

Research Article

Community perceptions of wildlife conservation and tourism: A case study of communities adjacent to four protected areas in Zimbabwe

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Abstract

The objectives of this study were: (1) to determine community perceptions of wildlife conservation and tourism, and (2) to establish socio-demographic factors that influence community perceptions of wildlife conservation and tourism. Using closed-ended questionnaires, we collected data from July 2013 to February 2014 in four protected areas (PAs) and adjacent communities in Zimbabwe, i.e., Umfurudzi Park, Gonarezhou National Park, Matusadona National Park and Cawston Ranch. A total of 938 responded to the survey. The community in Gonarezhou had neutral perceptions of wildlife conservation, while those in Umfurudzi, Matusadona, and Cawston Ranch had positive perceptions of wildlife conservation. All four communities had negative perceptions of tourism. There were variable correlations between socio-demographic factors and community perceptions of wildlife conservation and tourism among the different study communities. We concluded that the PAs in question have not fully involved the communities in PA management and that benefits from natural resources are not fairly shared among stakeholders, as explained by the different perceptions communities had on wildlife conservation and tourism. We recommend that conservation agencies should: (i) nurture positive perceptions and address the possible determinants of negative perceptions by the communities, (ii) enhance community involvement and benefits from tourism, and (iii) consider community heterogeneity in conservation planning.

Keywords: conservation, community heterogeneity, perceptions, socio-demographic factors, tourism

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Introduction

The International Union for Conservation of Nature (IUCN) defines a protected area (PA) as a geographical space that is clearly defined, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values [1]. PAs are mostly viewed in biological or ecological terms, but they serve several purposes that are valuable to people and even important to human welfare [2]. PAs are reserved for the conservation of biodiversity while allowing visitation by people for different important reasons. PAs are therefore valued assets for wildlife resources [3], which promote other activities like wildlife tourism with spin-offs for the wider economy [4]. Wildlife conservation refers to the practice of protecting wild plant and animal species and their habitats [5, 6] whereas tourism refers to people visiting away from their normal places of work and residence, the activities undertaken during their visit, and the facilities created to cater to their needs [7]. Wildlife tourism is often the most substantial part of the local economy, and therefore PAs can be catalysts of sustainable regional and rural development [8]. Any detrimental impacts on the environment can therefore deprive countries of possible wildlife tourism earnings and negatively affect a lot of people employed in the wildlife tourism sector [9].

The creation of many PAs, however, forced the relocation of local communities from their original areas of residency, depriving them of access to resources in the PAs such as meat, grazing areas, and firewood [4, 10]. This deprivation seems to have disconnected local communities from the adjacent PAs [11]. Such protectionist and coercive conservation policies, later known as 'fortress conservation' [12, 13], have dominated much of African conservation [14]. PAs that exclude local communities or their participation have often caused negative relationships between PAs and local communities, resulting in conflicts and problems such as increased illegal hunting, habitat encroachment and destruction, violence, and poverty among indigenous communities [15-18]. This background continues to influence the communities' perceptions of wildlife conservation and tourism to date [11]. Local people can be a direct threat to PAs when they refuse to cooperate with PA authorities or participate in PA agencies' conservation activities [19, 20], to the detriment of wildlife conservation and tourism [21].

New strategies such as 'community conservation' [22, 23] or participatory management' [24, 25] have been developed in response to the general belief of many conservationists that PAs are likely to fail unless local communities are to some extent involved in conservation efforts [26, 27]. Strategies to reconcile differences between local residents and PAs' needs encourage community participation in natural resource management while improving their economic comfort [28]. More often than not, wildlife conservation in Africa is presented in terms of a win-win discourse involving community participation and benefits [29]. However, Benjaminsen and Svarstad [29], using two case studies from Tanzania and South Africa, demonstrate how the conservation practices observed in Africa do not fit the win-win discourse, but are more in line with the 'fortress conservation' that previously dominated both discourse and practice. Wildlife affects local communities through both the damage it causes to crops and the benefits associated with it [30]. Muchapondwa *et al.* [31] are of the view that the benefits of wildlife potentially accrue at both global and local levels whereas the costs occur exclusively at the local level, but Cortes-Vazquez [32] showed that there is need for more nuanced descriptions and models, given that some locals benefit, while others lose out on these conservation efforts. Benefits to communities may come through involvement and participating in tourism activities within and adjacent to the PA [11], while negative attitudes and perceptions of tourism can be provoked by unequal sharing of the benefits of tourism within a community [33]. Assessing community perceptions of both conservation and tourism is therefore necessary.

Wildlife conservation's success depends on people's perceptions and attitudes towards conservation [34], which shape PA-community relationships [35-37]. Conservation agencies can improve management through understanding people's perceptions of PAs [38], and peoples' perceptions of conservation are aspects of many wildlife conservation studies [e.g., 38, 39, 40-43]. Perceptions are affected by different socio-demographic factors such as household income levels, education, age [44], size of livestock herd [45], length of residency, gender [46], sources of income, and household size [38, 47].

