlying courses of pressure and threats facing Ghana's protected areas.

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Protected areas; management effectiveness evaluation; community participation; financing; Volta Basin; Ghana

1. Introduction

Human impacts on natural ecosystems have resulted in habitat fragmentation, habitat loss and threats of species extinction. One global policy tool used to conserve biodiversity and to prevent the loss of habitats and wildlife is the establishment and management of protected areas (Eklund & Cabeza, 2017; Joppa, Loarie, & Pimm, 2008). A protected area (PA) is defined as *A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values* (Dudley, 2008). Protected areas have a diverse constituency, being first and foremost recognized as cornerstones of biodiversity conservation (Chape, Blyth, Fish, Fox, & Spalding, 2003). They are vital in ecological resilience-building under their capacity to absorb disturbances (Gunderson, 2000). Additionally, protected areas support ecosystem services and abound in resources vital for local economic livelihood enhancement (Bushell & Bricker, 2017).

Since 2000, the member countries of International Conservation Union (IUCN) have implemented policy guidelines to ensure increased global protected area coverage and to enhance the management effectiveness

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of these areas for safeguarding biodiversity loss. For instance, the framework for the evaluation of protected area management effectiveness was designed as a guide to assess how protected areas are meeting their goals and objectives (Hockings, Stolton, & Dudley, 2000). This initiative resulted in the development of about 95 methodologies and the implementation of more than 18,000 protected management effectiveness evaluations in over 9,00 sites (Geldmann et al., 2015). Another policy initiative was the setting of a global goal in 2005 to achieve at least 10% of global protected area coverage by 2010. This resulted in an increase in protected area coverage to about 12.7% by 2012 (Bertzky et al., 2012). Also, in 2010, the Convention on Biological Diversity (CBD) set the target for the evaluation of at least 60% of global protected areas by 2015 (CBD, 2010). Though by 2013, only about 29% of nationally designated protected areas were evaluated for their management effectiveness globally (Coad et al., 2013), indications are that many participating states were committed to these policy goals. Following the overwhelming global interest to achieve conservation objectives, Goal 11 of the Aichi 2020 Targets, under the CBD was set, calling for the protection of 17% of terrestrial and 10% of world's oceans by 2020 (Venter et al., 2014). So far, about 15.4% global protected area coverage that comprises approximately 236,200 sites has been achieved, with about 7% of the marine area within national jurisdiction (UNEP-WCMC and IUCN, 2017).

In spite of this global commitment and seeming success in protected area coverage, research has shown that more than 40% of protected areas are poorly managed (Leverington et al., 2010) and not only biodiversity is not in decline but also more species are in danger of extinction (Cook & Hockings, 2011; Tittensor, 2014). According to Schulze et al. (2017), an assessment of threats to terrestrial protected areas, based on data from 1,961 sites across 149 countries, showed that biological resource use was the most reported threat in 75% of the protected sites, with hunting being the most commonly occurring threat in 61% of the protected areas.

In Africa where poverty levels are high, protected areas are faced with myriads of threats from poaching and human encroachment because governments find it difficult to fund protected area networks adequately (Lindsey et al., 2013). On the contrary, the more developed countries, where funding is relatively better, are faced rather with threats from recreation (Jones, Newsome, & Macbeth, 2016). IUCN (2012) gave a regional breakdown of protected area threats in Africa and indicated that whereas Central, Western and Eastern African protected areas have hunting as the main threats, those in Southern Africa have invasive species and Northern Africa recreational activities as the main threats. The differential impacts could be an indication of disparities in the levels of funding, as Central, Western and Eastern African countries are relatively less economically developed than those from Southern and Northern Africa. Biodiversity is, therefore, fast eroding in these countries even within protected territories. For instance, several authors have reported of the rapid disappearance of large mammals in the protected areas of West Africa (Brugière, Chardonnet, & Scholte, 2015; Craigie et al., 2010; Scholte, 2011). In Kenya in East Africa, Ogutu, Owen-Smith, Piepho, and Said (2011) reported of decreases in populations of almost all wildlife species to a third or less of their former abundance in both protected areas and adjoining areas.

For these and other reasons, protected area management effectiveness has come under scrutiny and efforts are directed to articulate the criteria for a well-managed protected area where biodiversity and wildlife are protected, and local communities are benefitting from these protected lands (Watson, Dudley, Segan, & Hockings, 2014). This study, therefore, sought to evaluate the management effectiveness of six protected areas in Ghana, using the IUCN/World Commission on Protected Areas (WCPA) framework for designing management effectiveness evaluation systems (Ervin, 2003a, 2003b). The Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM) methodology, which is based on the IUCN/WCPA framework, was adopted as the evaluation tool. The robustness of the framework and the RAPPAM methodology were assessed within the context of the 'inclusive approach to ecosystems management', to determine the underlying courses of pressure and threats faced by the protected areas in Ghana and other parts of Africa.

1.1. Theoretical underpinning

Over the past three decades, local participation in decision-making, planning and benefit-sharing has been recognized as very crucial in ecosystems management. This research is premised on the 'inclusive model',

which relates conservation success to active local participation in decision-making and management (Tsinjg, Brosius, & Zerner, 1999). This model comes as a major paradigm from the 'exclusive model' which regarded local community members as intruders or outsiders who had to be kept at bay (Brechin, Wilshusen, Fortwangler, & West, 2003; Ferraro, 2002; Hockings, Stolton, Leverington, Dudley, & Corrau, 2006; Scherl et al., 2004).

The tenets of the inclusive model concur with the views of several other authors (Brekes, 2004; Brockington, 2004; Kothari, Camill, & Brown, 2013) who regarded local participation as paramount to conservation success. Meffe, Nielsen, Knight, and Schenborn (2002), for instance, applied this principle in developing the Ecosystems Management Framework, which prescribed zones of ecosystems management that incorporates ecological, socio-economic and institutional contexts, for the achievement of win-win-win solutions. Drawing from the same principle, Brooks, Franzen, Holmes, Grote, and Mulder (2006) considered four contextual items, namely ecological, economic, behavioural and attitudinal outcomes as criteria, for evaluating successes or failures of conservation programmes. According to them, economic and ecological outcomes relate to conservation target and human welfare respectively, whereas attitudes and behaviours incorporate the views of residents to the goals of conservation. Local inclusion would thus, engender behavioural change and reduce threats.

