International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 7 Number 1 (2018): Pages 157-169
ISDS Article ID: IJDS17110902

The ecological impact of linking biodiversity conservation with livelihoods goals: A community-based conservation case from Zimbabwe

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Abstract

The study sought to establish the status of biodiversity in the Mahenye community-conserved area in south-eastern Zimbabwe pursuing conservation and development goals simultaneously. While conservation and sustainable development ideals have been promoted by many conservationists internationally, there was a resurgence of the protectionist paradigm at the end of the 20th century within certain conservation circles premised on the notion that, a simultaneous pursuit of conservation and livelihoods goals will lead to ecological decline. A questionnaire, key-informant interviews, group discussion and observation were used in gathering primary data on the state of biodiversity in the Mahenye community-conserved area. Analysis of game count records in Mahenye was also crucial in establishing the status of biodiversity in the community protected area. Descriptive statistics were used in analysing quantitative data gathered through the questionnaire while qualitative data were analysed narratively in line with the research objective. The study revealed a healthy and steadily increasing wildlife population in the Mahenye community conservation area. Contrary to proponents of strict protectionism, the results of the study highlighted that it is possible to pursue conservation and development goals simultaneously without compromising the ecological integrity of protected areas.

Keywords: Biodiversity Status; Conservation-Development; Livelihoods; Mahenye; Protectionism

Cite this article as: Chigonda, T. (2018), "The ecological impact of linking biodiversity conservation with livelihoods goals: A community-based conservation case from Zimbabwe", *International Journal of Development and Sustainability*, Vol. 7 No. 1, pp. 157-169.

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1. Introduction

According to Scherl et al. (2004), the primary goal of protected areas is to conserve biological diversity and provide ecosystem services, and not to reduce poverty. They, however, further argue that a linkage between protected areas and issues of poverty in developing countries has become a practical and ethical necessity. Practically, for protected areas in poorer countries to survive, they must be seen as a land use option that contributes positively to sustainable development as other types of land use. Ethically, human rights and aspirations need to be incorporated into national and global conservation strategies if social justice is to be realised.

Indeed, an increasingly vocal proportion of the conservation community now believes that allocating land for biodiversity conservation needs to be reconciled with sustainable use at the local level (Gurney et al., 2014; Pinho et al., 2014; Romero et al., 2012; Scherl et al., 2004). Unless they become more relevant to countries' development strategies and the rights and needs of local people, many protected areas will come under increasing threat (Gurney et al., 2014; Meilby et al., 2014; Scherl et al., 2004). A constant call in the literature is increasingly for conservation to be integrated with local livelihoods enhancement (Miller, 2014). For example, Recommendation 5 of the Bali Action Plan clearly notes that people living in or near protected areas can support protected area management if they share appropriately in the benefits flowing from protected areas, are compensated appropriately for any lost right and are taken into account in planning and operations (Scherl et al., 2004). The 5th World Parks Congress held in September 2003 also emphasised that areas must be protected not against people, but for people, and should play a major role in achieving sustainable development and ensuring that they alleviate, and not exacerbate, poverty (IUCN, 2003; Mombeshora and Le Bel, 2009; Niedziałkowski et al., 2014). It is worth noting that, globally, more than 1.6 billion people depend to varying degrees on forests for their livelihoods (Pinho et al., 2014). There is also evidence that the poor are distributed in areas of high biodiversity (Fisher and Christopher, 2007; Gurney et al., 2014; Meilby et al., 2014; Redford et al., 2008), with a coincidence of poor countries and the majority of the world's biodiversity in the Southern hemisphere clearly evident (Barrett et al., 2011; Fisher and Christopher, 2007; Redford et al., 2008; Roe and Elliot, 2005; Zenteno et al., 2013). Such a spatial link between biodiversity and poverty (the ecogeography of poverty) is often presented as a basic rationale why biodiversity conservation and poverty reduction should be pursued jointly (Barrett et al., 2011; Roe, 2008).

Despite this apparent convergence at the international policy level, there is considerable divergence of opinion at the practical level as to the nature and scale of biodiversity-poverty links and the roles and responsibilities of different interest groups in addressing these linkages (Roe et al., 2010). While the ideals of conservation and sustainable development have been promoted by many conservationists, there are immense ecological, social and political challenges facing both arenas which has left some wondering about the practicality of joining such broad policy agendas (Brandon, 1998; Gustavsson et al., 2014; Kramer et al., 1997; Mukul et al., 2010; Walpole and Wilder, 2008).