Few studies of community perceptions of conservation and tourism have focused on multiple study areas, [e.g., 48, 49]. Snyman [44], noted that many perception studies have focused on one study area and did not compare community perceptions between different conservation areas. Furthermore, little is known about community perceptions of conservation and tourism in environments that have undergone political and economic disturbances. Tourists may shun a destination that is undergoing a period of instability, reducing tourism activity and economic returns for both the country [50] and especially for the local people [4] who may then develop negative perceptions of conservation and tourism. For instance, Zimbabwe experienced political instability and economic decline between 2000 and 2008 [51], which may have affected local people's perceptions of wildlife conservation and tourism in communities adjacent to PAs.

The present study compares community perceptions of conservation and tourism in four conservation areas: Umfurudzi Park, Gonarezhou National Park, Matusadona National Park and Cawston Ranch in Zimbabwe. Our objectives were: (1) to determine community perceptions of wildlife conservation and tourism, and (2) to establish socio-demographic factors that influence community perceptions of wildlife conservation and tourism.

Methods

Study Areas

Zimbabwe was chosen as a case study because of its documented history of wildlife conservation and its land reform programme, whose effects on wildlife conservation were globally reported through both the electronic and print media [51]. The four PAs were selected because of their spatial distribution as shown in Figure 1, and also because they reveal community perceptions of conservation and tourism in conservation areas with different management regimes by comparing public and private PAs.

All the sampled villages surrounding a PA are referred to as a community in this study. A community is defined here as an entity socially bound by a common cultural identity, living within a defined geo-spatial boundary, and having a common economic interest in the resources of the area [52]. Briefly, the four study areas include two safari areas and two national parks, and their adjacent communal areas (see Table 1).

Data collection

We used the quantitative research method using closed-ended questionnaires. Sampled households were in the range of ≥ 10 km from the PA boundary as these were believed to have much interaction with the PA [53]. We obtained permission to conduct the questionnaires from the Ministry of Local Government, Urban and Rural Development, the respective District Authorities, and the relevant traditional Chiefs prior to the start of the survey. On entering a village, we marked the first household and then we interviewed every third household to give us a good coverage of the community.