According to Hockings et al. (2006), the direct costs of managing protected areas are often distorted by the real or perceived indirect costs to surrounding communities. Compensation payment to local communities, for instance, appears to be a very controversial issue as many developing countries, such as in Africa, lack the capacity to pay full compensation to deserving landowners who are often forced to vacate their ancestral lands for the establishment of protected areas. In many cases, the result is general dissatisfaction among local community members leading to uncooperative behaviour, such as poaching and agricultural encroachment (Ayivor & Ntiamoa-Baidu, 2015; Wells & Brandon, 1992).

Closely related to local participation is the financing of protected areas, which researchers identified as a major challenge to the effective management of protected areas in Africa (Lindsey et al., 2013). Burner, Gullison, and Balmford (2004) cited 'empty forest parks' in Ghana, a situation where inadequate financial support for protected areas has resulted in the loss and degradation of important natural resources. In recent times, financial support from conventional sources, such as governments, royalties, donor agencies, multilateral organizations and NGOs, has come under stress due to the intense competition from other priority areas, such as education and health (Ayivor, Ofori, & Nyametso, 2017; Font, Cochrane, & Tapper, 2004; FPATF/WCPA/IUCN, 2000). Scholte (2011), noted that a three- to ten-fold increase in the operational budget of African protected areas is required to manage the protected areas effectively. The quest for an alternative source of funding for protected area saw the emergence of payment for ecosystems services which aims at providing positive incentives for good environmental stewardship (Ferraro & Kiss, 2002). According to Swallow et al. (2009), this funding strategy calls for retooling of the financing component of the management effectiveness framework to make it more applicable in the African context. From the foregoing, it is clear that local participation and financing in protected area management are two important building blocks to their effectiveness.

1.2. Overview of management effectiveness evaluation

The evaluation of protected area management effectiveness for this study was modelled on the WCPA framework for designing management effectiveness evaluation systems (Hockings, Stolton, & Dudley, 2000). Management effectiveness evaluation refers to the extent to which management is protecting values and achieving goals and objectives of protected areas (Hockings et al., 2006). It reflects three major themes in protected area management, namely: (i) design issues, relating to both individual sites and protected area systems; (ii) adequacy and appropriateness of management systems and processes; and, (iii) delivery of protected area objectives including conservation of values (Hockings et al., 2006). To maximize the potential benefits of protected areas and to minimize threats, there is a need to understand the strengths and weaknesses in their management through the evaluation process.

Hockings et al. (2000) provides the structure and process of the WCPA framework and a checklist of issues that need to be assessed, with suggestions of possible indicators. As illustrated in Figure 1, the structure entails

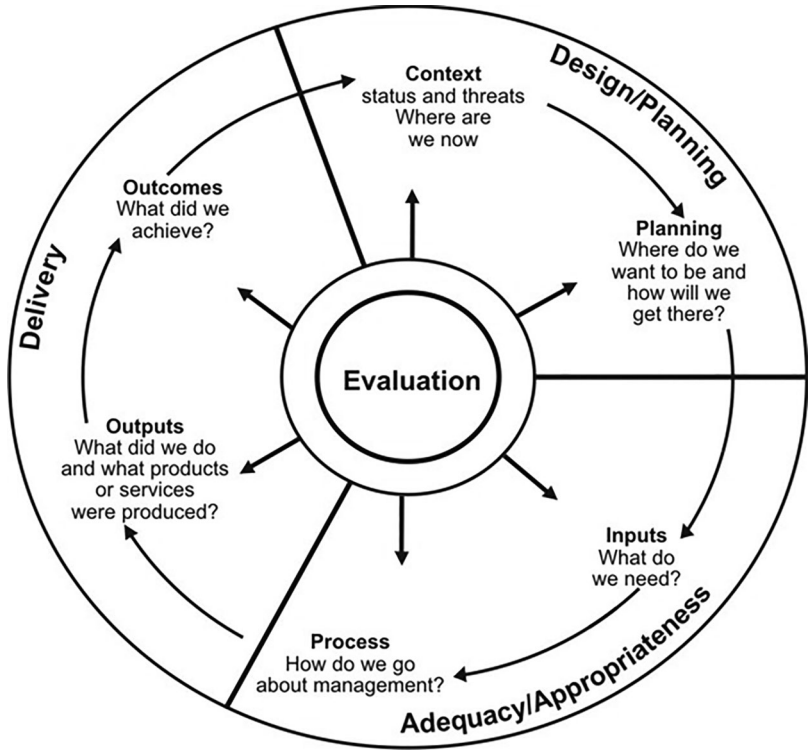

Figure 1. The cycle of management and evaluation of PAs (Source: Hockings et al., 2000).

six distinct components under three broad management themes, namely 'design/planning', 'adequacy/appropriateness' and 'delivery'.

Over 95 assessment tools have been developed from the IUCN/WCPA Protected Area Management Assessment Framework for the evaluation of management effectiveness of protected areas (Geldmann et al., 2015). Six of these methodologies are widely used internationally, while the rest are used regionally. The internationally based ones include RAPPAM (Ervin, 2003b); Management Effectiveness Tracking Tool (METT) (Stolton et al., 2007); Enhancing Our Heritage (EOH) (Hockings et al., 2007); How is your MPA doing (Pomeroy, Parks, & Watson, 2004); Conservation Action Planning (TNC, 2007); and WWF-World Bank MPA Score Card (Staub & Hatziolos, 2004). The African-based ones are West Indian Ocean Workbook, Egyptian Site-level Assessment, Central African Republic-Evaluation of 'Conservation Potential' of Protected Areas and Threats Analysis in Uganda (Leverington, Hockings, Pavese, Costa, & Couttau, 2008).