The end of the 20th century witnessed an emergence in international biodiversity conservation literature of a re-assessment of the idea of sustainable use (Adams, 2004; Hutton et al., 2005; Lele et al., 2010; Roe, 2008; Wilshusen et al., 2002). Chief among the advocates for a return to strict protectionism were Terborgh

(1999) who wrote *Requiem for Nature*, Oates (1999) who wrote *Myth and Reality in the Rainforest*; Kramer et al. (1997) who edited *The Last Stand: Protected Areas and the Defence of Tropical Biodiversity*; and Brandon et al. (1998a) who edited *Parks in Peril: People, Politics and Protected Areas.*

Proponents of the resurgent protectionist body of literature argue that current people-oriented approaches to biodiversity protection were failing as witnessed by a continuing global biodiversity crisis (Adams, 2004; Hou et al., 2014; Hutton et al., 2005; Roe, 2008; Wilshusen et al., 2002). They view species rich zones in national parks and other protected areas, mainly housed in tropical developing countries, as the 'last bastions' or 'last stands' of nature (Terborgh, 1999), the final bulwark erected to shield nature from complete collapse (van Schaik et al., 1997) which, however, were not being managed effectively to protect biodiversity (Kramer et al., 1997; Wilshusen et al., 2002), hence a renewed emphasis on strict protection. Protectionist proponents further argue that conservation programmes have been diluted by approaches that promote community development and greater local participation in decision making and recommend that conservation should desist from attempting to be 'all things to all people' but should focus on its central goal of nature protection (Wilshusen et al., 2002).

Proponents of protectionism view conservation and development as conflicting goals (Gustavsson et al., 2014; Kramer et al., 1997; Kramer and van Schaik, 1997; Mukul et al., 2010). The incompatibility of conservation and development has chiefly been supported by two main conclusions. First, advocates of strict protection argue that sustainable use depletes biodiversity (Redford and Richter, 1999; Robinson, 1993). Brandon et al. (1998b) argue that while politically expedient and intellectually appealing, the promotion of sustainable use as a means to protect resources is not well grounded in biological and ecological knowledge. They further argue that not all things can be protected through use and, in addition, not all places should be open to use. Second, experience with integrated conservation and development projects (ICDPs) has shown them to be ineffective in safeguarding protected area core zones (Agrawal and Redford, 2006; Bauch et al., 2014; Brandon et al., 1998b; Galli et al., 2014; Scherl et al., 2004; Wells and Brandon, 1992).

There is no disputing, however, to the fact that the world is experiencing an emergency situation in the name of the biodiversity crisis, and that greater protection measures need to be adopted in order to safeguard the world's biodiverse regions from imminent collapse. When it comes to which measures to take, however, the disagreements are clearly obvious (Brockington et al., 2008; Doak et al., 2014; Minteer and Miller, 2011). While protectionism may more likely be effective in safeguarding biodiversity, it is also very likely to be resisted by local communities disproportionately dependent on nature for subsistence. On the other hand, combining conservation with development has been viewed by some as a recipe for ecological failure as the agendas become too broad to handle effectively (Agrawal and Redford, 2006; Bauch et al., 2014; Redford et al., 1998). What is certainly clear, however, is the fact that the room for a return to strict protectionism is quite limited as this represents a failed past difficult to justify socially, politically and economically – the reinvention of a square wheel (Wilshusen et al., 2002). At the same time, it cannot as yet be concluded with confidence that ICDPs have failed on all accounts and are thus useless in all contexts (Wilshusen et al., 2002). There is huge scope for a further refinement and improvement of conservation-development initiatives as evidenced by the continued emergence of new-generation ICDPs such as

payments for environmental services (PES), reduced emissions from deforestation and degradation (REDD+) and other poverty-conservation mechanisms (Lele et al., 2010; Mombo et al., 2014).

In light of the above, this study examines the state of biodiversity in the Mahenye community-conserved area in south-eastern Zimbabwe pursuing biodiversity conservation together with development goals. The ultimate aim is to find out whether, as proponents of strict protectionism argue, linking biodiversity conservation with societal goals does not protect biodiversity. Research on biodiversity conservation and livelihoods in Zimbabwe has largely been silent regarding the ecological status of protected areas pursuing conservation and development goals simultaneously.

