

## Review Article

# Factors Affecting the Success of Conserving Biodiversity in National Parks: A Review of Case Studies from Africa

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Received 4 October 2012; Revised 8 January 2013; Accepted 22 January 2013

Academic Editor: Antonio Terlizzi

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National Parks are a cornerstone for biodiversity conservation in Africa. Two approaches are commonly used to sustain biodiversity in National Parks. Past and current studies show that both approaches are generally ineffective in conserving biodiversity in National Parks in Africa. However, there are a handful of cases where these approaches have been successful at conserving biodiversity in National Parks. The question this paper attempts to answer is why in some cases these approaches have been successful and in other cases they have failed. A metadata analysis of 123 documents on case studies about conservation of biodiversity in National Parks in Africa was conducted. A series of search engines were used to find papers for review. Results showed that all factors responsible for both the success and failure of conserving biodiversity in National Parks in various contexts were socioeconomic and cultural in nature. The highest percentage in both successful case studies (66%) and unsuccessful cases studies (55%) was associated with the creation and management of the park. These results suggest that future conservation approaches in National Parks in Africa should place more emphasis on the human dimension of biodiversity conservation than purely scientific studies of species and habitats in National Parks.

## 1. Introduction

National Parks are the most extensive type of protected areas in Africa and globally. They are classified under category II of the IUCN categories of protected areas [1]. National Parks are created to (1) protect the ecological integrity of one or more ecosystem for present and future generations; (2) exclude exploitation or occupation detrimental to the purposes of designation of the area; and (3) provide a foundation for spiritual, scientific, educational, recreational, and visitor opportunities, all of which must be environmentally and culturally compatible [1]. National Parks comprise the highest percentage (23%) of the total area covered by protected areas worldwide [1]. For instance, according to estimates by Colchester [2], Africa has more than 1,812 National Parks covering a total 3,112,027 km<sup>2</sup> of the continent. In Sub-Saharan Africa alone, over 1 million km<sup>2</sup> of land out of 23 million km<sup>2</sup> (constituting approximately 4%) has been set aside as National Parks [2].

Conservation of biodiversity in National Parks is done through two main approaches: one approach is the preservation approach, which aims at setting aside National Parks to exclude human activities except for tourism. Through this approach, direct use of natural resources in the park for commercial or subsistence purposes is prohibited [3]. This type of approach is often referred to as the “protectionism approach” or “the fines and fences” approach [3]. For consistency, the term “preservation approach” is used in this paper. The preservation approach aims at excluding human activities considered inimical to the objectives of conserving biodiversity in National Parks. The preservation approach was the most dominant approach until the 1980s, but in some National Parks, it has now been substituted by the second approach called the community-based conservation approach that allows people (especially those that neighbour National Parks) to benefit socially or economically from parks [4]. The community-based conservation approach was proposed to address the problems associated with excluding

human activities from the park. A detailed description of the development of the two approaches can be found elsewhere [4, 5].

The community-based conservation approach involves initiatives aimed at conserving biodiversity in the park but also letting local people benefit from the park [6]. Some of the initiatives involved in the community-based conservation approach include signing of resource use agreements such as in the Rwenzori Mountains National Park which allow local people who neighbour National Parks to have access to specific resources from the park for subsistence use [7]. In other cases, local people are given money for infrastructural development, such as in Integrated Conservation and Development Initiative in Korup National Park in Cameroon [8]. And in other National Parks such as Pendjari National Park in Benin, local people are given a percentage of revenue generated from tourism activities in the park [9].

Despite the implementation of these approaches, the Global Outlook 3 which is a recent report by the Secretariat of the Convention on Biological Diversity [9] shows that biodiversity loss from protected areas has persisted. The report revealed that the targets agreed upon by leaders of different countries in the world in 2002 to significantly reduce the rate of biodiversity loss at global, regional, and national levels had not been met by 2010. Threats to biodiversity such as habitat loss, climate change, pollution, unsustainable use of resources, and invasive alien species have intensified [9]. According to Butchart et al. [10], despite the many efforts taken around the world to conserve biodiversity and use it sustainably, approaches and strategies so far have not been adequate to address the scale of biodiversity loss or reduce the pressures.

Although none of the twenty-one subtargets accompanying the overall target of significantly reducing the rate of biodiversity loss by 2010 was achieved globally, there are some that had been locally achieved [11, 12]. de Oliveira [13] had earlier noted that for every profitable and successful protected area, there may be hundreds that are not successful.

There are a number of suggestions that have been made since the publication of the Global Outlook 3 by the Secretariat of the Convention of Biological Diversity. For instance, Rands et al. [12] suggested that beyond the year 2010, successful conservation approaches need to be reinforced and adequately financed. Rands et al. [12] opine that a more radical change is required to recognize biodiversity as a global public good and integrate biodiversity conservation into policies and decision frameworks. However, before any suggestion about effective conservation of biodiversity in National Parks is implemented, the current scenario necessitates an understanding of the underlying factors for success and failure of the existing biodiversity conservation approaches.

Although many studies have been conducted on threats that protected areas face, there is a scarcity of literature that assesses why those threats have persisted. In addition, there is a scarcity of published literature that analyzes why some strategies aimed at preventing biodiversity loss succeed in some instances and fail in other instances. In the absence of such literature, it becomes difficult to propose other

strategies or to have a basis upon which new ones can be improved.

Although the Secretariat for the Convention on Biological Diversity [11] identified underlying causes to biodiversity loss such as demographic change, economic activity, levels of international trade, per capita consumption patterns linked to individual wealth, cultural and religious factors, and scientific and technological change, these factors were not discussed in specific detail in the context of conserving biodiversity in National Parks in Africa. In this paper, the aim is to identify and analyze factors that affect the success of conserving biodiversity in National Parks in Africa.

## 2. Methods

A literature review of biodiversity conservation in National Parks in Africa was conducted. The literature that was reviewed was systematically selected from the internet using search engines shown in Table 1. Web searches were conducted between May 2009 and March 2011. The search terms used separately or in combination included “*National Park management*,” “*evaluation of success of National Parks*,” “*effectiveness of National Parks*,” “*community based conservation of National Parks*,” “*community based natural resource management*,” and “*effectiveness of community based conservation approach*”. For ScienceDirect, the search was conducted on the first three hundred articles.

The web search resulted in 227 journal articles, books, technical papers, working documents, and theses which are collectively called “publications” in this paper. The title of each publication was read to determine if it met the criteria for inclusion. If the title and abstract of the publication indicated that it might meet the inclusion criteria, the full text was viewed and the publication was saved on a personal computer. A publication was selected for review if it met the following criteria:

- (1) was written in English,
- (2) reported on establishment, management, and effectiveness of a National Park in Africa,
- (3) reported on implementation, monitoring, and effectiveness of any aspects of community-based conservation in or around a National Park in Africa,
- (4) assessed performance of any biodiversity conservation approach in and around a National Park in Africa,
- (5) discussed actual reasons for success or failure of the approach in a National Park in Africa.

Attention was first given to publications that were in peer-reviewed journals, project reports, and working articles. Because much grey literature (such as unpublished Masters and Ph.D. theses) in conservation is of high quality and could be valuable for evaluating and understanding factors affecting the success or failure of conserving biodiversity in National Parks, grey literature publications were also included in the review. Publications that had a conceptual or theoretical significance to justify the argument in this paper were also

TABLE 1: Web search engines from which the literature for review was obtained.

Source of data	Description of the source
CBNRM Net	CBNRM Net is an integrated and adaptable knowledge management tool. It has over 200 case studies on community-based natural resource management collected from various countries around the world.
Khup.com	Khup.com is a search engine, which provides updated and quality results for e-books, books, magazines, user's guides, and references in pdf format in various fields including biodiversity conservation.
Advancing conservation in the social context reference library	Advancing conservation in the social context reference library is an interdisciplinary research initiative designed to generate knowledge and promote potential solutions about the tradeoffs that characterize complex ecological and social relationships. Registered users access and download materials from advancing conservation in the social context library.
ScienceDirect	ScienceDirect is an online collection of published scientific research. It contains nearly 10 million articles from over 2,500 journals and over 6,000 e-books, reference works, book series, and handbooks issued by Elsevier.
Google Scholar	Google Scholar is a freely accessible web search engine that indexes full text of scholarly literature across an array of publishing formats and disciplines. It indexes most peer-reviewed online journals from scholarly publishers especially in Europe and America.

TABLE 2: The number of subfactors in each category.

Category of factors	Number of factors in unsuccessful cases sub	Number of factors in successful cases sub
Creation and management of the park	19	14
Local community neighbouring the park	10	7
The area where the park is located	3	2
National policy governing the park	2	0
Financial resource base of the park.	3	1

included in the review. Publications that reported on trans-boundary National Parks were also included in the review.

Publications that reported case studies in Africa as well as other continents were only included in the review if they reported specific results on African case studies. Publications that reported multiple case studies from Africa were included in the review even when the case study results were generalised. Publications that reported threats or lack of threats in National Parks without giving reasons for the observations were not included in the review.