A critical assessment of these methodologies revealed that most of them are designed for site-level assessment or monitoring and evaluation and thus, not suitable for broad level comparisons. Also, many of them were either exclusively designed for marine-protected areas or may not cover all the key components of the WCPA Management Assessment Framework (Leverington et al., 2008). The RAPPAM methodology, which this study adopts, is designed for broad-level comparison among many protected areas and provides protected area managers and policymakers with a relatively quick and cost-effective method for identifying major threats and issues that need to be addressed to enhance management effectiveness (Ervin, 2003b).

The methodology is based on a self-assessment method intended to solicit perceptions of protected area managers and administrators on all issues about protected areas based on the scientific data available to them and on the experience of participants (Sciberras & Rodriguez-Rodriguez, 2013). The effectiveness assessment is meant to review the management processes, while the systematic assessment involves observing system-level design, protected area policies and policy environment (Ervin, 2003a). The approach was selected for this

study because of its uniqueness as a comparative assessment tool for several protected areas in a geographical region such as a watershed, a province or a country (Lu, Kao, & Chao, 2012).

2. Materials and methods

2.1. Selected sites

The protected area system in Ghana comprises ca. 36,973 km^2 (15.5%) of the country's land area made up of 266 forest reserves and 24 wildlife protected areas. The wildlife protected areas include seven National Parks, one Strict Nature Reserve, six Resource Reserves, four Wildlife Sanctuaries and six Ramsar Sites (EPA, 2017). Currently, 16 of the wildlife protected areas are backed by L.I. 710. The management effectiveness of some individual sites has been assessed in the past (IUCN/PACO, 2010), but there has not been any system-wide management effectiveness evaluation of protected areas covering the entire country or a delineated area, such as an ecological region or geographical region. This study, therefore, focused on the Volta River basin, which is a strategic geographical region covering about two-thirds of the area of Ghana.

The Volta Basin is a major geographical landmark in Ghana, accounting for about two-thirds of the total land area of the country. There are six major wildlife protected areas in this basin: the Bui National Park (1,813 km^2), Digya National Park (3,478 km^2), Gbele Resource Reserve (565 km^2), Kogyae Strict Nature Reserve (386km^2), Kyabobo National Park (222 km^2) and Mole National Park (4,577 km^2) (GFC, 2012) (Figure 2).

The study focused on the Volta Basin because it is a well-defined geographical region in which several of the large protected areas in the country are located. The basin is a major agro-ecological zone and regarded as the food hub of Ghana (Titriku, 1999). It is also of strategic importance to the Akosombo, Kpong and Bui hydro-electric power plants located on the Volta River, which together produces over 50% of Ghana's electricity needs. Effective management of forest and wildlife resources within the basin will ensure a much more diversified landscape and enhance the protection of the Volta lakeshores to maintain the power generation capacity of the hydro-electric dam.

2.1.1. Methods

The RAPPAM methodology is based on questionnaire administration in a workshop setting and pre-designed to evaluate six components of the IUCN/WCPA framework (Table 1).

The fact-finding workshop involved 40 participants comprising protected area managers and administrators from the Wildlife Division of the Ghana Forestry Commission, personnel from NGOs and academics from the University of Ghana. An 18-page questionnaire was completed for each of the six protected areas. The analysis was based on the format specified by the RAPPAM methodology (Ervin, 2003a) and discussed during the two-day workshop. By convention, each component and its elements (Table 1) were assigned scores which provided quantitative data for the analysis (Ervin, 2003a).

According to the methodology, every activity which is pressure or threat to the protected area has three measurable indicators, namely: extent, impact and permanence. The 'extent' could be localized, scattered, widespread, or throughout; 'impact' could be mild, moderate, high or severe; while 'permanence', which refers to time scale, could be short-term, medium-term, long-term or permanent. Each of the four attributes describing the nature of the elements carries a score ranging from one to four. For each activity, the product of scores for all three attributes (i.e. extent, impact and permanence) gives the degree of pressure or threat that the activity poses. Each pressure or threat has a score of one (1) to 64, which is the product of the *extent* with a scale of 1–4 [i.e. localized (1), scattered (2), widespread (3), throughout (4)]; the *impact* [scale 1–4 i. e. mild (1), moderate (2), high (3), severe (4)] and *permanence* [scale 1–4 i.e. short-(1) term (2), medium-term (3), long-term or permanent (4)]. It is, therefore, not a linear scale. A total score of 1–3 is weak, 4–9 moderate, 12–24 high and 27–64 severe. The cumulative score for each pressure/threat is obtained by adding the individual scores for each pressure/threat and multiplying the result by the number of protected areas being assessed (e.g. $64 \times 6 = 384$).