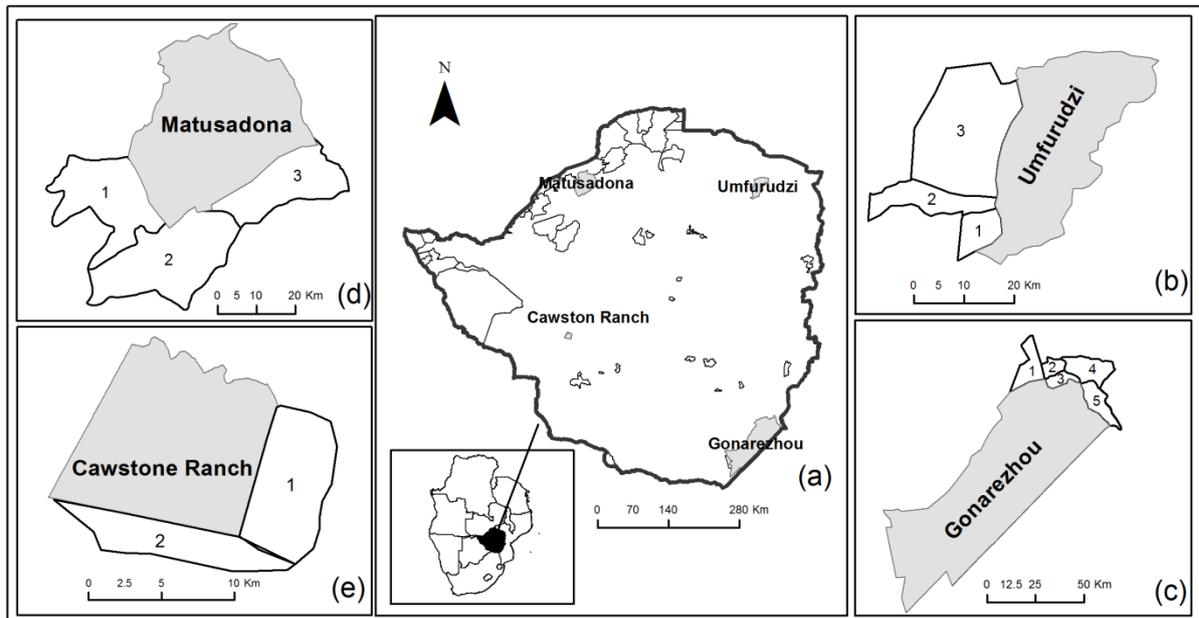


Fig. 1. Location of the four study sites in Zimbabwe. (a) shows the PAs in Zimbabwe among which are the four study PAs; (b) shows Umfurdzi National Park and the Umfurdzi community comprising of three areas: 1- Sanye, 2- Mufurdzi 1, and 3- Mufurdzi 2; (c) shows Gonarezhou National Park and the Gonarezhou community comprising of five areas: 1- Chizvirizvi, 2- Mupinga, 3- Chitsa, 4- Mutandahwe, and 5- Mahenye; (d) shows Matusadona National Park and the Matusadona community comprising of three areas: 1- Nebiri, 2- Musambakaruma 2, and 3- Musambakaruma 1; and (e) shows Cawstone Ranch and the Cawstone Ranch community comprising of two areas: 1- Ward 10 and 2- Ward 9.

A questionnaire was given to the household head or in the absence of the household head, an adult family member of 18 or more years of age. We first obtained informed consent from all individuals who were interviewed. Each questionnaire took approximately 20 to 30 minutes to complete. Questionnaires were administered with the help of local interviewers who had secondary education and were trained how to collect data. Data were collected from July 2013 to February 2014. A total of 1,000 questionnaires were issued to sampled households in the four communities, and 938 usable questionnaires were returned, a 93% response rate. The respondents' socio-demographic profiles are shown in Appendix 1.

Respondents were asked to indicate the extent they agreed with the given statements concerning their perceptions of tourism and conservation on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". The seven-point Likert scale was used to prevent people from being too neutral in their responses [54]. Seven carefully thought out items (statements) rated community perceptions of tourism, and six items rated community perceptions of conservation (Table 2).

Data Analysis

Data were summarized using descriptive statistics, and we used the mode to determine the scores that occurred most frequently in the data sets and the range to quantify the dispersion of scores in the data [55], since the data were not normally distributed. We used the Kruskal-Wallis Analysis of Variance (ANOVA) to test whether there were significant differences in community perceptions of conservation and of tourism among the four communities. Where there were differences, post-hoc examination of the mean ranks was done to determine the differences [56]. Spearman's correlation

coefficient was used to establish socio-demographic factors that influence community perceptions of wildlife conservation and tourism using the Statistical Package for the Social Sciences (SPSS) Version 20.0 [57]. To determine the scale's internal consistency, the scales were tested for reliability using the Cronbach's alpha coefficient (α). The scales' reliability ranged from 0.60 to 0.79 in all the communities. These reliability results were all acceptable as the recommended value for α is 0.70, and 0.60 [58] for new measures.

Table 1. General characteristics and organisation of the four PAs and their surrounding communities. Source: Utete and Mwedzi [80]; Gandiwa *et al.* [81]; Muboko *et al.* [60]; Muposhi *et al.* [82].

Attributes	Study site			
	Umfurudzi	Gonarezhou	Matusadona	Cawston Ranch
Status	Safari Area	National Park	National Park	Safari Area
Ownership	Government	Government	Government	Private
Management	-Public-private partnership -Top-down management practices	-Public-private partnership -Top-down management practices	-Public -Top-down management practices	-Private -Top-down management practices
Coordination with academia and researchers	Yes	Yes	Yes	Yes
Year established	1981	1930 as a Game reserve, upgraded to a National Park in 1975	1963 as a Game reserve, upgraded to a National Park in 1975	1988
Size (km ²)	760	5,000	1,400	128
CBNRM projects	None	CAMPFIRE	CAMPFIRE	None
Community involvement in decision-making	None	Limited involvement only in CAMPFIRE management	Limited involvement only in CAMPFIRE management	None
Tourism facilities	Campsites	Lodges, camp sites	Lodges, camp sites	Bush camps
Community benefits from PAs	No benefits	Mainly CAMPFIRE benefits	-Employment benefits -CAMPFIRE benefits	A number of material benefits e.g., game meat, employment
Human-wildlife conflict	Loss of crops and livestock	Loss of crops and livestock	Minimal crop and livestock destruction	Loss of crops
Compensation for losses from wildlife	No compensation	No compensation	No compensation	No compensation
Local languages	Shona	Shangani	Tonga, Shona	Ndebele

Note: CBNRM stands for Community-Based Natural Resource Management. Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) is a form of CBNRM project that uses wildlife and other natural resources for promoting devolution of rights to manage, use, dispose of, and benefit from natural resources to rural institutions and improved governance and livelihoods. CAMPFIRE is based on the principle that, if communities receive economic benefits from wildlife, they will change their attitudes and want to conserve and manage it.