Of the 227 publications, 123 met the criteria for selection and inclusion in the review. These publications are shown in the reference list and in Supplementary Material available online at <http://dx.doi.org/10.1155/2013/798101>.

The procedure of reviewing the publications followed guidelines recommended by Randolph [14]. Deductive coding of text as explained by [15] was conducted on each of the selected publications. A case study was considered "successful" if the publication reviewed stated that there was staving off of biodiversity loss in a National Park or if there was a reduction in threats to the park. If an approach such as community-based conservation succeeded in giving local people incentives or attracting tourists to the park but failed to stave off biodiversity loss or to reduce threats to biodiversity in the park, it was categorized as a failure. The categorization of factors as responsible for success or failure was based on what was reported by the authors of the publications. Case studies and examples referred to in the body of the paper were selected based on their relevance to the presentation and discussion.

### 3. Results

Various factors that affected conservation of biodiversity in National Parks in Africa were identified. The identified factors were grouped into five categories which included the creation and management of the park, local community neighbouring the park, the area where the park is located, national policy governing the park, and financial resource base of the park. Table 2 shows the number of sub-factors in each of the five categories. For instance, in the category of creation and management of the park, there were 19 sub-factors and 14 sub-factors associated with unsuccessful cases and successful cases, respectively.

One category (the creation and management of the park) constituted an overlap of sub-factors that affected the conservation of biodiversity in National Parks positively and negatively in different contexts.

*3.1. Creation and Management of the Park.* Creation of a National Park involves placing a caveat on the use of a particular area often more than 100 km<sup>2</sup>. How this is done influences how that area will be managed and how effective biodiversity conservation in that area will be. Table 3 shows the number of publication in which the sub-factors that were associated with the creation and management. Some of the factors were responsible for success in some situation and for failure in other situations.

*3.1.1. Displacing Local People in Order to Establish National Parks.* That the displacement of people from their traditional

TABLE 3: The number of publications in which the subfactors associated with the creation and management of the park were reported.

Subfactors	Number and percentage of publications reporting the factor to be responsible for success	Number and percentage of publications reporting the factor to be responsible for failure
Subfactors responsible for success and failure in different contexts		
The creation of the park led to displacement of local people from the land they occupied.	2 (1.6%)	35 (28.5%)
The local people neighbouring the park were restricted from accessing resources in the park.	20 (16.3%)	48 (39.0%)
The local people who initially obtained resources in the area were not adequately compensated for no longer accessing resources in the park.	39 (31.7%)	39 (31.7%)
Subfactors responsible only for success		
The park administration had conflict resolution mechanisms and implemented them in case of any conflict.	11 (8.9%)	0
The park's administration possessed documents for legal establishment of the park.	4 (3.3%)	0
The park's administration gave harsh punishments to people who contravened park rules.	13 (10.6%)	0
The park's administration provided education, awareness, and outreach programmes to local communities neighbouring the park.	26 (21.1%)	0
The management of the park was effected through the leadership structures of the local community.	20 (16.3%)	0
The park had a monitoring and evaluation system.	15 (12.2%)	0
Subfactors responsible only for failure		
The local people neighbouring the park were asked to pay fees to access resources in the park.	0	17 (13.8%)
The local people neighbouring the park were not consulted before the park was created.	0	58 (47.2%)
A feasibility study to account for the local context was not conducted before creating the park.	0	12 (9.8%)
The park administration did not give the promised incentives to local people in the case of community-based conservation approach.	0	5 (4.1%)
The park was created in an area with high biodiversity and not degraded.	0	10 (8.1%)
The creation of the park did not take into account the past and current human ecology of the area.	0	13 (10.6%)
There were no clear communication channels between park staff and leaders at the local and national level.	0	20 (16.3%)
The policies governing the park were not enforced.	0	12 (9.8%)
The park staff were not skilled and were paid a low salary.	0	25 (20.3%)
Previous initiatives to conserve biodiversity in the park had failed.	0	6 (4.9%)
The park had been newly created.	0	9 (7.3%)

lands led to unsuccessful conservation of biodiversity in National Parks was reported in 35 (28.5%) publications (for instance [16–18]). Displacement involves the involuntary physical removal of people from their historical or existing home as a result of actions by governments or other organisational actors. Displacement of people from their traditional lands caused a negative attitude among local residents towards the existence of the park, and negative attitudes were responsible for conflicts between local people and the park staff. A study by Kideghesho et al. [17],

among communities neighbouring the Serengeti National Park, found that people who had been evicted when the park was created more strongly opposed the existence of the park than those who were not evicted. Similar findings were reported in studies by Hoole and Berkes [18] that described how Herero communities were ousted from Etosha National Park. Creation of protected areas not only causes conflicts between park managers and local people [19], but also results in killing highly prized wildlife species by local people as a way of protesting the approach [20, 21]. These case studies

suggest that the loss of biodiversity from National Parks is as a result of people feeling no longer accountable for those resources.

Although displacement of people during creation of National Parks was one of the factors affecting successful conservation of biodiversity in parks [17], in 2 publications, success of conserving biodiversity in National Parks was attributed to evicting local people who occupied the area. This indicates that in some instances, it is appropriate to evict local people from their traditional lands for biodiversity conservation especially when supported by national policy. This makes the displacement of local people in order to establish parks a debatable issue.

*3.1.2. Restriction of Local People against Access to Resources in Parks.* In 48 (39%) of the publications, unsuccessful conservation of biodiversity in National Parks was attributed to restricting local people neighbouring the park from accessing resources in the park. This was reported for instance in [9, 17, 22, 23]. For example, Shackleton et al. [23] attribute the failure of conserving biodiversity in three National Parks in Uganda to restricted access to park resources. Restricted access caused negative attitudes amongst local communities towards the existence of the park and resulted in some people conducting the prohibited activities illegally in the park. For instance, negative attitudes towards the protected areas in Western Serengeti correlated with restrictions over access to pasture and water for livestock [17]. Similarly, a study by Vodouhè et al. [9] found that 92% of the people (mainly farmers) who were asked about their attitudes towards the conservation of Pendjari National Park said that the decision of the park management staff to ban agricultural activities within the park boundaries generated a strong negative opinion of the park management. In the same study, 98% of people involved in livestock production commented negatively on the Pendjari National Park staff's decision to ban animal rearing within the park [9].

Although restricting local people from accessing park resources was reported as a factor that led to the failure of conserving biodiversity in parks, in 20 (16.3%) of the publications reviewed, authors attributed successful conservation of biodiversity in National Parks to restriction over resource use by constantly patrolling and physically guarding the park. A study by Bruner et al. [24] found that park effectiveness at conserving biodiversity correlated most strongly with density of guards. They found that the median density of guards in the 15 most effective parks was more than eight times higher than in the 15 least effective parks (3 guards per 100 km<sup>2</sup> in the 15 most effective parks compared with 0.4 guards per 100 km<sup>2</sup> in the least effective). However, enforcement capacity (a function of training, equipment, and salary) was not found to correlate with effectiveness, suggesting that these characteristics are less important than the presence of guards, contradicting some cases where it was reported that those factors hindered the successful conservation of biodiversity in National Parks.

This indicates that in some cases, it is necessary to restrict access to National Parks for more effective conservation

of biodiversity. However, successful conservation through restricted access was supported by presence of a clearly demarcated border [24, 25]. Roe et al. [25] suggest that with the presence of a clearly demarcated border, park resources can be clearly segregated and agreed upon by users, although they note that the mobility of animals frustrates this especially under game cropping arrangements. Similarly, findings [26] in Tanzania, which linked success of biodiversity conservation with different levels of protection, found that biodiversity in strictly guarded areas was more conserved than in less guarded areas.

*3.1.3. Lack of Adequate Compensation, or Failure to Take into Account the Needs, of Local People Who Initially Depended on Resources in the Area Occupied by the Park.* In 39 (31.7%) of the publications, unsuccessful conservation of biodiversity was attributed to the failure of the park staff to adequately compensate local people who initially depended on resources in the area where the park was created [9, 27, 28]. This compelled local people to go against park rules and to harvest resources in the park. A study by Vodouhè et al. [9] showed that nearly 37% of the people neighbouring Pendjari National Park said that 30% of total revenues generated through hunting activities distributed to the population were insufficient to compensate for having no access to resources in the park that they initially depended on. For this reason, it was said that some people continued going into the park to harvest resources so as to meet their livelihood needs. Also a study by Holmern et al. [28] on hunting in Serengeti National Park showed that providing adjacent villages with incentives to abstain from illegal hunting indicated that the incentives given did not lead to economically sustainable activities and they made only a minor economic contribution compared to illegal hunting.