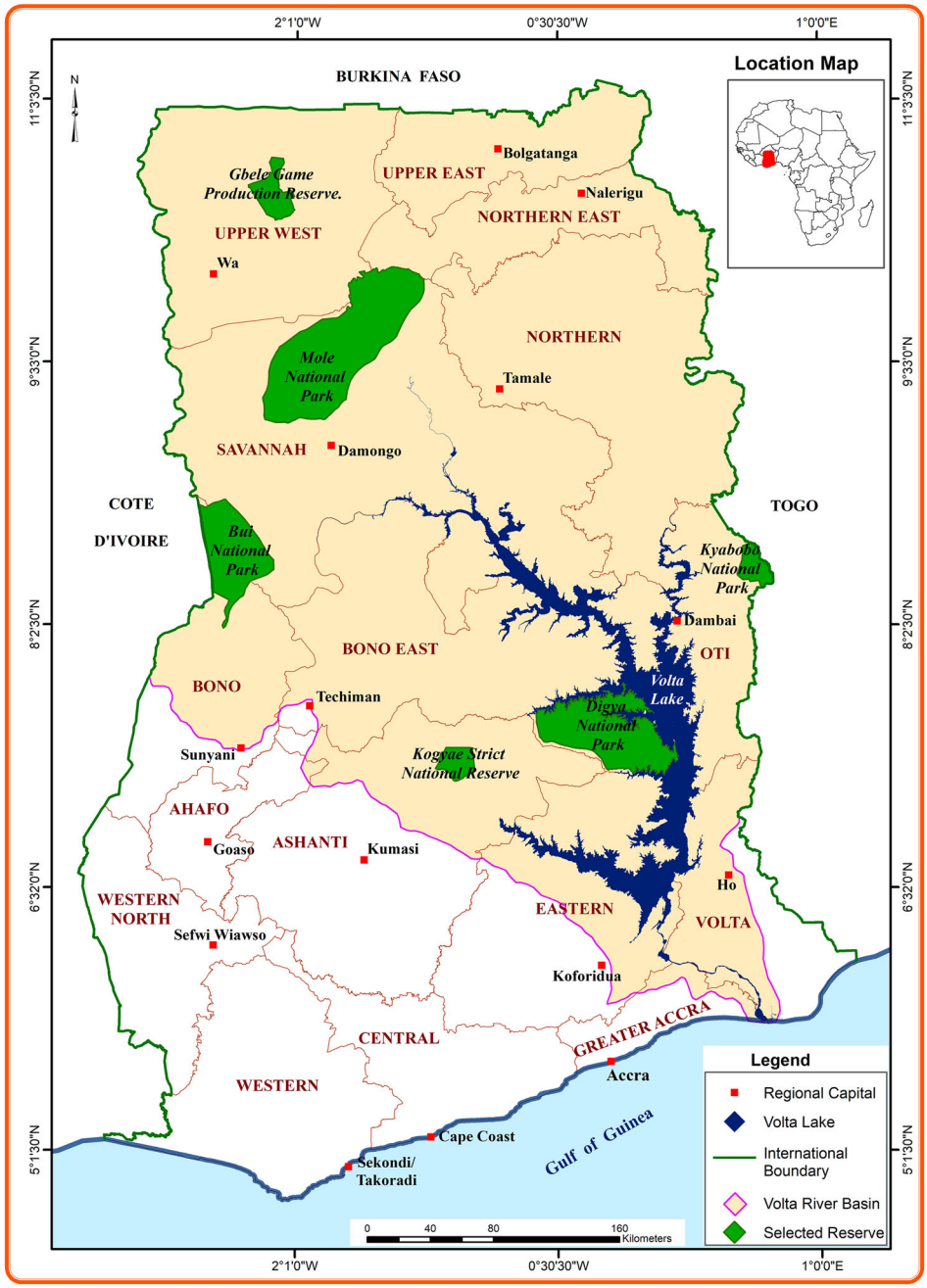

Figure 2. Map of the Volta Basin in Ghana and the selected wildlife protected areas.

About questions on biological and socio-economic importance, there were four possible responses, namely: yes (5), mostly yes (3), mostly no (1) and no (0). A score of 5 does not necessarily mean that there is no problem and a score of 0 does not indicate total failure. Average scores for the elements under each of the components were calculated and the results presented graphically.

The RAPPAM methodology recommends the inclusion of all protected areas within a country (up to about 50 or more) for assessment. The guidelines state that for any smaller identifiable region (e.g. a river basin), six or

Table 1. Components of the RAPPAM methodology.

Components	Assessment Elements	
Context	• Biological importance • Socio-economic importance	• Vulnerability • Pressure • Threats
PA Design and Planning	• PA objectives • Legal security	• Site design and Planning • PA system design
Inputs	• Staff • Communication and information equipment	• Infrastructure • Finance
Management Process	• Management planning • Management practice	• Research, monitoring and evaluation
Output	• Threat prevention • Site restoration • Wildlife management • Community outreach • Visitor management	• Infrastructure outputs • Planning outputs • Monitoring • Training • Research
Outcomes	• PA policy • Policy environment	• Biodiversity conservation • Community involvement

Source: Ervin (2003a).

more protected areas could be assessed using the methodology (Ervin, 2003b). The methodology, therefore, was considered appropriate for assessing the management effectiveness of the six protected areas within the Volta basin (Figure 2).

According to Ervin (Ervin, 2003a), management effectiveness evaluation entails the assessment of four out of the six components of the IUCN/WCPA framework: planning, inputs, process and output. The analysis of the 'context' component only provides information on the status and threats of protected areas. It is not considered in the actual management effectiveness evaluation but ascertains the nature and extent of pressure and threats, vulnerability, as well as biological and socio-economic importance of the protected area. The assessment of this component was considered as very crucial in ascertaining the current state-of-the protected areas. Another component of the framework not added in the management effectiveness evaluation is 'outcome'. As prescribed by the methodology (Ervin, 2003a), the study used systematic assessment method, which entails a review of system-level design, protected area policies and the policy environment, to provide a summary of the results for the outcome.

The results of the evaluation and other studies assess the robustness of the RAPPAM methodology, which is based on the WCPA Management Effectiveness Framework (Ervin, 2003a, 2003b).

Graphical methods, such as bar charts, statistical tables and a schematic model, were used as analytical tools. Pearson correlation was used to determine the relationships between the four components of management effectiveness evaluation.

3. Results

3.1. Biological and socio-economic importance of PAs

The scores for biological and socio-economic importance are presented in Figure 3. Digya and Gbele scored highest for biological importance on the scale of 0–5, while Gbele and Kyabobo scored highest for socio-economic importance. Kogyae recorded the lowest scores for both biological and socio-economic importance.

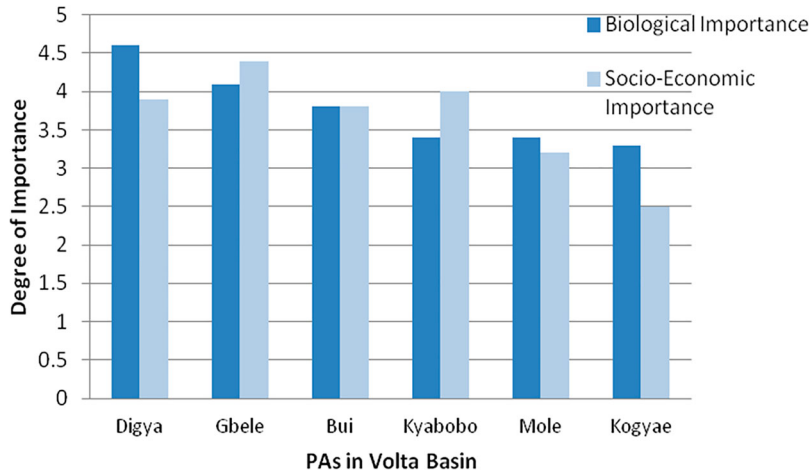

Figure 3. Scores for biological and socio-economic importance for the different PAs.