Table 2. Scale items for rating community perceptions of wildlife conservation and tourism

Scale items for rating community perceptions of wildlife conservation		Scale items for rating community perceptions of tourism	
Item No	Statement	Item No	Statement
1	It is important to protect plants and trees in the Park	1	I would be happy to see more tourists here
2	It is important to protect wild animal species in the Park	2	I would be happy if my children worked in the tourism industry
3	People who poach should be punished	3	Tourism benefits the whole community
4	It is good this land is protected	4	My family has more money because of tourism
5	I think the Park was created for the betterment of the community	5	Because visitors want to experience our culture, tourism strengthens our cultural tradition
6	I am happy that my village borders the Park	6	Tourists respect our culture and traditions
		7	Tourism offers financial opportunities for me that have adequately offset my losses from conservation

Results

Community perceptions of conservation

Community views on conservation were neutral in Gonarezhou and positive in Umfurudzi, Matusadona and Cawston Ranch (Table 3). Despite all the communities having the same mode and range for the first two scale items, i.e., 7 and 6 respectively, which indicated positive perceptions towards the protection of plants and wild animals, Kruskal-Wallis ANOVA test results indicated significant differences in the perceptions.

Community perceptions of tourism

Community perceptions of tourism were generally negative in all the four communities (Appendix 2). Despite all the communities having the same mode and range for the second scale item, i.e., 7 and 6 respectively, which indicated positive perceptions of their children working in the tourism industry, Kruskal-Wallis ANOVA test results indicated significant differences in the perceptions. Scale items 4 to 7 were also found to be significantly different despite all communities strongly disagreeing with the statements.

Relationship between socio-demographic factors and wildlife conservation, and tourism perceptions

We recorded variable correlations between socio-demographic factors and community perceptions of wildlife conservation and tourism among the different study communities. There was a strong correlation between age and community perceptions of wildlife conservation for Umfurudzi community; a strong correlation between level of education and community perceptions of wildlife conservation for Cawston Ranch community; and a strong correlation between number of years stayed in the village and community perceptions of wildlife conservation for Gonarezhou community (Appendix 3).

A strong correlation was recorded between gender and community perceptions of tourism for Umfurudzi and Gonarezhou communities. Similarly, there was a strong correlation between age and community perceptions of tourism for Umfurudzi and Matusadona communities. A strong correlation was also recorded between number of years stayed in the village and community perceptions of tourism for Gonarezhou and Cawston Ranch communities. Lastly, a strong correlation was recorded between total number of livestock and community perceptions of tourism for Umfurudzi and Cawston Ranch communities (Appendix 3).

Table 3. Differences and similarities in community perceptions of conservation in Umfurudzi Park, Gonarezhou NP, Matusadona NP and Cawston Ranch in Zimbabwe. Values are the mode and range in parenthesis. Rating scale: 1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neither disagree nor agree, 5=somewhat agree, 6=agree, 7=strongly agree. N: sample size; df: degrees of freedom. Values with different superscript letters within rows differ significantly (Kruskal-Wallis ANNOVA test specific comparisons; $P < 0.05$).

Conservation perception	Study site				N	df	Kruskal-Wallis	P value
	Umfurudzi	Gonarezhou	Matusadona	Cawston Ranch				
It is important to protect plants and trees in the Park	7(6) ^b	7(6) ^a	7(6) ^b	7(6) ^a	938	3	42.67	<0.001
It is important to protect wild animal species in the Park	7(6) ^b	7(6) ^a	7(6) ^b	7(6) ^a	938	3	58.46	<0.001
People who poach should be punished	7(6)	7(6)	7(6)	7(6)	938	3	6.84	0.077
It is good this land is protected	7(6) ^b	1(6) ^a	7(6) ^c	7(6) ^c	938	3	103.69	<0.001
I think the Park was created for the betterment of the community	1(6) ^b	1(6) ^a	7(6) ^c	7(6) ^b	938	3	177.98	<0.001
I am happy that my village borders the Park	1(6) ^b	1(6) ^a	7(6) ^c	1(6) ^b	938	3	75.86	<0.001
Overall	7(1)	4(1)	7(0)	7(1)	-	-	-	-

Discussion

Perceptions of wildlife conservation and influence of socio-demographic factors

Our results show that communities had mixed perceptions of wildlife conservation and concur with those of Gandiwa *et al.* [53], who reported mixed perceptions of conservation in Gonarezhou. This may indicate that the communities generally understand the importance of wildlife conservation regardless of previously recorded cases of human-wildlife conflict [59-61] and limited access to natural resources [4], which are believed to trigger negative perceptions of conservation [44, 62]. By agreeing to most of the statements that measured their perception of conservation, the communities showed an appreciation of conservation. Similar findings were reported by Tessema *et al.* [63] in their study of four PAs in Ethiopia, and Mehta and Heinen [64] for communities around two PAs in Nepal, contrary to other communities who were found to be less positive towards conservation, e.g., in Lake

Mburo National Park, Uganda [22] and Cross River National Park in Nigeria [65]. While the Umfurudzi, Gonarezhou and Cawston Ranch communities may have been generally positive in their perceptions of conservation, they did not appreciate the fact that their villages bordered the PAs. This is likely due to the costs they incurred from living closer to PAs, e.g., loss of crops and livestock due to wildlife depredation [62, 66]. This concurs with Marcus [48]'s study of the Madagasy community, Madagascar, which, while generally being happy that the park had been created, did not want it in their proximity.