However, where the park administration took into account the needs of the community neighbouring the park, there was successful conservation of biodiversity in those parks. This was reported in 39 (31.7%) of the publications. For example, Archabald and Naughton-Treves [22] found that 22% of respondents living near three National Parks in Uganda thought that tourism revenue sharing had improved their attitudes towards conservation of biodiversity in those National Parks. Also in the same study, 53% of the respondents thought that tourism revenue sharing was more important than illegally harvesting nontimber forest products from the parks. Similarly, a study by Roe et al. [25] concluded that the value of wildlife assets greatly affects the incentives for community-based conservation and hence its chances of success. They, however, cautioned that benefits should be shared in a way that is commensurate with the varying sacrifices and contributions made or the damages incurred by the local people. Similarly, in one case study in South Africa, it was found that to be effective, benefit sharing schemes need to be seen to be transparent and accountable, with well-defined principles and practices that are understood, agreed, and accepted by all stakeholders. A study by Dudley et al. [29] in the forest surrounding Lobéké National Park among two groups of Cameroonian people (the Baka pygmies and the Bagando) concurs with these findings.

Similarly, Kremen et al. [30] attribute successful conservation of the Masoala National Park to the design considering the economic and cultural benefits of the local people. Successful conservation of wildlife and forest biodiversity conservation in Taita Kenya was also as a result of recognizing the needs of local people [31]. Various studies such as [32, 33] show that traditionally, local people in African communities depend on environmental resources directly for survival. People hunt animals, collect wild fruits, and their culture revolves around resources in the environment. A lack of this recognition was a fault on the side of conservationists who established the first protected areas in Africa. It is a greater fault on the side of current conservationists to establish protected areas without taking into account that local people depend on those resources for livelihood and survival. Conservationist must realize that the biodiversity that parks are designed to protect is a social good. More than 80% of the people in eastern and South Africa depended on the immediate forest resources for livelihood and survival [33].

People who depend on the immediate environmental resources are said to have traditional practices informed by traditional ecological knowledge that they use to conserve those resources [34]. So it should not be assumed that dependence on environmental resources automatically leads to biodiversity loss. In other words, there is a possibility that traditional communities have traditional conservation strategies which have been ignored by National Park managers. This issue has been explored further in Muhumuza et al. (in prep.). The point that is being made here is that conservation of National Parks in the current African context should not be based on knowledge, assumptions, and demographics of the 19th century.

*3.1.4. Conflict Resolution Mechanism and Direct Compensation Schemes.* When there are conflicts resulting from the eviction of people from their traditional lands, in some publications, it was emphasized that the park administration must put in place conflict resolution mechanisms. In 11 (8.9%) of the publications reviewed, the authors highlighted the importance of dispute resolution for conservation of biodiversity in parks. For instance, Bruner et al. [24] showed that park administrators that had conflict resolution mechanisms and implemented them when conflict arose more effectively managed conservation of biodiversity in parks than those that did not. Conflict or dispute resolution mechanisms are therefore likely to be an essential component of successful initiatives of conserving biodiversity in National Parks. Some of the conflict resolutions involve compensation for loss of property, for instance, when vermin from National Parks destroyed local people's crops. Bruner et al. [24] found that the existence of direct compensation programmes to local communities correlated significantly with management effectiveness of National Parks.

*3.1.5. Possession of Legal Documents for the Establishment of Parks.* In 4 (3.3%) publications reviewed, more successful conservation of biodiversity was attributed to the possession of documents for legal establishment of the park. Legal

creation of the park was fundamental in effective park management and was proven to be a critical factor in deterring land use changes, particularly in areas of development frontiers [29]. Legal creation of protected areas seems to provide some immediate guarantees of protection under certain conditions. For instance, it serves as a deterrent to significant land use changes and habitat conversion even in the absence of other management actions [29]. Legal establishment of National Parks is also linked to government support because it gives government a legal mandate to have control over National Parks [25, 35–38]). Derman [36] attributed the initial success of the Communal Areas Management Program for Indigenous Resources (CAMPFIRE) program to official support of the Zimbabwean government.

*3.1.6. Punishing Contraveners of Park Rules.* In 13 (10.6%) of the publications, successful conservation of biodiversity in National Parks was ascribed to harsh punishments given to people who contravened park rules. Harsh punishments are a product of the probability of apprehending violators when guards detected a violation (either in progress or after the act) and a probability of the violator receiving a significant sanction if apprehended [24]. Effectiveness of the park to conserve biodiversity significantly correlated with the level of punishments of illegal activities in the park [24]. However, Bruner et al. [24] found that punishments against clearing and logging correlated with park effectiveness, whereas deterrents against hunting did not. Dudley et al. [39] in their study in Cross River National Park and Okomu National Park recommend that punishments or some aspects of the decree governing operation of protected areas may require modification to reflect contemporary developments, including possibly harsher punishments for illegal activities and conversely greater access to protected area benefits for local communities.

*3.1.7. Provision of Education, Awareness, and Implementation of Outreach Programmes.* In 26 (21.1%) of the publications, authors found that provision of education, awareness, and outreach programmes to local communities neighbouring the park was responsible in some cases for successful conservation of biodiversity [29, 37, 40]. A study by Ormsby and Kaplin [40] in Masoala National Park in Madagascar found that 93% of residents living near the park were aware of the existence of the park and expressed positive opinions about the park, attributing this to the education and awareness programmes that the park administration had provided. Dudley et al. [29] also ascribed success of the Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia to the provision of awareness programmes. They attributed provision of environmental education to the reduction in deforestation from 1.6% in 1997 to about 1.4% in 2004. Also the forest stocking density positively changed from 548 stems per hectare in 1998 to 793 in 2004, which is an increase of 31% [29]. Provision of awareness programmes was linked to sensitization of the community on the need for conservation. A study in Bwindi Impenetrable National Park in Uganda also confirmed that environmental education enhanced management effectiveness in the parks.

Education and awareness activities play a vital role in building support for protected areas in general and for particular management actions. Sensitization is highly significant in terms of future interventions [29].

*3.1.8. Effecting Park Management through Local Structures.* In 22 (17.9%) of the publications, it was reported that conservation of biodiversity was successful because the management of the park was effected through the leadership structures of the local community [9, 25, 38]. A study by Vodouhê et al. [9] found that conservation of biodiversity in Pendjari National Park was successful among other reasons because the park staff recognized a local organization made up of members of local communities who were mandated to inform park staff about each activity that local people intended to conduct in the park. Recognizing the local community organization not only reinforced local people's positive perception about the park management, but also increased the awareness of the local people about biodiversity conservation. Community institutions such as social structures, rules, processes, and arrangements are the building blocks of community organization and collective action and so have a major influence on the efficacy of biodiversity conservation [25].

*3.1.9. Presence of a Participatory Monitoring and Evaluation System.* Effecting conservation of the park through the existing leadership system also enhanced participatory monitoring of resource use in parks. In 15 (12.2%) of the case studies, effectiveness of conserving biodiversity in National Parks was because of the presence of a participatory monitoring and evaluation system [25, 29, 41–45]. For instance, successful conservation of Miombo woodlands was attributed to a community-based monitoring system that focuses on natural resource use and forest quality in montane evergreen forest and Miombo woodland areas which was developed and implemented in 23 villages in 2002 as part of a participatory forest management regime in Iringa district, Tanzania [45]. A study by Dudley et al. [29] suggested that a good monitoring and evaluation system is closely correlated to those protected areas where biodiversity is being best conserved. Conservation effectiveness of protected areas in Tanzania was attributed to establishing clear management and monitoring objectives in advance [41]. Stuart-Hill et al. [44] reported a detailed discussion on the success of using an "Incident Book" system as a monitoring tool for effective conservation of National Parks in Namibia.

In other publications (for instance [9, 17, 38, 46, 47]), successful conservation of biodiversity in National Parks was associated with local community members monitoring the use of resources in the park. In Uganda, for instance, Uganda Wildlife Authority signed resource use agreements with local communities which included that local people participate in monitoring of resources. Fisher and Jackson [46] reported that this venture was behind the success in reducing anthropogenic pressure around Kibale National Park in Uganda. Similar findings were reported in the western part of Serengeti National Park [17, 47] and in Zimbabwe's CAMPFIRE programme. Successful conservation of National Parks was also attributed to cooperation between the local

community and the park staff [9, 25, 38, 48]. Cooperation allows mutual agreements between protected area staff and the local community to be reached and compromises to be struck with regard to protected area resource use. This is important as it underscores the need for park managers to provide livelihood and employment opportunities and involvement in park governance processes, regardless of the state of any land claims that were in process or completed [48, 49]. In some National Parks where the local community had the autonomy to make rules and regulations governing access to resources in the park, success was registered [25, 49]. A case in point was in Namibia where members of the conservancy committee were democratically elected and were given the mandate of making rules and regulations to govern resource use [25]. However, in that case, the success of devolving power to local communities to make rules required culturally appropriate competence in legitimacy and accountability. Roe et al. [25] warn that representativeness and legitimacy do not always go hand in hand.

*3.1.10. Asking Local People to Pay Fees to Access Resources in the Park.* In 17 (13.8%) of the publications, it was reported that the local people neighbouring the park were asked to pay fees to access resources in the park. This hampered successful conservation because local people could not see the point of asking them to pay for resources that they thought belonged to them [48]. For instance, negative attitudes towards Kgalagadi Transfrontier National Park in South Africa were as a result of neighbouring indigenous groups being required to pay regular access fees to the park unless they were entering for a cultural purpose [48]. This led some local people to feel that they were being treated like tourists [48].