With regard to average vulnerability of the respective protected areas, the main issues observed were the high market value of protected area resources and the high demand for them; easy accessibility of the areas to illegal activities; low law enforcement and non-deterrent penalties on offenders; and difficulty to monitor illegal activities dues to low staff strength, low remunerations for staff and high level of corruption. The scores for vulnerability ranged from 2 to 2.9, showing how vulnerable the areas were. The most vulnerable protected area was Kogyae followed by Mole, Kyabobo, Gbele and Bui in that order, while the least vulnerable was Digya. Pressure and threats facing protected areas in the Volta basin were categorized as either direct (such as 'agricultural encroachment', 'poaching' and 'fuel wood extraction') or indirect ('poverty in nearby communities' and 'adjacent land use').

Figure 4 provides cumulative scores for the degree of pressure and threats faced by the protected areas on the scale of 0–384. The six most serious pressures were 'poverty in nearby communities' (with a cumulative score of 143), 'illegal entry including poaching' (92), 'adjacent land-use' (77), 'indiscriminate waste disposal' (75), 'high human population' (72) and 'agricultural encroachment' (47). Concerning threats, 'poverty in nearby communities' (with a score of 127), 'illegal entry including poaching' (125), 'high population densities' (114) and 'adjacent land-use' (113), were among the most severe.

3.2. Overall management effectiveness

Overall management effectiveness refers to the composite representation of the scores relating to planning, inputs, processes and output. The results of the analysis illustrate whether or not protected areas have achieved the goals and objectives set out for the four components. The relationship between these four components is important for the management effectiveness enhancement. Figure 5 shows the relationships of overall management effectiveness assessed under the four components of the framework. The average scores were: 'Planning' 3.6; 'Inputs' 2.7; 'Process' 3.7; and 'Outputs' 3.9.

Comparing individual protected areas, the average scores for the assessment suggested that in terms of achievement of goals and objectives, Kyabobo scored the highest, followed by Kogyae, with Bui and Mole scoring the lowest (Figure 6).

Analysis of input, output, process and planning using the Pearson Correlation coefficient shows no significant relationship among the components (p-value > 0.05). However, there is an inverse relationship between input and output i.e. −0.321 and input and process (−0.189). Input and planning nonetheless showed a positive relationship (0.929). The analysis indicates that output has an inverse relationship with all the other components i.e. −0.321, −0.756 and −0.143 for input, process and planning, respectively. This implies that inadequate planning, fewer inputs and inadequate processes, somehow, resulted in high output, which is quite questionable.

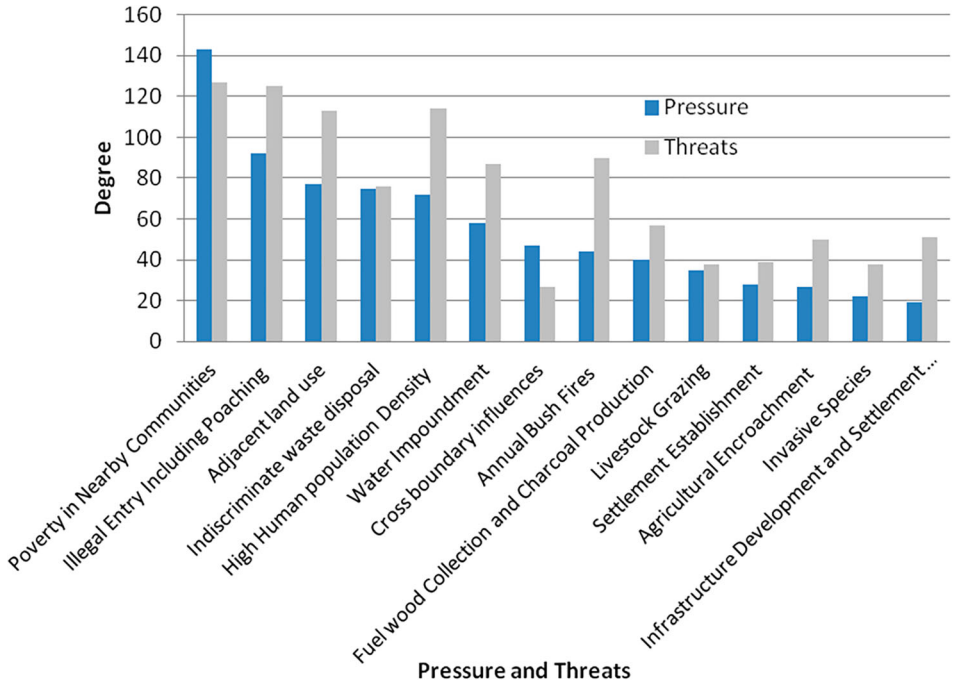

Figure 4. Degree of cumulative pressure and threats facing the Volta Basin PA system.