We found that gender has no effect on community perceptions of conservation, as did Kideghesho *et al.* [45], who reported that in Western Serengeti, Tanzania, gender had no effect on community perceptions of conservation. Perhaps because men and women enjoy the same benefits from wildlife resources and suffer the same costs from wildlife depredation, they tend to share the same views on conservation, although Kaltenborn *et al.* [67], and Kaltenborn and Bjerke [68] found that gender affects community perceptions on conservation. Concerning age and conservation perceptions, our results concur with Tessema *et al.* [63] and Snyman [44], who found a significant positive correlation between age and conservation perceptions, likely because as people get older, they become more understanding and tolerant. Younger people, who are more involved in poaching [37] and, have constant battles with conservation authorities, therefore have negative perceptions of conservation. However, according to Shibia [69], younger community members are more positive about conservation and tourism than older community members because they are usually more educated and understand conservation issues better. Similar to our study, Kaltenborn *et al.* [67] and Kideghesho *et al.* [45] report that community members with higher levels of education have more positive perceptions of PAs and conservation than those with lower levels of education. Kideghesho *et al.* [45] suggest that better educated residents have access to better employment, providing alternative livelihood strategies that reduce dependency on resources from PAs for survival.

Concerning the number of years stayed in the village, our results concur with Mehta and Heinen [64] and Arjunan *et al.* [46] who found that length of residency affects conservation perceptions, perhaps because the longer people stay in a village, the more accustomed they become to the place and to the environment. King [70], however, found that in South Africa, many of the new residents in the Mzinti community were less dependent on the natural resources and therefore had more positive perceptions of conservation than older residents. Contrary to Tessema *et al.* [63], who found that larger families value PAs more than smaller families, and Snyman [44], who argues that household size has no significant effect on attitudes towards conservation, our results indicate that, overall, household size had a significant negative correlation with conservation perceptions. We suggest that larger families would require more resources from the PAs that are no longer allowed and therefore may develop negative perceptions towards conservation.

Our study indicates that the number of livestock has no significant correlation with conservation perceptions. However, according to Gadd [62] and Romañach *et al.* [18], villagers with large herds of livestock are more negative to PAs and are often less supportive of conservation than those with fewer livestock. Our findings are different likely because greater percentages in each of the four communities (ranging from 66% to 89%) had smaller numbers of livestock, i.e., 10 and below. Contrary to Allendorf *et al.* [71], our study shows that level of income has no significant correlation with conservation perceptions, likely because in all the four communities, most community members were in the same income category, with the greatest percentage of villagers (ranging from 74% to 96%) earning less than US\$1,000 per annum.

Perceptions of tourism and the influence of socio-demographic factors

Community perceptions of tourism were generally negative in all study areas, likely because none of the communities appreciated the fact that they received no financial benefits from tourism. Elsewhere, in a study by Mutanga *et al.* [72] residents around Mana Pools National Park, Zimbabwe, were found to have negative perceptions of tourism attributed to lack of financial benefits. Connelly-Kirch [73] suggests that those communities that benefit from tourism usually have positive perceptions of tourism. We found that most respondents in Umfurudzi and Gonarezhou would not be happy to see more tourists in their areas, whereas those in Matusadona and Cawston Ranch would be happy to see more tourists, likely because of the benefits Matusadona and Cawston Ranch get from the PAs. Our results showed negative perceptions of tourism by all the communities, most likely influenced by the need to protect their local culture. In Nadi, Fiji, King *et al.* [74] also attributed the negative perception by the community to the desire to protect their culture. However, some studies point in the direction of tourism being irrelevant as a factor of strong or weak local culture. For example, Bruner [75] postulated that if local populations can "stage" their own cultures for tourist consumption and benefit materially from it, they do not really worry too much about the encounters with tourists. Of more importance are issues of ownership of the tourist activities.

Contrary to Snyman [44], our results showed no significant correlations between community perceptions of tourism and levels of education, household sizes, or levels of income in all four communities. Regardless of their level of education, household size, and level of income, all the community members resented the lack of financial benefits from tourism. Also contrary to Snyman [44], our results showed a significant correlation between gender and tourism, likely because the employment opportunities created through tourism development mostly tend to favor women [76]. Concerning age, our results concur with He *et al.* [77] in their case study of Wolong nature reserve for giant pandas in China, where perceptions of tourism are affected by age. Mutanga *et al.* [72] suggest that older people's perceptions could stem from deep-rooted memories of the losses they incurred as the park evolved, including loss of land and detachment from traditional ceremonies and sacred places. In Gonarezhou, our results showed a positive correlation between number of years stayed in the village and tourism perceptions. As with the conservation perceptions, this could also be because the longer people stay in a village, the more accustomed they become to the place and the better they adapt to the environment.