*3.1.11. Lack of Consultation with, and Involvement of, the Local People before Establishing the Park.* Lack of consultation with the local people before the park was created was reported in 58 (47.2%) of the publications (for instance, in [50, 51]) as responsible for unsuccessful conservation of biodiversity in parks. According to Mbile et al. [51], Korup National Park was created without any form of prior negotiations with any of the local people and for that reason, access to resources remained a *de facto* reality. Also Gibson and Marks [50] reported that in many National Parks in Africa, local people have been neglected in the processes of negotiations regarding the use of the resources within National Parks. This resulted in people not taking up the conservation objectives of the park. For instance, Vodouhê et al. [9] found that the former management of the Pendjari National Park in Benin did not include communities living adjacent to it and this caused local people to have a feeling of injustice and they thought that the central government had stolen their resources. This resulted in frequent conflicts between the park staff and local communities who defied the rules against accessing the park to hunt animals or to do agriculture. In some cases, due to lack of involvement of the people, local people who were expected to implement some of the project activities did not know much about some projects that the park was implementing to conserve biodiversity. For instance, a study by Wainwright and Wehrmeyer [52] about Luangwa Integrated Resource

Development Project in Zambia found that only 10% of the residents interviewed claimed to have a good understanding of the program implemented by the project in coordination with the park, despite 47.5% of respondents having known Luangwa Integrated Resource Development Project for more than three years. These studies concluded that if local people were not involved in decisions over management of resources in National Parks, then they cannot support the objectives of the park administration. This conclusion is supported by evidence from other case studies which reported that when local people neighbouring the park agreed on the objectives of conserving the park (8, 2.2%) and comanagement arrangements were arrived at through a consensus manner between the park staff and the local community (11, 3.0%), there was successful conservation in those parks. For instance, conservation was more successful when local people neighbouring the park agreed on the objectives for establishing the park [9]. Allowing local communities neighbouring the Pendjari National Park to agree on conservation objectives led to the creation of a participatory management strategy which allowed them to harvest medicinal plants and useful fruits through the authorization from the Village Associations for the Management of Wildlife Reserves (VAFMWR) [9].

In some cases, consultations with the local people led to joint formulation of policy. In Zanzibar, according to a study by Williams et al. [53], new policy and legislation were piloted through the joint formulation of hunting by-laws with each village. The by-laws set out the rules for resource control and revenue generation mechanisms to promote community management and financial viability. Joint efforts between the government agency responsible for the wildlife resource and partner villages were simultaneously made to improve the implementation of an annual closed hunting season. All these arrangements led to more effective conservation of biodiversity in National Parks. Kremen et al. [30] also reported success in Masoala National Park as a result of arriving at comanagement arrangements in a consensus manner. In South Africa, the Makuleke agreement, whereby the community gained ownership of more than 25,000 hectares of valuable conservation land in the Kruger National Park, is the result of almost three years of negotiations. The agreement came about because both key role players (the community and the South African National Parks Board) were prepared to redefine their objectives over time. The end result enhanced biodiversity conservation because 4,000 ha of new land was added to the park and an agreement reached against change of land use on the restituted portion. Also the community benefited because they were mandated to establish their own tourism lodges, with the help of commercial partners, inside the park [25].

From these examples, it appears that involving the community requires constant support of the community involved. Strong project stewardship by the local government with backing from the national government was also attributed to the success of the Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia [37]. A study on the community-based conservation project in Mahenye, Zimbabwe, suggested that even in apparently successful conservation and development

projects, local participatory decision-making institutions are fragile and require continuing external support [35]. They caution against full devolution of authority to the community level without safeguards to maintain good governance and adequate capacity. Based on a study on community-based natural resource management and development in Botswana it was concluded that local communities cannot achieve the goals of sustainable development on their own, hence suggesting external support [38].

*3.1.12. Establishing a Park without First Conducting a Feasibility Study.* In 12 (9.8%) of the publications, unsuccessful biodiversity conservation in National Parks was ascribed to the failure of conducting a feasibility study to account for how the local context would influence the outcome of initiatives of conserving biodiversity in National Parks [50]. According to Malleson [8], among other factors for the failure to sustain biodiversity in Korup National Park in Cameroon was the failure of park managers and the staff of the Korup project (that was implemented to solve some existing problems associated with biodiversity conservation in the park) to understand the existing needs of the local people, the socioeconomic and political factors, and the complex historical processes which underpin the use of natural resources in Korup. To highlight this point, Malleson [8] points out:

*“without a firm grasp of the ecological, socio-political and economic complexities of the Korup forest area, Korup project management continued to base the design and implementation of its rural development component on a number of misguided assumptions” (p. 245).*

Similarly, Gibson and Marks [50] using game theory and a case study from Zambia found that failure of initiatives to prevent hunting in National Parks in Africa was as a result of implementing these initiatives without an understanding of some of the economic, political, and social benefits of local hunting. As a result, Gibson and Marks [50] argue that community-based wildlife management schemes may succeed in protecting some of the larger mammals only by virtue of their increased enforcement levels, not their ability to distribute socioeconomic benefits to the local people.

*3.1.13. Failure to Give the Promised Incentives to Local People and Failure of Local People That Received the Incentives to Change Their Behaviour.* In 5 (4.1%) of the publications, failure to conserve biodiversity in National Parks especially where the park was implementing community-based conservation initiatives was attributed to not giving the promised incentives to local people that were meant to keep them from going to the park [28, 37, 50]. In that situation, local people saw no benefit in their engagement with the park administration and continued going against park rules to access resources in the park [37]. For instance, in the analysis of the effectiveness of the Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia, Kasperek [37] attributed the relatively low performance of the project in Mozambique to the project

failing to deliver the promised incentives that were meant to motivate people against charcoal burning in protected areas.

In some cases, where the incentives were given to the people, they did not cause the expected positive change amongst local people to prevent them from accessing resources in the park. This was because the differences in age, gender, and wealth of local communities neighbouring the park were not taken into account while implementing the community-based conservation approaches [8, 37, 52]. Wainwright and Wehrmeyer [52], for instance, attribute the failure of Luangwa Integrated Resource Development Project in Zambia to the exclusion of women from the project activities, and yet women play an important role in resource harvesting from National Parks. Kasperek [37] in the assessment of the effectiveness of Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia observed that natural resource management, and specifically forest management, is quite gender sensitive, an aspect that was not considered in the project. Men and women do not benefit to the same extent from forest products, and yet gender issues were not treated by the project team either as a separate output or as a cross-cutting issue [37]. Similarly, Malleon [8] attributed the failure of conserving biodiversity in the Korup National Park to the failure of the Korup project officers to realize that communities in Korup Forest area consist of socially heterogeneous groups of people. Most settlements in Korup Forest area were socially diverse, and communities consisted of a very complex mesh of different types of institutions, households, and individuals whose rights of access to land and forest resources were differentiated along the lines of political power, wealth, ethnicity, gender, and marital status [8]. Such diversity leads to a failure in consensus and in providing incentives to satisfy every member of the community.

*3.1.14. Creation of the Park in an Area with High Levels of Biodiversity and Not Degraded.* In 10 (8.1%) of the publications, failure to stave off biodiversity loss in protected areas was ascribed to creating the park in an area that had high biodiversity and was not degraded. Because of this, local people perceived the creation of the park as unwarranted claiming that their good practices concerning resource use had kept the area undegraded, and that is why it attracted the attention of conservationists. However, Bruner et al. [24] and Dudley et al. [29] also noted that in the communities where people were claiming that creation of the park was unwarranted, local communities kept on encroaching on park land because of lack of a buffer zone. In this case, local people (especially) those near the park claimed that they did not know where the border between their gardens and the park was [29]. This was because the biodiversity on the private land was relatively homogenous with that in the park. This means that the park needed a clear boundary.

*3.1.15. Lack of Consideration of Ecological Factors in the Area Where the Park Was Created.* The failure to conserve biodiversity in National Parks was also attributed to the lack of consideration of the past and current human ecology of the area before the park was created. This factor was

reported in 13 (10.6%) of the publications reviewed. Mbile et al. [51] for instance argue that in Africa, human ecological interactions are important in shaping forest health. Hunters in the Korup Forest area are said to have evolved with wildlife and shaped the ecosystem there, so eliminating them from the area when the park was created meant disrupting the ecological balance [51]. Related to the human ecological factor is the size of the park. According to some studies [25, 39], if the size of the park created was small, there cannot be successful conservation of biodiversity in that park. Roe et al. [25] claimed that the manageable scale of National Parks needed to be sufficiently large to warrant collective action and revenue generation to sustain them. Dudley et al. [39] attributed the failure of National Parks in Kwazulu-Natal in South Africa to inadequate design. According to them, over half of Kwazulu-Natal protected areas were not designed to optimize biodiversity conservation, were surrounded by landscapes that did not enable effective park management, or were too small to maintain viable populations. Dudley et al. [39] made a similar observation on Kyabobo Range National Park in Ghana.