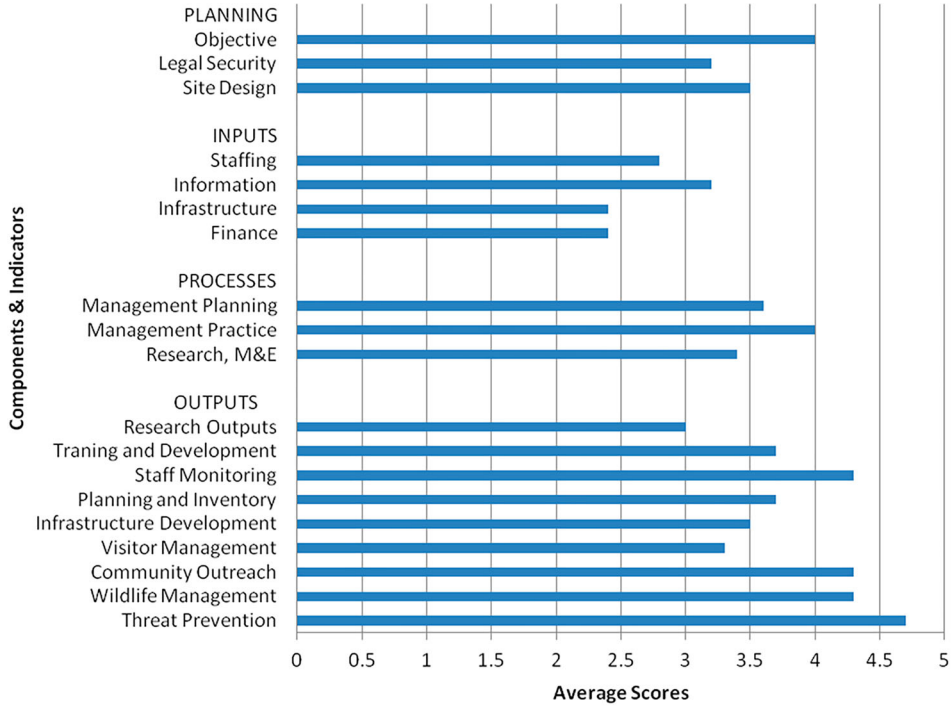

Figure 5. Average scores for overall management effectiveness of the six protected areas.

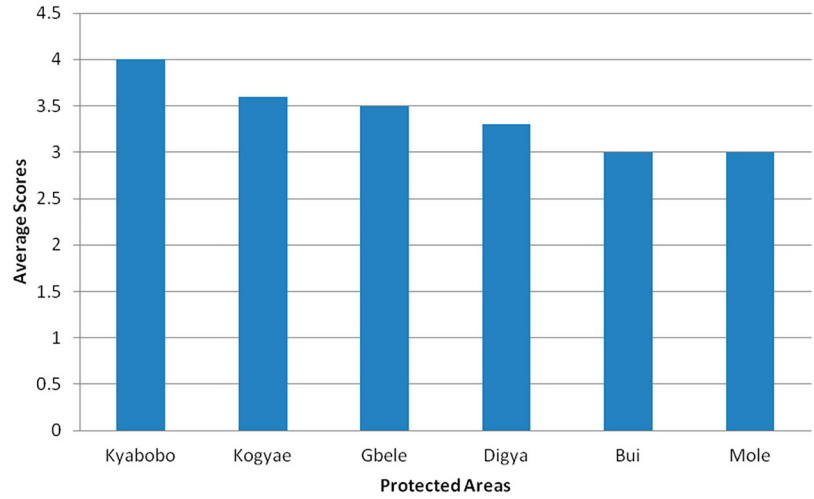

Figure 6. Comparison of individual protected areas in terms of their scores for achievement of goals and objectives management effectiveness.

3.3. Management outcome

Assessment of outcome is important because it measures the actual achievements of management actions. One important element evaluated was the PA system. The results showed the protected area system in the basin did not have any elaborate network of connectivity enhanced by biological corridors, buffer zones or sustainably managed landscapes to ensure functional relationship within the system. However, the protected area system maintains ecosystems representativeness and natural processes such as migratory patterns of birds across the landscape.

About policy environment, the results revealed that though good policies exist for the effective management of the protected areas in Ghana, the processes to ensure smooth implementation of the policies were not vigorously pursued. It was noted, however, that the outlook on policy environment was positive as direct national policy regimes which facilitate and promote the effective management of protected areas, such as poverty eradication, had received much attention. Ghana has pursued both national and international development programmes aimed at poverty eradication including, e.g. the UN Millennium Development Goals, New Partnership for Africa's Development (NEPAD), Ghana Shared Growth and Development Agenda (GSGDA) and the Sustainable Development Goals (SDGs).

3.4. Local participation and protected area financing

The IUCN/WCPA management effectiveness framework, on which RAPPAM is based, fails to give stronger recognition to two components of management effectiveness that we consider as paramount to protected area success in the African context. These are 'local community participation' and 'protected area financing'. The two components were mentioned partly under 'planning', 'inputs' 'management process' and outputs components, as shown in Table 2. However, these were not presented as independent components for evaluation in the framework, thus, failing to bring their influence to bear on the evaluation process particularly in the African context.

4. Discussion

4.1. Context

Biological importance in the context of protected area management evaluation refers to the ability of a protected area system to protect and maintain the diversity of life forms. The results of both the current and previous

Table 2. Components of IUCN/WCPA management effectiveness model with highlights on 'Local participation'.

Component	Local participation	Protected area financing
Planning	• local communities support the overall objectives of the PA • unsettled disputes regarding land tenure or use rights • effective resolution of conflicts with the local community • land use in the surrounding areas and how this enables effective PA management	• Staff and financial resources are adequate to conduct critical law enforcement activities
Input	• effective communication with local communities	• Funding in the past 5 years has been adequate to conduct critical management activities • Funding for the next 5 years is adequate to conduct critical management activities • The allocation of expenditures is appropriate to PA priorities and objectives • Financial management practices enable efficient and effective PA management • The long-term financial outlook for the PA is stable
Management Process	• the degree to which PA staff regularly collaborate with partners, local communities, and other organizations • local community participation in making decisions that affect them	
Outputs	• efforts of PA managers in community outreach and education	

assessments (e.g. IUN/PACO, 2010) indicated that most of the protected areas were reported to contain a relatively high numbers of mammalian species.

Concerning individual protected area performance in biological importance, Digya National Park had the highest average score. This may be attributed to the fact that Digya supports small populations of the African elephants (*Loxodonta africana) and* manatee (*Trichechus senegalensis)*, listed on IUCN 'Red List' as vulnerable; and clawless otter (*Aonyx capensia*), listed as near threatened (IUCN, 2016; Jachmann, 2010). In the literature, however, Mole National Park is recognized as biologically very important with a wide array of species (IUCN/PACO, 2010).