We found that perceptions of conservation were generally positive while perceptions of tourism were generally negative in all four communities. Our study, in line with the general suggestions for Biosphere Reserves [78], concludes that the PAs in question have not adequately assessed the interests of the various stakeholders and therefore have not fully involved them in planning and decision-making for the management and use of the PAs. Moreover, although PAs play an important role in the conservation and sustainable utilisation of the natural resources (Fig. 2), some communities adjacent to these PAs enjoy few benefits. We conclude that the benefits from the sustainable utilisation of natural resources have not been fairly shared among stakeholders in some communities.

Because our study was conducted soon after the economic decline in Zimbabwe, community perceptions of wildlife conservation and tourism may differ from other, more stable countries, which limits generalising our results. However, we provide important insights of perceptions following disasters. Our study looked only at national parks and safari areas and adjacent areas. We suggest that future studies should consider other PA categories such as recreational parks, sanctuaries, and botanical reserves, as these may have different impacts on community perceptions due to the non-availability of large carnivores and herbivores.

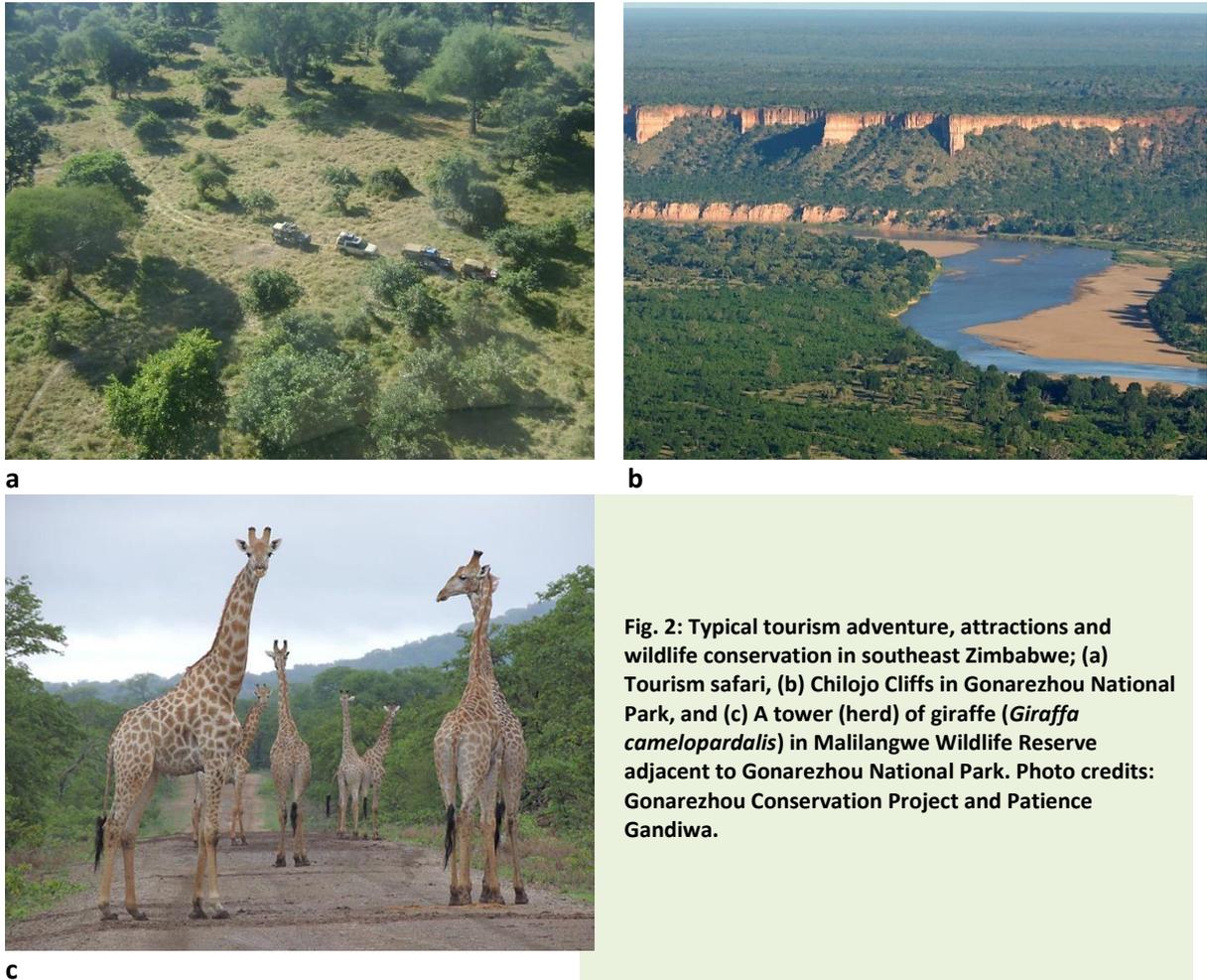


Fig. 2: Typical tourism adventure, attractions and wildlife conservation in southeast Zimbabwe; (a) Tourism safari, (b) Chilojo Cliffs in Gonarezhou National Park, and (c) A tower (herd) of giraffe (*Giraffa camelopardalis*) in Malilangwe Wildlife Reserve adjacent to Gonarezhou National Park. Photo credits: Gonarezhou Conservation Project and Patience Gandiwa.