2. Materials and methods

2.1. Study site

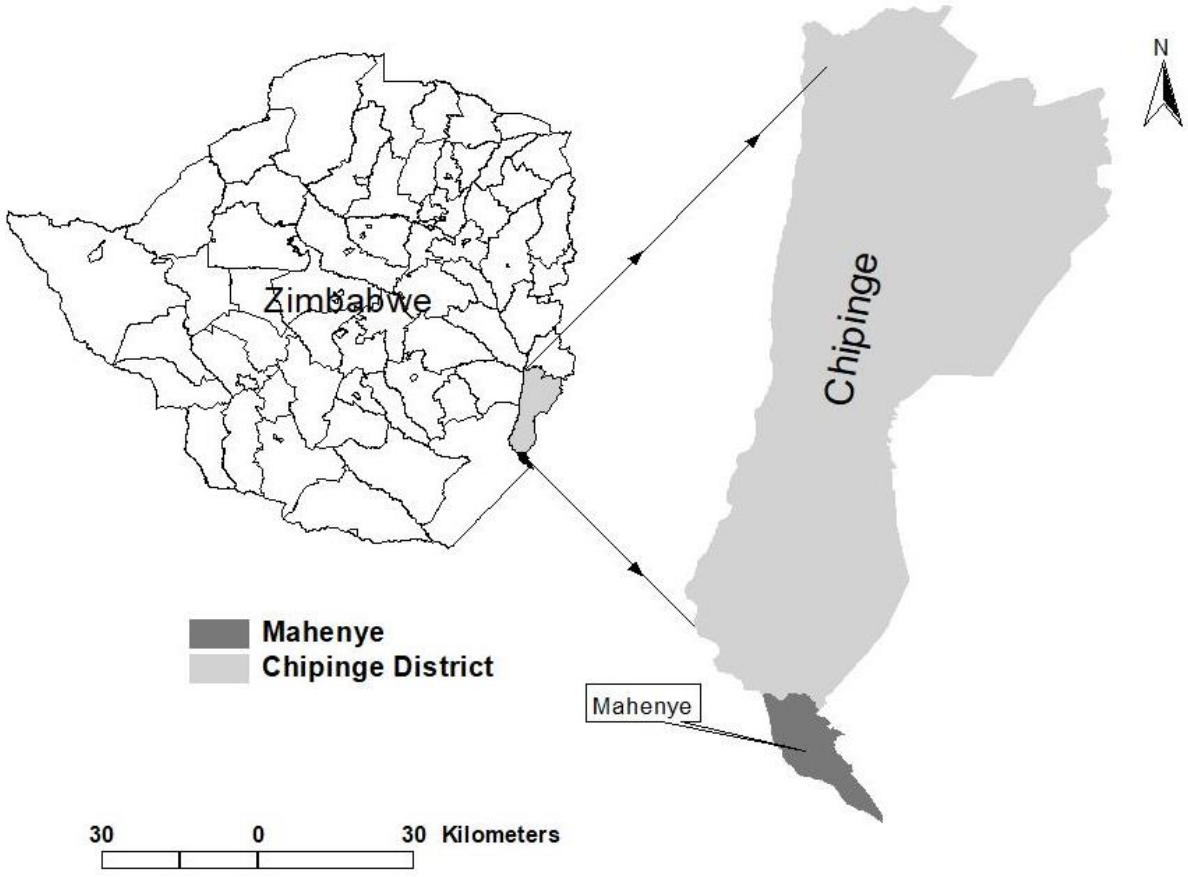

Figure 1. Location of Mahenye

Mahenye is located in Chipinge District in Manicaland Province (Figure1). The area is involved in the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), a national community-based natural resource management initiative that started in the late 1980s to promote the sustainable utilisation of natural resources in communities bordering the country's public protected areas. The Mahenye community has set aside a 15 000 hectare wilderness area where photographic and trophy hunting activities are carried out. Trophy hunting activities are based on sustainable hunting quotas for various huntable species such as elephant, lion, leopard and buffalo among others set by the Parks and Wildlife Management Authority (PWMA). However, since the appropriate authority to manage wildlife in the communal areas of Zimbabwe lies with Rural District Councils (RDCs), all trophy and safari hunting revenue accrues to RDC accounts and not local communities. RDCs will then disburse 55% of the gross hunting revenue to sub district structures such as wards and villages. The local communities will then use the income received for developing their areas through, *inter alia*, infrastructural development, educational and health services improvement, household cash dividends and investment in income generating projects managed by local CAMPFIRE committees such as the Mahenye CAMPFIRE Committee (MCC).