Socio-economic importance of protected areas refers to both tangible and intangible values of the protected area and their ability to meet the economic, socio-cultural, religious and spiritual needs of local people and the society as a whole. The protected areas evaluated showed high scores for elements such as recreational, cultural and educational values, which is indicative of the high potential for ecotourism. The total contribution of the tourism sector to GDP in Ghana was 2.3% of GDP in 2011 with a net revenue of US$2.19 billion and created 234 679 jobs (Eshun & Tagoe-Darko, 2015). The Kakum and Mole national parks receive a record number of visitors on an annual basis and have contributed significantly to the ecotourism sub-sector (Eshun & Tagoe-Darko, 2015; Jachmann, 2010).

Threats to the protected areas vary spatially and temporally. The dominant threats in the 1980s and 1990s related mainly to resource allocation, policy issues and direct exploitation of protected area resources (IUCN/CNPPA, 1984); (Hockings, 2003); (Shushila, 2006). From 2000 onwards the threats related more to population-induced issues, namely, adjacent land-use, agricultural encroachment and poverty in nearby communities. A critical analysis of the pressures facing the protected areas evaluated revealed that 'Poverty in the nearby communities' featured as the highest pressure in all cases. This is reflective of what pertains worldwide (Scherl et al., 2004). While monetary poverty index in Ghana has decreased from 51.7% in 1992 to 24.2 by 2015, incidence of poverty persists in rural areas (Ghana Statistical Service, 2016). A recent poverty mapping in Ghana indicated that poverty is prevalent in and around most of the districts where protected areas are located (Ghana Statistical

Service, 2015). Examples of these districts with the respective poverty indices are West Gonja (Mole): 52.7; Sissala West: 81.2 (Gbele); Sekyere Afram Plains: 59.6 (Digya); and Banda: 78.0 (Bui), compared to the national average of 24.2 (Ghana Statistical Service, 2015).

A critical look at the scoring for the four components evaluated for management effectiveness revealed that 'planning' scored relatively high, which suggested that the management objectives have provided for the protection and maintenance of biological diversity, and there was enough legal security to provide long-term security for all the protected areas evaluated (Ervin, 2003a). On the other hand, the 'input' component, which was supposed to be the prime mover of management effectiveness, had a relatively lower score. This suggested that most of the protected areas did not have adequate inputs with which to work. The 'management process' component had relatively high scores suggesting that despite the low inputs, the protected areas' staff carried out their duties diligently. The 'output' component recorded a high score which suggested that the objectives set out for the management of the protected areas were generally being met.

Furthermore, the analysis of the context component revealed that although Kogyae Strict Nature Reserve scored the least in terms of 'biological importance', 'socio-economic importance' and 'vulnerability', it scored second best after Kyabobo National Park, under the 'Overall Management Effectiveness' assessment. Indeed, these are inconsistencies that are not supported by the literature, as discussed in the section below. Many authors have attributed the inconsistencies to the inherent weakness in the RAPPAM methodology's design and implementation, specifically the biases associated with self-assessment (Coad et al., 2013).

4.2. Robustness of RAPPAM as an evaluation tool in the local context

Several weaknesses were observed in applying the methodology within the local context. Under 'management outputs' for instance, we noted that the elements assessed had fairly high scores, which by implication, reflected successes in threat prevention, management of wildlife, community outreach programmes, staff monitoring, visitor management and training and development. These results, however, were not consistent with the results of the 'input' component, as the scores for most of the elements appeared inadequate for the effective protected area management. In other words, it appears irrational for low inputs (which should have correspondingly resulted in low outputs), to give rise to high outputs.

Moreover, the assessment scores for some of the protected areas did not support results from previous studies (IUCN, 2016; IUCN/PACO, 2010). For example, whereas Mole National Park was reported by previous studies to be one of the most well-resourced and well-managed parks in Ghana (IUCN/PACO, 2010), the results of our assessment indicated otherwise. Also, the performance of Bui, Digya and Kogyae based on other studies does not corroborate these findings (Ayivor, Gordon, & Ntiamoa-Baidu, 2013; Ayivor & Ntiamoa-Baidu, 2015). This reaffirms the subjectivity of the methodology as a result of self-assessment as articulated in previous studies (Coad et al., 2015; Goodman, 2003; Leverington et al., 2008; Lu et al., 2012). The inconsistencies in some of our evaluation results suggest that whereas the managers of less effectively managed protected areas seemed to give high scores to the output component not to appear inefficient as administrators in public eyes, managers of more effectively managed areas may appear to be cautious in awarding high scores not to create the impression that all was well. Indeed, all protected areas in Ghana receive very little budgetary support from the government, which does not augur well for effective management. Most of those doing better owned their successes to donor support and may not want to highlight their successes to reduce the chances of further support. Although the literature is replete with most of these weaknesses, we did not anticipate these sharp discrepancies in the results of our evaluation scores for Digya, Kakum, Kogyae and Mole compared to previous studies (Ayivor & Ntiamoa-Baidu, 2015; Ayivor et al., 2013; IUCN/PACO, 2010).

4.3. Components of ecosystems management fundamental to IUCN/WCPA management effectiveness model and RAPPAM methodology

Some empirical studies (e.g. Abrams et al., 2009; Brooks et al., 2006; DeCaro & Stokes, 2008) have suggested that application of certain environmental models or concepts (e.g. RAPPAM) may differ from region to region

and over different cultures. For instance, DeCaro and Stokes (2008) noted that different administrative designs create social atmospheres that differentially affect the endorsement of conservation goals. Swallow et al. (2009) noted that just as there are considerable variations in the portfolio of environmental policy instruments for the developed world, we should expect similar variations in systems for payment for ecosystem services across the developing world. These observations indicate that conservation policies, models and strategies may not be cast in stone for all places, but may differ depending on the socio-economic context.