Implications for conservation

Our findings point to the fact that it will be beneficial for PAs to provide incentives to communities that encourage the conservation and sustainable use of natural resources as well as develop alternative means of livelihood for local populations, especially from tourism. Furthermore, since perceptions are regarded as attitude-forming processes [34], it is important that conservation agencies direct more effort to changing negative perceptions [79] that easily become negative attitudes. Based on our findings, we recommend the following: (1) conservation agencies should nurture positive perceptions and address the possible determinants of negative perceptions in order to improve community appreciation of conservation; (2) conservation agencies need to enhance community involvement and benefits from tourism by establishing links between community support and conservation for more successful planning; and (3) conservation agencies need to consider community heterogeneity in their conservation planning and community relationship management initiatives.

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Appendix 1. Socio-demographic profiles of respondents. Values are numbers of respondents, and percentages in parenthesis; N: sample size.

Demographics	Community				Overall N=938
	Umfurudzi N=74	Gonarezhou N=278	Matusadona N=281	Cawston Ranch N=305	
<i>Gender</i>					
Male	44(59.5)	181(65.1)	147(52.3)	169(55.4)	541(57.7)
Female	30(40.5)	97(34.9)	134(47.7)	136(44.6)	397(42.3)
<i>Age(years)</i>					
18-25	15(20.3)	44(15.8)	71(25.3)	47(15.4)	177(18.9)
26-35	20(27.0)	70(25.2)	95(38.8)	52(17.0)	237(25.3)
36-45	19(25.7)	52(18.7)	68(24.2)	62(20.3)	201(21.4)
46-55	6(8.1)	29(10.4)	15(5.3)	57(18.7)	107(11.4)
56-65	7(9.5)	54(19.4)	18(6.4)	52(17.0)	131(14.0)
66-75	6(8.1)	25(9.0)	12(4.3)	27(8.9)	70(7.5)
76+	1(1.4)	4(1.4)	2(0.7)	8(2.6)	15(1.6)
<i>Highest level of education</i>					
No formal education	8(10.8)	88(31.7)	28(10.0)	35(11.5)	159(17.0)
Primary education	22(29.7)	106(38.1)	164(58.4)	150(49.2)	442(47.1)
Secondary education	43(58.1)	74(26.6)	83(29.5)	108(35.4)	308(32.8)
Adult education	1(1.4)	6(2.2)	2(0.7)	4(1.3)	13(1.4)
College diploma	0(0.0)	4(1.4)	3(1.1)	4(1.3)	11(1.2)
University graduate	0(0.0)	0(0.0)	1(0.4)	4(1.3)	5(0.5)
<i>Number of years stayed in the village</i>					
<2	4(5.4)	0(0.0)	7(2.5)	28(9.2)	39(4.2)
3-10	14(18.9)	16(5.8)	31(11.0)	73(23.9)	134(14.3)
11-20	22(29.7)	69(24.9)	43(15.3)	196(64.3)	330(35.2)
21-30	9(12.2)	63(22.7)	79(28.1)	2(0.7)	153(16.3)
31-40	22(29.7)	47(17.0)	64(22.8)	4(1.3)	137(14.6)
41-50	2(2.7)	21(7.6)	28(10.0)	1(0.3)	52(5.5)
51+	1(1.4)	61(22.0)	29(10.3)	1(0.3)	92(9.8)
<i>Household size</i>					
<5	29(39.2)	97(34.9)	159(56.6)	119(39.0)	404(43.1)
6-10	36(48.6)	120(43.2)	94(33.5)	131(43.0)	381(40.6)
10+	9(12.2)	61(21.9)	28(10.0)	55(18.0)	153(16.3)
<i>Total number of livestock</i>					
< 5	20(27.0)	109(39.5)	194(69.0)	162(53.1)	485(51.7)
6-10	29(39.2)	83(30.1)	57(20.3)	69(22.6)	238(25.4)
11-15	13(17.6)	29(10.5)	12(4.3)	30(9.8)	84(9.0)
16-20	7(9.5)	19(6.9)	6(2.1)	18(5.9)	50(5.3)
21-25	1(1.4)	11(4.0)	2(0.7)	12(3.9)	26(2.8)
26-30	0(0.0)	10(153.6)	2(0.7)	8(2.6)	20(2.1)
30+	4(5.4)	15(5.4)	8(2.8)	6(2.0)	33(3.5)
<i>Level of income per year</i>					
< US\$1000	55(74.3)	228(82.0)	271(96.4)	270(88.5)	824(87.8)
US\$1000-\$2000	12(16.2)	28(10.1)	6(2.1)	22(7.2)	68(7.2)
US\$2001-\$3000	2(2.7)	12(4.3)	1(0.4)	3(1.0)	18(1.9)
US\$3001-\$4000	1(1.4)	1(0.4)	0(0.0)	5(1.6)	7(0.7)
US\$4001-\$5000	1(1.4)	4(1.4)	1(0.4)	0(0.0)	6(0.6)
US\$5001-\$6000	2(2.7)	2(0.7)	0(0.0)	1(0.3)	5(0.5)
US\$6000+	1(1.4)	3(1.1)	2(0.7)	4(1.3)	10(1.1)