2.2. Data collection and analysis

Primary data for this study was collected through a questionnaire, interviews, a group discussion and observation. The ultimate purpose of these research instruments was the collection of information on the state of biodiversity in the Mahenye community which, as noted earlier, is pursuing conservation and development goals simultaneously.

The questionnaire targeted the residents of Mahenye and solicited their perceptions on the state of biodiversity before and after the establishment of the community conservation area. One hundred and fifty (150) households, constituting 21% of the target population of 707 households in the study area, were selected for questionnaire interviews. A sample size of 10% and above is considered sufficient for controlling sampling errors, and is valid for generalising the results of a study to the whole population (de Vos et al., 2011). Simple random sampling was employed in selecting households into the sample. The names of all household heads in Mahenye were written on small pieces of paper and put in a hat. One hundred and fifty names were then randomly drawn from the hat. The advantage of simple random sampling is that every individual in the sampling frame has an equal chance of being selected into the sample which removes bias.

Interviews with some key informants were also conducted in Mahenye. The key informants included the MCC chairperson, the Chief Resource Monitor for the community conservation project, the traditional leadership and the Councillor for Mahenye. Purposive sampling was used in choosing the key informants in which only those people deemed to have the required information for the study were approached. In addition, a group discussion made up of 15 people was also conducted in Mahenye. The group discussants were also purposively sampled with the help of research assistants resident in Mahenye. The purpose of the group discussion and interviews was to gather in-depth information on the biodiversity of Mahenye. This addressed the weakness of the questionnaire in collecting in-depth information. There was deliberate bias

towards the selection of respondents who were old enough to be knowledgeable about the state of biodiversity in Mahenye before the commencement of the community conservation initiative in 1991.

Secondary data was also consulted in the study. Of particular note were some game count records kept by the MCC which were crucial in establishing the current state of biodiversity in the Mahenye community conservation area. The researcher also used observation both as a data collection instrument and as a means of verifying information obtained through the other data sources used in the study.

Descriptive statistics were used in analysing quantitative data gathered through the questionnaire in which responses were computed into percentage frequencies. Some of the calculated percentage frequencies were simply incorporated into the text while others were presented in frequency tables. Qualitative data was analysed narratively in line with the research objective and then corroborated with quantitative data in the discussion.

3. Results and discussion

Proponents of strict protection have argued that pursuing conservation with development goals results in ineffective biodiversity protection, and have often cited the failure of ICDPs in effectively safeguarding protected area core zones as evidence of the incompatibility of conservation and development goals (Agrawal and Redford, 2006; Brandon et al., 1998a). On the other hand, those in favour of linking conservation with development argue that this can be the only way to safeguard protected areas, especially in developing countries where they are often surrounded by poor communities (Scherl et al., 2004; Wilshusen et al., 2002). In light of these arguments, the study sought to establish the status of biodiversity in the Mahenye community-conserved area pursuing conservation linked with livelihoods goals.

Before establishing the state of biodiversity in the community conservation area, it is important to assess the socio-economic status of the residents of Mahenye. All questionnaire respondents depended on subsistence farming as the main source of livelihood. The study area is characterised by low average annual rainfall of 400-500mm and high temperatures. This makes the area unsuitable for crop production. It was not surprising therefore when 91% (n=137) of questionnaire respondents in Mahenye rated themselves as very poor, with the majority of them (69%) (n=104) having an average monthly income of less than US$50. The high poverty levels in Mahenye highlight the importance of linking biodiversity conservation with livelihoods goals in the study area.

Questionnaire respondents in Mahenye were asked about their perceptions on the state of biodiversity just before the establishment of the Mahenye community conservation area (Table 1). The majority of the respondents (94.7%) (n = 142) indicated that biodiversity was abundant and increasing in the area now occupied by the wilderness area just before the establishment of the community conservation area. Only 1.3% (n = 2) of the respondents said that the biodiversity in the area now occupied by the community conservation area was threatened just before the establishment of the protected area, while 4% (n = 6) indicated that they did not know what the state of biodiversity was just before the establishment of the community conservation area.

Table 1. Respondents' perceptions on the state of biodiversity just before the establishment of the Mahenye community conservation area

Perceptions on the state of biodiversity just before establishment of conservation area	% frequency (n=150)
Abundant and increasing	94.7
Threatened	1.3
Scarce	-
Don't know	4.0
Total	100

All the key informants in Mahenye, namely the Chief Resource Monitor, the MCC chairperson, the Chief and the Councillor for the area also indicated that biodiversity was abundant in the area now occupied by the wilderness area just before its establishment. This was in tandem with the views of the majority of the questionnaire respondents in Table 1.