*3.1.16. Lack of Clear Communication Channels between Park Staff and Leaders.* Lack of clear communication channels between park staff and leaders at the local and national level was also attributed to failure of conserving biodiversity in National Parks in 20 (16.3%) of the publications. For instance, Mallya [54] found that miscommunication amongst stakeholders of the Serengeti National Park coupled with the conflicting laws and regulations from local and national leaders and park staff led to improper investment agreements that resulted in inadequate benefits from investors to local communities. Similar findings were also reported where rural district councils, the local people, and park staff debated how tourism revenue should be shared [36]. Local people wanted local communities at the village or village development committee level to benefit from wildlife management programs, yet the park staff and district councils argued for the district at large to benefit.

*3.1.17. Failure to Enforce Policies Governing the Park.* In 12 (9.8%) of the publications, the failure of conserving biodiversity in National Parks was ascribed to not enforcing policies governing the park. Although enforcement of policy shows one of the strongest relationships to management effectiveness, the assessment carried out by Dudley et al. [29] in various National Parks from 11 African countries showed that policies were not enforced in all the National Parks surveyed. This resulted in a number of problems such as failure to monitor illegal resource use in the park, contested ownership of park land, and other problems associated with the mismanagement of the park [29]. Based on the findings by Dudley and colleagues [29], many of the problems already presented in this paper that hindered effective conservation of biodiversity in National Parks were indirectly linked to failure to enforce policies governing the park.

*3.1.18. Limited Number of Park Staff and Paying Park Staff Low Salaries.* Related to limited enforcement of policies

TABLE 4: Subfactors associated with the local community neighbouring the park that were responsible for successful and unsuccessful conservation of biodiversity.

Subfactors	Number and percentage of publications reporting the factor
Subfactors responsible for failure	
The local people dependency on the park resources for their livelihood and survival.	21 (17.1%)
Local people lacked land, secure land tenure, and contested ownership of land in the park.	29 (23.6%)
There were economic and cultural differences and variation in expectations among community members.	27 (22.0%)
The benefits local people derived from the park did not lead to change in their behavior.	3 (2.4%)
There was corruption amongst community leaders.	13 (10.6%)
There was a cultural attachment to the park by local people.	23 (18.7%)
Subfactors responsible for success	
The local people neighbouring the park engaged in other economic activities.	15 (12.2%)
The local people neighbouring the area had secure land tenure.	4 (3.3%)

governing parks was a factor of unskilled park staff [29, 43]. A study by Dudley et al. [29] reported that many National Parks in Africa had staff that faced serious shortfalls of skills and capacity to effectively perform. In addition to limited skills, the park staff was paid low salaries. For example, a study by Archabal and Naughton-Treves [22] in three National Parks in Uganda reported that wardens in charge had revealed that park staff were not only getting a low salary but had frequently gone without pay for months. Under such circumstances, park staff found it difficult to share money accruing from tourism revenue with the community in the implementation of benefit sharing schemes.

*3.1.19. Failure of Previous Conservation Initiatives.* Another factor that caused failure of the conservation of biodiversity in National Parks was that previous initiatives to conserve biodiversity in a particular park had failed [25, 40, 55]. This factor was reported in 6 (4.9%) of the publications reviewed. Ormsby and Kaplin [40] found that in Masoala National Park in Madagascar inconsistency in past and present park management goals led to confusion among the community regarding the park programme. The community was aware of the existence of the park but was unfamiliar with its goals. Ormsby and Kaplin [40] also reported that the park staff had raised high and unrealistic expectations among some communities which were not met. Similar findings are reported in a study that investigated the attitude of communities adjacent to the Chobe National Park in Botswana and the South Luangwa National Park in Zambia [55]. After two decades of implementing the programme, there appeared to be confusion among communities regarding community-based natural resource management. They also attributed this to unfulfilled expectations and frustrations [55]. These factors highlight inadequacies in implementation with regard to outreach and inclusion of local people in conservation programmes.

*3.2. Whether the Park Was Old or Was Newly Created.* Failure to conserve biodiversity was also associated with how long

ago the park was created. Conservation of biodiversity was more unsuccessful in newly created parks than parks that were established long ago [17, 29, 37]. This factor was reported in 9 (7.3%) of the publications. For instance, in a study by Dudley et al. [29] about the Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia, it was reported that older protected areas tended to score slightly higher in successful conservation than newer ones.

The reason why old National Parks were found to be more successful than newly created parks could be associated with the difference in support that the two categories of park receive from the community. Kideghesho et al. [17] observed disparity of support between old and new parks and interpreted that disparity is to mean that the young generation were less likely to oppose a park that was created when they were not yet born (citing Serengeti National Park created in 1951) than protected areas, that were created in early 2000 (citing Ikorongo, Grumeti and Kijereshi National Parks).

*3.3. The Local Community Neighbouring the Park.* There were various subfactors associated with the local community neighbouring National Parks that influenced the conservation of biodiversity in those parks (Table 4).

*3.3.1. Dependence on Park Resources for Livelihood and Survival by Local People.* In 21 (17.1%) of the publications reviewed, it was reported that the dependence of local people on National Park resources for their livelihood and survival affected biodiversity conservation in those parks [8, 56]. Dependence on the park resources meant that people had access to the resources in the park. For instance, failure to sustain biodiversity in Korup National Park was partly as a result of local people neighbouring the park obtaining a wide range of livelihood opportunities upon which communities in the densely populated areas surrounding the park relied in varying degrees, to make a living [8].

*3.3.2. Lack of Land, Lack of Secure Land Tenure, and Contested Ownership of Land in the Park.* Connected to the factor of dependence on park resources by local people for livelihood and survival by the local people was a factor of lack of land and secure land tenure. For example, in the case of Korup National Park, the local people neighbouring the park had little and others no land for other activities and as a consequence were compelled to harvest park resources. This also explains why in 14 (11.4%) of the publications, it was reported that local people contested the ownership of the park because they wanted to have access to resources therein due to lack of land.

*3.3.3. Economic and Cultural Differences and Variation in Expectations among Community Members.* In 13 (10.6%) of the case studies, economic and cultural differences among community members curtailed successful conservation of biodiversity in parks. In a study in the Korup National Park, Malleson [8] reported that wealthy, self-interested and politically powerful individuals were in a strong position to take control of the exploitation of the most profitable forest-related enterprises, such as timber exploitation, ivory, and game meat trades, and to acquire prime land for agricultural production usually associated with community-based conservation programmes. The majority who were poor could not engage in such enterprise and hence did not feel that they were benefiting from the park. These imbalances made it difficult for marginalised and politically weak communities on the forest edge to contest the appropriation of forest resources by politically powerful elites from the same area or by conservation projects. Cultural differences among community members also led to failure of conserving biodiversity in National Parks because initiatives such as benefit sharing were not satisfactory to all members of different cultural backgrounds in the community. Vodouhê et al. [9] found that people who perceived that they benefited from the Pendjari National Park were from tribes whose traditional activities like hunting were associated with the park contrary to those who lived far away from the park whose economic activities were not linked to the park resources. A study by Shackleton et al. [23] also reported similar findings. This indicates that people who benefit and are aware of how they benefit from parks are more likely to support the conservation of parks than those who do not or are not aware of how they benefit.

Other than the economic and cultural differences, there was variation in expectations among different community members for the benefits from the park that led to failure in conserving biodiversity in National Parks. This was reported in 22 (3.4%) of the case studies reviewed. For instance, a study by Archabald and Naughton-Treves [22] in three National Parks in Uganda found that there were numerous stakeholders with differing priorities on how to put tourism revenue to use. For example, some respondents including implementers and beneficiaries at all levels argued that individuals who suffered direct costs from conservation, such as eviction from park land or high levels of crop raiding should receive a larger share of revenue-sharing benefits.

*3.3.4. Inability of Local Communities to Appreciate Incentive Obtained by Supporting Conservation of the Park.* Other than variation in expectations of various individuals, the benefits local people derived from the park did not lead to change in their behavior, and hence they continued to unsustainably utilize resources from National Parks. This factor was reported in 3 (2.4%) of the publications reviewed. Malleson [8], for instance, attributes the failure of the Korup project to conserve biodiversity in Korup National Park to a lack of linking conservation goals and the introduction of new alternative income-generating activities. Some people obtained incentives from community-based conservation schemes and continued illegal use of park resources. Malleson [8] cited an example of a participant in her study who was employed by the Korup project on a part-time basis but which did not make him feel that his employment was an adequate incentive to stop him from hunting in his spare time in the Korup National Park. This means that people weighed the incentives obtained from community-based initiatives and the costs they incurred by giving up their activities in protected areas. This indicates that local people did not appreciate the incentives they obtained in order to support conservation of biodiversity in National Parks.