Local participation and protected area financing were obviously missing as independent components in the methodology, particularly as it applies to Africa. Local participation in ecosystems management as Meffe et al. (2002) indicated, is very important for win-win-win outcomes. As noted by Ferraro (2002), the long-term integrity of protected areas in developing countries is dependent on the sustained support of fringe communities who bear the direct cost of protection. We argue, therefore, that local community participation should be a separate component in the management effectiveness framework, instead of the current practice where different aspects of local community participation are mentioned in other components of the management effectiveness framework. Once the communities are brought on board, they will engage with other stakeholders in law enforcement, bush fire prevention, information exchange, decision-making process and outreach programmes. The 'local community participation', when introduced into the framework, would feedback into process and input components, as well as outputs and outcomes. Cernea and Schmidt-Soltau (2003) referred to this relationship as 'double sustainability', implying that at the end of the process, conservation goals would be achieved, while enhancing local livelihoods at the same time.

Financing of protected areas was mentioned under the 'planning' and 'input' components. We, however, believe that protected area financing go beyond the two components and has a greater role to play in protected area management effectiveness. As observed from our evaluation, financing does not only provide resources for the 'input' components but also has links with 'context', 'process' and 'planning' components. Several authors have highlighted management challenges relating to the inadequacy of funding for protected areas (Emerton, Bishop, & Thomas, 2006; Hockings et al., 2006; Shushila, 2006). Emerton et al. (2006) thus, advocated a new way of conceptualizing, capturing and using protected area funding if protected area financial sustainability was to be achieved. In 2010, a global assessment of management effectiveness of 4,151 protected sites concluded that adequacy and reliability of funding, facilities and equipment, staff shortages and the lack of appropriate benefit-sharing programmes for local communities were the weakest aspects of protected area management (Leverington et al., 2010).

We proposed, therefore, that 'Protected area financing' also be made a separate component feeding into the 'context' and 'planning' as well as the 'input' and 'process' components, which, in turn, would feed into 'outputs' and 'outcomes'. Non-payment of compensation, increasing levels of pressure and threats, lack of updated management plans, lack of community outreach programmes, ineffective research and monitoring programmes, all emanate primarily from inadequate funding. The financing component should include assessments of elements, such as current sources of funding, timeliness of funding, mechanisms for proper accountability, auditing procedures, and future sources of funding.

4.4. Management effectiveness: a new framework in perspective

Based on the discussions, we provide a schematic presentation of a modified framework (Figure 7), which introduces the two components into the IUCN/WCPA management effectiveness framework. The proposed framework recognizes the important role fringe communities play in protected area management, which underscores the tenets of the 'inclusive model' and enhances local trust and support for nature conservation.

In our proposed framework, 'Finance' component has been introduced, and this has links with 'Context', as well as 'Design' and 'Planning' components. The 'Finance' component also has major links with the 'Input' component and also ensures the efficiency of the 'Process' component. Thus, from 'adequate and sustained funding', management would progress into 'Input' and 'Process', with 'Finance' providing support for logistics, staff capacity and communication equipment. The 'Process' component, which involves implementation of the set objectives, also depends on adequate financing to ensure success. Figure 7 illustrates the modified framework for the African context, with a total of eight components instead of six. We, therefore, proposed that the

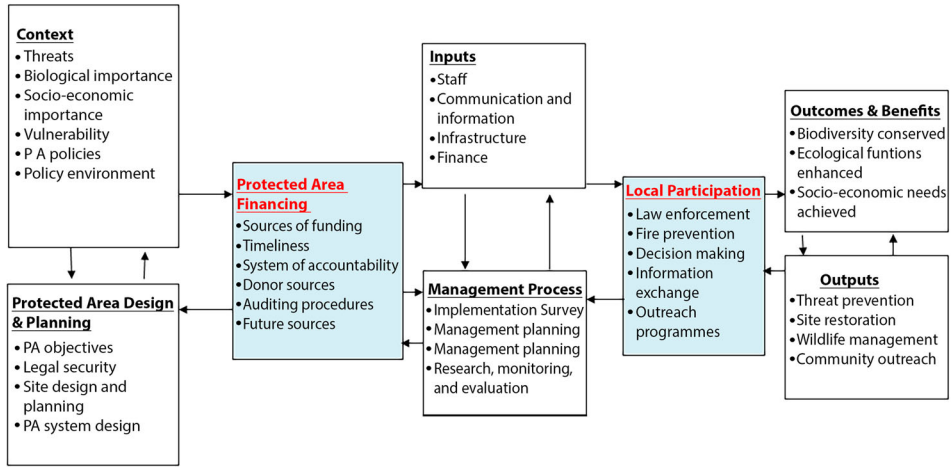

Figure 7. Proposed modification to the IUCN/WCPA model for management effectiveness of protected areas.

RAPPAM methodology as an evaluation tool be designed with all the eight components to ensure that pertinent issues relating to Africa are taken care of to achieve more workable and reliable results.

5. Conclusion

Protected areas remain the bedrock of biodiversity conservation. This makes their effective management an issue of global concern. Based on the results of management effectiveness evaluation of selected protected in Ghana and evidence from other empirical studies, this research concludes that the implementation of management effectiveness evaluation of protected areas using the IUCN/WCPA Management Effectiveness Framework should place greater emphasis on local participation to achieve greater success, particularly in Africa. Again, drawing on evidence from the findings and other studies, the effectiveness of protected area management is greatly influenced by the level of financing, which is lacking in most African protected areas. There is, therefore, the need to consider these two components as additional entities in the evaluation process. The study, therefore, proposes a slight modification of the IUCN/WCPA Management Effectiveness Framework and subsequently the RAPPAM methodology as an evaluation tool within the African context to understand in a holistic manner the underlying causes of pressure and threats in Africa's protected areas. Finally, we observed that the robustness of the RAPPM methodology can be further enhanced by engaging independent assessors including local community stakeholders, to gain more public confidence in the results. Since these modifications would result in a major policy shift in Africa if adopted, there is a need for a broader stakeholder engagement and further discussions on this proposal.

The next steps will involve implementation of the modified IUCN/WCPA management effectiveness framework, with RAPPAM as the evaluation tool in selected African countries, to ensure that it is extensively tested and acceptable by a wide range of stakeholder.

Disclosure statement

No potential conflict of interest was reported by the authors.

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