When further asked about the current state of biodiversity in the community conservation area (Table 2), the majority of the questionnaire respondents (84.7%) (n = 127) in Mahenye described the biodiversity as abundant and increasing, 6% (n = 9) described the current state of biodiversity in the wilderness area as threatened, 5.3% (n = 8) described it as scarce while 4% (n = 6) said they did not know the current state of biodiversity in the community-conserved area.

Table 2. Respondents' perceptions on the current state of biodiversity in the Mahenye community conservation area

Perceptions on the current state of biodiversity in the conservation area	% frequency (n=150)
Abundant and increasing	84.7
Threatened	6.0
Scarce	5.3
Don't know	4.0
Total	100

With 11.3% (n = 17) of questionnaire respondents now describing the biodiversity of the Mahenye wilderness area as threatened or scarce compared to only 1.3% (n = 2) who had indicated the biodiversity of the wilderness area to be threatened before the establishment of the community conservation area, the responses seem to suggest some slight decline in the biodiversity of the Mahenye wilderness area. The questionnaire respondents who indicated that biodiversity was declining in the wilderness area (n = 17)

were further asked to identify decline indicators. 58.8% (n = 10) claimed that some wild animals were no longer seen in the wilderness area, 23.5% (n = 4) indicated that vegetation cover and wild animal populations were declining in the community conservation area, 17.6% (n = 3) noted declining wild animal populations while 5.9% (n = 1) cited declining vegetation cover. Among the major drivers of biodiversity decline identified by the questionnaire respondents claiming that biodiversity was declining in Mahenye (n = 17) included poaching (94%) (n = 16), ineffective conservation approaches (29.4%) (n = 5), over-reliance on natural resources by locals (29.4%) (n = 5), increasing human populations (17.6%) (n = 3), climate change (17.6%) (n = 3) and land-use changes around the conservation area (5.9%) (n = 1). (Please note: respondents were allowed to choose multiple responses per question, and so percentage frequencies are over 100%).

The claims by 11.3% (n = 17) of questionnaire respondents that biodiversity was declining in the Mahenye wilderness area were, however, contrary to the views of key informants who noted that biodiversity was actually increasing in the community conservation area. The Chief Resource Monitor for the Mahenye CAMPFIRE project indicated that, while incidences of poaching had slightly increased since 2000, mainly due to declining CAMPFIRE benefits to the community, illegal access to resources in the conservation area had not yet reached levels serious enough to cause biodiversity decline. According to the Chief Resource Monitor, the increase in poaching in Mahenye after 2000 was in fact a show of protest by the residents against declining CAMPFIRE benefits, and could suddenly decline, or even disappear, if such benefits were restored. The Chief Resource Monitor further noted that the limited poaching that was occurring in the wilderness area was for subsistence purposes by local people, with no commercial poachers capable of causing serious biodiversity decline involved. He however warned that proactive measures should urgently be taken so as to deter poaching before it gets to levels that may eventually threaten wildlife numbers. As noted earlier, the best approach to curb poaching in Mahenye rests on restoring CAMPFIRE benefits to pre-2000 levels.

The Chief Resource Monitor further noted that CAMPFIRE resource monitors regularly carried out some ground-based game counts in the wilderness area so as to have some rough estimates of wildlife population trends. He noted that such game counts have consistently indicated healthy trends in populations of counted animal species in the conservation area. Table 3 shows game counts of various species that were carried out during the periods June 1998 to May 1999 and June 2015 to May 2016. As Table 1 indicates, 83% of the counted wildlife species registered some steady increases in numbers, with buffalo and impala indicating 165% and 111% growth in counts respectively between the 1998/99 and 2015/16 periods. Only nyala and waterbuck recorded some slight decline in numbers of -6.6% and -8.6% respectively. The game counts seem to confirm the views of the majority of questionnaire respondents (84.7%) (n = 127) and the key informants who indicated that the biodiversity in the Mahenye wilderness area was abundant and increasing.

Based on the game counts, the MCC has persistently called for an increase in the annual hunting quota for Mahenye, especially that for elephants. The PWMA has consistently pegged the hunting quota between 4-6 elephants per annum while the MCC has unsuccessfully lobbied for an increase of the elephant quota to 8.