*3.3.5. Corruption among Community Leaders.* Corruption among community leaders was another factor that indirectly resulted in failure to conserve biodiversity in the park. This factor was reported in 13 (10.6%) of the publications reviewed. For example, a study by Archabald and Naughton-Treves [22] found that in one parish bordering Bwindi National Park, a local council chairman was corrupt which limited the success of a tourism revenue scheme because he had embezzled the tourism revenue sharing funds. Similarly, in Mgahinga, a community neighbouring Mgahinga National Park, one community refused to contribute to their project because they thought that the local representative to the park protection committee was corrupt. These studies are indicative of the problem of corruption that could hinder successful conservation of biodiversity in National Parks.

*3.3.6. Strong Cultural Association of the Local People with the Park.* Although some case studies such as [9] reported that tribes whose traditional activities were linked to National Parks were more positive about conservation of the park; in 23 (18.7%) of the publications, authors reported contradictory findings. For instance, Mbile et al. [51] found that cultural attachment to the park by local people was also a strong hindrance to effective conservation of biodiversity. Mbile and colleagues [51] found that because some villagers were more culturally and historically attached to some or all the area in the National Park, they felt more obliged to use resources in a culturally appropriate manner regardless of whether that manner was proconservation or counter-conservation.

*3.3.7. The Local People Neighbouring the Park Engaged in Other Economic Activities.* However, in 15 (12.2%) of the publications reviewed, it was reported that there was successful conservation of biodiversity in National Parks where

TABLE 5: Subfactors associated with the characteristics of the area where the park was located.

Subfactors	Number and percentage publications
Subfactors responsible for failure	
The park was located in an area of high human population density.	23 (18.7%)
The park was located in an area that was politically unstable.	5 (4.1%)
Subfactor responsible for success	
The park was located in a remote area with low human density.	35 (28.5%)

the local people neighbouring the park engaged in other economic activities. Availability of alternative sources of income is essential in relieving anthropogenic pressure on forest resources. However, Kasparek [37] suggests that this should not be taken for granted because livelihoods vary and their influence in motivating people to conserve resources in the park has to be tested in practice.

*3.3.8. The Local People Neighbouring the Area Had Secure Land Tenure.* In 4 (3.3%) of the publications, it was reported that in communities neighbouring parks where local people had secure land tenure and land for agriculture, there was successful conservation of biodiversity in those parks. For instance, Roe et al. [25] found that lack of arable land in rural areas in Africa compels local people to access land in National Parks.

*3.4. Characteristics of the Area Where the Park Was Located.* Three factors associated with the characteristics of the area where the park was located were reported to be responsible for successful and unsuccessful conservation of biodiversity in National Parks (Table 5).

*3.4.1. Location of the Park in an Area of High Human Population Density.* According to some studies reported in 23 (14.1%), it was difficult to conserve biodiversity in parks that were located in an area of high human population density [16, 57, 58]. For instance, increase in human populations along the western boundary of the Serengeti ecosystem led to negative consequences for wildlife populations [57]. Similarly, rapid population growth in Kenya led to conversion of “wildlands” to agricultural lands [57, 58]. Also, a study by Kiringe et al. [16] found that people living in villages located in National Parks put pressure on park resources.

*3.4.2. Location of the Park in a Politically Unstable Area.* In 5 (3.1%) of the publications, unsuccessful conservation of biodiversity was reported to be as a result of the parks being located in a politically unstable area. For example, Hamilton et al. [59] found that Uganda Wildlife Authority faced challenges of conserving biodiversity in Bwindi National Park in the late 1990s, because of rebel activities that were taking place in the park. Political instability in National Parks was

reported to have affected successful biodiversity because no patrols were conducted in the park to check illegal activities and also few tourists visited the park. In the absence of park patrols, local people would sneak into the park and illegally extract resources unnoticed [59]. Tourism is a main source of revenue in many National Parks in Africa [60]. According to Hamilton et al. [59], low tourist numbers visiting Bwindi National Park during the time of political instability in the area resulted in low revenue generation which affected the management of the park.

*3.4.3. Remoteness of the Area Where the Park Was Located.* Other studies attributed the success of conserving biodiversity in National Parks to the fact that those parks were located in remote areas. This factor was reported in 13 (10.6%) of the publications reviewed. Characteristics of a remote area described by Hockings [61] included lack of infrastructure such as roads and limited provision of services such as medical and education services. In remote areas, people were said to be more subsistence than commercial in practice. Their subsistence practices enabled them to live in balance with the environment.

Remote areas were also characterized by low human population density, a factor that 22 case studies attributed to successful conservation of biodiversity in National Parks. Due to limited infrastructure and provision of services, people were not often attracted to remote areas; hence, the number of people remains low. Also, in such areas due to limited provision of services, the mortality could have been higher than in towns where life support services were more available.

People are often attracted to places where they think they can conduct economic activities and develop or get better services. For instance, Hockings [61] found that conservation of biodiversity was more successful in National Parks located in areas of low agricultural potential. This meant that people would not be attracted to settle in areas where the soil is infertile. Hockings [61] suggests that it should not be taken for granted that people in remote areas have conservation practices; it is just that National Parks remain secure by virtue of their remoteness, a situation that is likely to change as infrastructural development and high population densities set in.

*3.5. The National Policy Governing the Park.* Two factors (political interference and lack of national policies to support management decisions of the park) were associated with national policy that affected the conservation of biodiversity in National Parks.

*3.5.1. Political Interference.* In 8 (6.5%) of the publications, authors attributed failure to sustain biodiversity in National Parks to political interference in the management of the park. For example, Kasparek [37] in a study assessing the effectiveness of a Sustainable Forest Management and Conservation Project that was implemented in four African countries (in Botswana, Malawi, Mozambique, and Namibia) reported that in Malawi, the effectiveness was limited by political interference in the project activities. Funds given to

local people as an incentive for alternative livelihoods were suspended for that reason. Also in some cases (for instance, in Uganda), government officials were reported to have allowed local communities to access park resources in exchange for votes.

*3.5.2. Lack of National Policies to Support Management Decisions of the Park.* In 26 (21.1%) of the publications, lack of national policies to support the management decisions of the park staff was reported to be responsible for unsuccessful conservation of biodiversity. According to Malleon [8] in the absence of national policies, local people challenged the actions of the park staff. For example, in Cameroon, the Korup Project team worked with six villages around the Korup National Park to establish natural resource management committees to facilitate effective conservation of the park; however, these committees are not legally recognized under Cameroon's new forest law [8]. Such a situation had earlier been reported by Williams et al. [53] pointing out that policy constraints and bureaucracy resulted in some by-laws agreed upon amongst local people and park staff to remain unapproved and therefore impossible to implement. In Uganda, a study by Archabald and Naughton-Treves [22] showed that unclear revenue sharing policy and institutional support resulted in some park wardens using preservation approaches in parks where they were supposed to implement community-based initiatives. Also, Mallya [54] in a study conducted in Serengeti National Park reported that due to conflicting laws and regulations, there were investment agreements that resulted in inadequate benefits given to local communities.

*3.6. The Financial Resource Base of the Park.* The financial resource base of the park was also found to be responsible for the success or failure of conserving biodiversity in National Parks.

In 16 (13%) of the publications, authors reported that failure to conserve biodiversity in National Parks was as a result of lack of finances by the administration of the park to implement its management plan. In 20 (13%) of the publications, the lack of finances in National Parks was associated with lack of reliable sources of funding. In South Africa, the effective management of parks was partly curtailed by unreliable sources of funding [39]. A similar scenario was reported in Nini Suhien National Park in Ghana [39]. These were affected by low fees collected from tourism. The major source of income in many National Parks in Africa is tourism, an activity that is seasonal [39].

Lack of finances hindered the conduct of research to inform policy and management decisions [22], the development of park infrastructure [62], the acquisition of equipment [62], the training of staff and the employment of skilled personnel [42, 58], and the monitoring and evaluation programmes [42, 63]. In a study by Archabald and Naughton-Treves [22] in three National Parks in Uganda, senior level park staff are said to have expressed concern that the amount of income generated in each park was inadequate to cover basic costs. This resulted in local people not getting incentives, suspension of park patrols, delayed and low salary

payment of park staff, and failure to implement compensation schemes [22].

Also in a study by Ervin [42], major staffing weaknesses across four protected area systems that were studied were linked to lack of sufficient finances. The levels of investment in protected area management were below what is required to pay the recurring costs to effectively conserve the biodiversity contained within protected area systems. Similar findings were reported by Wilkie et al. [58]:

*“expanding the present system by creation of additional protected areas without commensurate increases in funding for management will merely establish “paper parks” and will fail to improve the level of biodiversity conservation in the region” (p.703).*

Wilkie et al. [58] claimed that on average, African nations spend 0.19% of their national budgets on protected area management and concluded that if governments of those nations continue to underfinance protected areas then most, if not all, protected areas will continue to exhibit reductions in the biomass of individual species and risk the extirpation or extinction of large, slow reproducing species, and rare endemics.

How lack of finances affected infrastructural development was explored in more detail by Dudley et al. [39] and Malleon [8]. For instance, in Korup National Park, limited revenue generated by park admission fees from tourists visiting the park went to the central government coffers and little or no finances were left for infrastructural development of the park [8]. A study by Dudley et al. [39] also found that in South Africa nearly 70 percent of field staff working in National Parks felt that equipment to facilitate them in their work was inadequate and hence prevented them from effective monitoring and managing of parks.

In 2 (1.6%) of the publications, authors reported that successful conservation of biodiversity in National Parks occurred because local councils and the community mobilized funds for the conservation of biodiversity in parks. For example, in a study by Kasperek [37] that evaluated the Sustainable Forest Management and Conservation Project in Botswana, Malawi, Mozambique, and Namibia, it was reported that local people mobilized funds from fees generated from licensing, fines, and sales of trees and poles from the park and contributed to the Community Development Fund. These funds sustained the community-based biodiversity conservation projects, and hence more successful conservation of biodiversity occurred.

However, it is imperative to note that availability of funds does not guarantee that the issues pointed out will be addressed or that biodiversity conservation will be better. As some of the cases in this review have shown, corruption amongst community members and park staff may hinder biodiversity conservation funds from being utilized appropriately. For instance, at the time of writing this paper (in July 2011), the board of directors and the executive director of Uganda Wildlife Authority (responsible for all the protected areas in Uganda) and the executive director of Uganda National Forest Authority (responsible for all forests

in Uganda) had been suspended for misappropriating funds and corruption-related cases. Funds to a tune of 800,000 USD meant for the USAID funded programme called Protected Areas Management for Sustainable Use had been misused by Uganda Wildlife Authority officials [64]. Similarly, the Uganda National Forest officials misused funds from timber harvesting [65]. Such cases are indicative that even when finances are available, they may not be used to conserve biodiversity.

#### 4. Discussion

There are three points of view and perceptions that emerge from this review. These perceptions and points of view are associated with three factors; displacement of people in order to establish National Parks, provision of “poor” people with economic incentives with an assumption that they will not illegally extract park resources, and high human population density as a driver of biodiversity loss.

A synthesis of the results of this review has been structured around these factors because they dominate the literature on conservation. Firstly, various conservationists believe (as this review has shown) that the interaction of humans with natural resources is a threat to biodiversity. They perceive “genuine nature” to be devoid of humans and this forms a foundation for the idea of displacing people in order to establish National Parks. In this section, differing points of view about the benefits associated with not displacing people in order to establish National Parks is presented.

Secondly, in contemporary conservation practice, it is assumed that poor people mostly depend on natural resources and hence are responsible for biodiversity loss and environmental degradation. For instance, in the community-conservation approach, poor people are often targeted so that when they are given economic incentives, they can develop and hence reduce pressure on natural resources. Contrary to this perception, in some cases, the rich are actually more responsible for biodiversity loss from National Parks than the poor.

Thirdly, this review has shown that high human population density is one of the main factors underlying biodiversity loss. In this section, it is shown that this factor has often been ignored or not properly taken into consideration in implementing biodiversity conservation strategies. Different human population scenarios in the context of biodiversity conservation are presented and recommendations made on how to deal with them in the current milieu especially in National Parks in Africa.

The next subsection delves into these three issues.

*4.1. Arguments against Displacement of Local People in Order to Establish National Parks.* Various authors have advocated against the creation of parks by displacing people. Agrawal and Redford [34] argue that empirical studies that establish the relationship between the displacement of humans from protected areas and the marginal gain that such displacement confers on biodiversity conservation are lacking.

In a critical review using a case study of three National Parks (Serengeti National Park, Mkomazi Game Reserve, and

Arusha National Park), Nelson [66] claims that the creation of the first National Parks in Africa was at a time when wildlife populations were recovering from a population decline that had occurred a decade earlier caused by diseases (Rinderpest plague) introduced by immigrants from Europe. At that time, Africa was flourishing with wildlife and vegetation, and European colonialists quickly set aside those areas as protected areas thinking that they were of no use to the indigenous people whose population was also still recovering having declined because of small pox [67]. These arguments suggest that strict preservation may not be an effective strategy of conserving biodiversity even when there is no anthropogenic threat.

Although in this study the negative consequences to biodiversity conservation due to displacement of people when creating National Parks and restricting them from accessing resources those parks were social, Ghimire and Pimbert [68] provide an ecological explanation against such approaches of biodiversity conservation. The authors argue that purely protected areas such as strictly preserved National Parks are not good for sustaining biodiversity because they reduce the functionality of the ecosystem due to restricted interaction. Ghimire and Pimbert [68] claim that in remote parts of Africa indigenous humans are part of the forests and they coevolved with wildlife. Therefore, removing them from forests and creating National Parks destabilizes the functioning of the ecosystem. Wild and Mutebi [69] in earlier studies had expressed a similar point of view. With the disappearance of the forest elephants, they argue that some pit sawing could be beneficial to the gorillas by opening up the forest and providing the luxuriant vegetation they need for food. Creation of National Parks that exclude humans could thus lead to change in the behaviour of the wild animals. Given that the population of megafauna in most African forests has reduced, contrary to what most people think, human activities in forests could be critical in ensuring forest health [69].

Hutton and Dickson [70] use evidence from bush meat trade in Central Africa to link ecology and economics of protected areas and resources therein. They argue that while many conservationists conventionally think that either consumptive use of National Park resources must be stopped or heavily regulated, commercial use of wildlife is not in itself incompatible with conservation. They exemplify that elephants do not magically maintain static numbers and that, unless controlled hunting carefully regulates their numbers, they increase and ultimately are responsible in confined conditions for destroying their own environment and drive some plant species to extinction. Between 1992 and 1993 during a drought in Zimbabwe, it was difficult to distinguish the wasteland in parks caused by elephants from the wasteland outside caused by people and cattle confined in a small area.

In a situation where animal populations increase in number and exceed sustainable levels to the detriment of their habitats, some conservationists recommend culling game or cropping animals. This issue has often caused a lot of heated debate; for instance, the suggestion to cull elephants in Kruger National Park to control their numbers caused a lot of debate amongst the public and conservationists [71, 72]. The debate

turned political and economic and the proposal for culling was suspended. It is necessary to first have thorough research conducted to inform any ecological decisions that are to be taken. Each case has its unique characteristics that must be taken into account.

Another ecological point of view against strict preservation of National Parks is that strict protection of National Parks isolates them from their surroundings. Isolation of protected areas is said to result in serious threats to the long-term viability of many wildlife populations and migrations in Africa [73]. Ecologists have debated the impact of isolation on wildlife populations in parks. The primary drivers of isolation of protected areas are habitat loss. Naughton-Treves et al. [74] conducted a study in 49 tropical protected areas which showed that deforestation within park boundaries and surrounding areas was isolating those areas. Deforestation for instance restricts the movement of wildlife into and out of protected areas. To address that problem, a multipronged conservation strategy is often recommended that involves creating corridors for wildlife connecting different protected areas [73]. Mountain and lowland gorillas survived in a region of political instability because Bwindi National Park was connected to Ituri forest, forests in the Rwenzori Mountains and Virunga in Democratic Republic of Congo [59]. Although this is commendable, it may not be feasible in many National Parks in Africa given the current settlement patterns in most areas in Africa.

In addition, protected areas face many ecological risks both natural and human created. An example is when the entire remaining protected habitat of the golden lion tamarin (*Leontopithecus rosalia*) was almost wiped out by fire in 1992 (Castro, 1995 in 75). Shaffer [75] presents four broad categories of natural risks that isolated protected areas face. These include ecological uncertainty (resulting from random events in the survival and reproduction of individuals), environmental uncertainty (due to random, or at least unpredictable, changes in weather, food supply, and the populations of competitors, predators, and parasites and natural catastrophes such as floods, fires, or droughts, which may occur at random intervals, and genetic uncertainty or random changes in genetic make-up due to genetic drift or inbreeding that alter the survival and reproductive probabilities of individuals).

A consideration of these ecological factors and social factors is identified as being important in this study for effective biodiversity conservation when creating and managing National Parks.

*4.2. Pitfalls of Providing Local People with Economic Incentives as a Strategy for Biodiversity Conservation in National Parks.* Although some case studies in this review underscored the need for community involvement in the management of parks in Africa and commend community-based conservation initiatives, it is argued that simply involving them is not enough to solve problems that face National Parks. Similarly involving people or giving them incentives as is usually done in community-based conservation projects does not automatically lead to good conservation practices as the findings of this review have shown.

Various people may be motivated to protect the environment for different reasons [76]. Similarly, people may be motivated to conserve biodiversity in National Parks for different reasons. Integrated conservation and development projects are good examples to use to illustrate this point because according to Mogaka et al. [77], they are among the most common projects implemented among local communities neighbouring National Parks in Africa. A common assumption in integrated conservation and development projects is that if local people develop (i.e., acquire better income alternatives), they will be prompted to access park resources less. This may not always be the case; it depends on human social factors.