The Mahenye wilderness area shares an unfenced boundary with the adjacent Gonarezhou National Park, the second largest protected area in Zimbabwe. This boundary, marked by the Save River, allows many

animals to cross over from the national park into the community conservation area especially during the dry season when water levels are low. There has been a significant increase in the populations of various wildlife species, particularly elephants, during the last few decades in Gonarezhou National Park (PWMA, 2011). The national park is reported to have an estimated population of between 9000 and 11000 elephants whose numbers continue to grow. In addition, population estimates of three game species (elephant, buffalo and zebra) carried out in Gonarezhou in a stratum adjacent to Mahenye showed some healthy populations comprising 1335 elephants, 3156 buffalo and 78 zebra (Table 4) (The Africa Resources Trust, 2002). With a porous boundary between Gonarezhou and Mahenye, a lot of these animals eventually find their way into the community wilderness area and therefore they represent the potential richness of Mahenye in wildlife.

Table 3. Wildlife game counts in the Mahenye wilderness area: June 1998 - May 1999 and June 2015 – May 2016

Species	Total count (June 1998 to May 1999)	Total count (June 2015 to May 2016)	Difference	% change
Elephant	1396	1517	121	8.7
Buffalo	23	61	38	165
Kudu	401	536	135	33.7
Nyala	61	57	-4	-6.6
Bushbuck	254	371	117	46
Waterbuck	256	234	-22	-8.6
Warthog	152	212	60	39.5
Impala	36	76	40	111
Duiker	248	311	63	25.4
Klipspringer	388	429	41	10.6
Suni	121	149	28	23
Grysbok	384	447	63	16.4

Source: The Mahenye CAMPFIRE Committee (MCC)

Table 4. Population estimates of selected species in a stratum in Gonarezhou National Park adjacent to Mahenye Ward

Species	Estimate	Density per km^2	Population
Elephant	1335	1.61	5 175+-40.3%
Buffalo	3156	3.8	4 234+-137.0%
Zebra	78	0.09	662+-50.1%

Source: The Africa Resources Trust, 2002

The abundance of wildlife in the Mahenye wilderness area was also noted in a group discussion held in the area. All group discussants unanimously indicated that both plant and animal biodiversity in the wilderness area was thriving. The discussants attributed the positive biodiversity trends to the CAMPFIRE project which had instilled some conservation values among the people of Mahenye. One group discussant noted that:

> *A lot of wild animals are attracted into the Mahenye wilderness area from Gonarezhou National Park by the dense vegetation cover in the community-conserved area*. The increasing numbers of *elephants and other wildlife are however damaging our crops, and we do not receive any compensation at all from CAMPFIRE.*

Although, as shown earlier, a few residents had resorted to poaching due to declining CAMPFIRE benefits, the majority of the Mahenye residents still upheld the conservation values cultivated by the community conservation initiative. Mahenye residents are prohibited from utilising resources in the community wilderness area and have largely complied with this regulation.

4. Conclusion

In spite of indications of some slight increase in poaching activities in the Mahenye wilderness area since 2000 due to declining community benefits from CAMPFIRE, all the information sources for the study revealed that the biodiversity in the community-conserved area was quite healthy. The majority of the questionnaire respondents (84.7%) (n = 127) in Mahenye described the biodiversity in the wilderness area as abundant and increasing against 11.3% (n = 17) who stated that biodiversity in the community conservation area was declining. In addition, all key informants and focus group discussants also indicated that the biodiversity in the community conservation area was abundant and increasing. Game counts that are regularly conducted in the community conservation area by CAMPFIRE resource monitors also indicated positive wildlife trends. Observations during fieldwork also confirmed the abundance of floral and faunal biodiversity in the community conservation area highlighted by the various study respondents. The positive biodiversity trends in the community conservation area indicate that, contrary to strict protectionism, it is possible to pursue conservation and development goals successfully without compromising the ecological integrity of biodiversity. It is important to note that the reported recent slight increase in poaching in the Mahenye wilderness area has been spurred by a decline in conservation-related livelihood benefits from the local CAMPFIRE project, which is another proof in support of the need to link conservation and development goals. In this case, it therefore follows that for there to be more effective biodiversity conservation in Mahenye, the local people must benefit meaningfully from the biodiversity through sustainable use. Literature evidence indicates that conservation areas in developing countries cannot survive if they do not meaningfully contribute to the well-being of poor natural resource dependent adjacent communities (Scherl et al., 2004; Wolmer et al., 2004).

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