According to Alpert [78], development may increase consumerism, make people less reliant on the immediate natural resources and hence less sensitive to local resources, and weakens some cultural institutions that are tailored to management of natural resources in a traditional way. For example, it is common in integrated conservation and development projects to give a certain amount of money or a certain percentage of the revenue (usually ranging between 20% and 30%) to local people neighbouring a park for infrastructural development such as construction of roads. Such a venture may actually lead to more unsustainable use of resources from the park. A study by Barrett and Arcese [79] revealed that improvement in roads and transport facilities enabled markets that trade in resources acquired illegally from protected areas to thrive.

These studies explain findings of this review that even when local people were given incentives, that on its own did not change their behaviour. Therefore, provision of services and incentives to the rural poor in order to encourage them to change their behaviour so that they can conserve resources might be a wrong assumption. Adams and Hutton [80] suggest that development and conservation of biodiversity are two distinct objectives which need to be looked at differently in different contexts. For instance, rural development that is often espoused to be associated with conservation in integrated and conservation development projects could depend on conservation in the long term but not in the short term. Noss [81] projected that rural development that is based on conservation cannot be attained in less than fifty years. Fifty years far exceeds the average life span of most rural inhabitants in Africa. The ten countries with the lowest life expectancies are from Sub-Saharan Africa. The life expectancy of people in most African countries ranged between 25.9 years and 49.9 years [82].

Although sustainable development relies on ecosystem services such as nutrient cycling, preservation of water supplies, and enhancement of soil formation [78] such things might not matter, to poor rural farmers in remote areas of Africa in a situation where they struggle to attain basic needs. However, this does not mean that the affluent are more likely to exhibit proconservation behaviour. Although, a study by Newmark and Hough [83] in Uganda, South Africa and Tanzania reported that well-off individuals tended to be more pro-conservation than poor individuals, it is argued that even when individuals have attained a certain level of development or amassed a certain amount of wealth, it not a guarantee that

they will conserve biodiversity. Africa is currently operates with a capitalistic economy, and many people are becoming materialistic and striving to attain exceptional levels of development. For example, in Tanzania, a study focusing on utilitarian perception of resources in protected areas by local people living outside Katavi National Park [84] found that people from well-off households were often the ones who resented the “conservation and development” concept because the development of other individuals interfered with their small scale business enterprises. In addition, evidence provided by Marcus [85] from his evaluation of four Integrated Conservation and Development projects in Madagascar suggests that there is no guarantee that people of high social economic status have a more positive perception of protected areas than the poor people. It is only in some circumstances that wealthier people suffer less as a result of reduced access to natural resources and as a consequence are not often seen to conflict with protected area managers. These socioeconomic issues need to be taken into account in the management of National Parks.

*4.3. Human Population Density, Ecological Dynamics of Africa, and Establishment of National Parks: Past and Present Scenarios.* Trends of human population increase show that at the time the first National Parks were created in Africa, the numbers of people were ecologically limited. Given diseases, and hostile environments, there was a low human population depending on a huge amount of resources in a vast environment (suggesting a low human population density). Statistics show that at the beginning of 1900 when the first protected areas were created in Africa, the human population was approximately 13.3 million people but currently, the population is 92.3 million people. Before the beginning of the 20th century, the human population was low, people in Africa were not yet materialistic and their way of life was still controlled by ecology. Therefore, in that case, resource availability far exceeded resource use and for these reasons, there were no reports of environmental degradation. Establishing protected areas at that time could have been easy given that it involved little social and economic cost [86]. This was also reflected in the results of this review that protected areas located in areas with a low human population density were more successful at conserving biodiversity than those located in areas with high human population densities.

The factor of human population needs to be taken into account in the current process of creating and managing protected areas. This is because, presently, Africa is the second most populated continent [87], with high female fertility rates [88] and with a high rate of population growth [87]. The human population factor affects biodiversity conservation in various ways. Firstly, high human population limits the enactment of by-laws. A study by Nkonya et al. [89] that aimed at assessing compliance to natural resource by-laws in Uganda reported that initial increase in population density reduces the likelihood of enacting by-laws. Enactment and compliance to natural resource management policies were more effective in areas where the population density was below 1000 people/km<sup>2</sup> [89] indicating a strong influence of human population to compliance to resource use policies.

Secondly, high human population densities necessitate that people will be displaced when creating protected areas. This often results in limited access to land for agriculture and confining them into smaller areas. This has various implications; one implication is that people will degrade the smaller area where they are confined and indiscriminately harvest the resources therein (such as in Bwindi National Park in Uganda). The second implication is that people may increase pressure, demanding access to the resources in the National Parks, and illegally access the park resources. For instance, Semuliki National Park is located in a remote area and was created when the population of the surrounding area was relatively low but faces similar problems associated with demand for access to resources by local people as the case is in other National Parks such as the Rwenzori Mountains National Park in Uganda, Lake Nakuru National Park in Kenya, and Chobe National Park in Botswana. These two implications lead to unsustainable utilization of biodiversity in and outside National Parks. The third implication is that the establishment of the National Parks builds social tensions amongst local communities over resource use because they are not able to develop at the same pace as other regions where National Parks have not been created [90]. Some authors claim that social tensions and desperation to attain higher levels of development lead to migration of local people to cities in search of a “better life” [91]. This point also confirms that people in Africa are becoming materialistic; unlike in the past, they no longer need just to survive but desire to attain higher standards of living. This has an implication for conservation of biodiversity in National Parks because according to Averbeck [92], after failing to attain wealth from cities, out of desperation, they return to the rural areas to forcefully access and extract resources from protected areas.

Allowing restricted access to park resources where National Parks are surrounded by high population densities may also lead to the harvest of resources in an uncontrolled manner. In such a case, strict preservation may be the solution in the short term. As shown in the results of this review, in some cases, conservation of biodiversity was more successful in protected areas where local people were evicted from the area, denied access to the parks and measures to constantly patrol, and guard the area put in place. This suggests that a balance between strict preservation and community-based conservation should be considered as the situation dictates. In Kenya, there was indiscriminate harvesting of resources, which led to 44% percent loss in wildlife between 1977 and 1995, and that when part of the area was gazetted into a National Park, wildlife loss reduced to 31% in protected areas but the loss in unprotected area increased to 48% [93]. This indicates that creation of protected areas can reduce species loss in areas where there was previous indiscriminate harvesting. This concurs with the research in Bwindi National Park [94]. Increase in human populations along the western boundaries of the Serengeti ecosystem has led to negative consequences within the protected area on wildlife populations, as indicated by trends in the buffalo population [57]. These suggestions concur with studies which suggest that where some demographic characteristics dictate, National Parks should be protected strictly [95, 96]. However, this

does not mean that those areas should be strictly protected indefinitely. The results of this review suggest that both strict preservation and community-based conservation approaches are useful depending on the demographic situation of the National Park. The demographic factors of the areas also need to be placed in the past and current ecological context of the area.

## 5. Conclusion

The aim of this paper was to review the existing literature on conservation of biodiversity in National Parks in Africa and identify factors that affect the success of biodiversity conservation. The review has found that biodiversity conservation in National Parks is affected by various factors associated with the creation and management of the park, the local community neighbouring the park, the area where the park is located, the national policy governing the park, and the financial resource base of the park. These factors are socioeconomic and cultural in nature involving the management of local communities that neighbour National Parks as much as the resources in parks. This indicates that future strategies of conserving biodiversity in parks should focus as much on the socio-economic human dimension of biodiversity conservation as the scientific study of species and habitats in National Parks.

Limited attention to the socioeconomic and related aspects of culture had previously been blamed for failure of community-based conservation approaches [97, 98]. Studies on the social dimension of biodiversity conservation and how various socio-economic and cultural factors affect park resource use and biodiversity conservation in various contexts are recommended.

As this investigation has shown, factors that affect biodiversity were not uniform across all successful or unsuccessful case studies. In each case study, there were specific underlying causes that influenced each of the identified factors. Future studies that investigate how and why local people neighbouring National Parks interact with resources therein ought to be integrative in nature to include the psychological, socio-economic, and cultural factors and not only emphasize the economic aspects as is often done in Integrated Conservation and Development Programmes and Projects [99] or the traditional ecological knowledge as is done in studies that link local people's culture and biodiversity conservation [100, 101].

This investigation has also revealed that biodiversity in National Parks depends on the relations between local people and park staff. This necessitates training park staff in community social relations and development in addition to scientific managing of plant and animal species and their habitats.

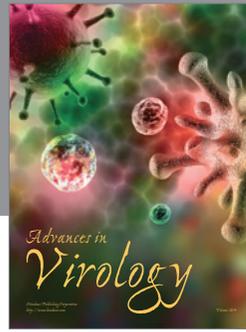
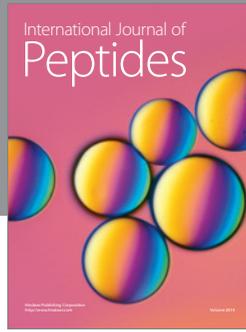
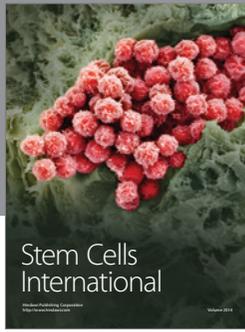
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