Note: Adult education refers to activities that are intentionally designed for the purpose of bringing about learning among people whose age, social roles, or self-perception define them as adults [83].

Appendix 2. Differences and similarities in community perceptions of tourism in Umfurudzi NP, Gonarezhou NP, Matusadona NP and Cawston Ranch in Zimbabwe. Values are the mode and range in parenthesis. Rating scale: 1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neither disagree nor agree, 5=somewhat agree, 6=agree, 7=strongly agree. N: sample size; df: degrees of freedom. Values with different superscript letters within rows differ significantly (Kruskal-Wallis ANNOVA test specific comparisons; $P < 0.05$).

Tourism perception	Study site				N	df	Kruskal-Wallis	P value
	Umfurudzi	Gonarezhou	Matusadona	Cawston Ranch				
I would be happy to see more tourists here	1(6) ^a	1(6) ^a	7(6) ^b	7(6) ^a	938	3	61.05	<0.001
I would be happy if my children worked in the tourism industry	7(6) ^b	7(6) ^c	7(6) ^c	7(6) ^a	938	3	115.54	<0.001
Tourism benefits the whole community	1(6) ^a	1(6) ^a	7(6) ^c	1(6) ^b	938	3	155.04	<0.001
My family has more money because of tourism	1(6) ^a	1(6) ^a	1(6) ^b	1(6) ^b	938	3	74.77	<0.001
Because visitors want to experience our culture, tourism strengthens our cultural tradition	1(6) ^a	1(6) ^b	1(6) ^c	1(6) ^b	938	3	47.76	<0.001
Tourists respect our culture and traditions	1(6) ^a	1(6) ^b	1(6) ^c	1(6) ^b	938	3	24.44	<0.001
Tourism offers financial opportunities for me that have adequately offset my losses from conservation	1(6) ^a	1(6) ^a	1(6) ^b	1(6) ^b	938	3	46.40	<0.001
Overall	1(1)	1(1)	1(1)	1(1)	-	-	-	-

Appendix 3. Relationship between socio-demographic factors and wildlife conservation, and tourism perceptions. Values are Spearman's rho correlation coefficient (r); n.s. = not significant ($p > 0.05$).

Socio-demographic factors	Communities			
	Umfurudzi	Gonarezhou	Matusadona	Cawston Ranch
Community perceptions of wildlife conservation				
Gender	$r = -0.14$ n.s.	$r = 0.11$ n.s.	$r = 0.10$ n.s.	$r = 0.07$ n.s.
Age	$r = 0.25$ $p < 0.05$	$r = 0.01$ n.s.	$r = 0.08$ n.s.	$r = -0.02$ n.s.
Level of education	$r = 0.11$ n.s.	$r = -0.01$ n.s.	$r = 0.03$ n.s.	$r = 0.22$ $p < 0.001$
Number of years in village	$r = 0.18$ n.s.	$r = 0.21$ $p < 0.001$	$r = 0.11$ n.s.	$r = -0.04$ n.s.
Household size	$r = -0.18$ n.s.	$r = 0.05$ n.s.	$r = -0.04$ n.s.	$r = 0.00$ n.s.
Number of livestock	$r = 0.17$ n.s.	$r = -0.07$ n.s.	$r = 0.04$ n.s.	$r = 0.05$ n.s.
Level of income	$r = 0.06$ n.s.	$r = -0.07$ n.s.	$r = -0.03$ n.s.	$r = 0.06$ n.s.
Community perceptions of tourism				
Gender	$r = -0.29$ $p < 0.05$	$r = -0.06$ $p < 0.01$	$r = 0.09$ n.s.	$r = 0.09$ n.s.
Age	$r = 0.24$ $p < 0.05$	$r = 0.02$ n.s.	$r = 0.12$ $p < 0.05$	$r = -0.02$ n.s.
Level of education	$r = 0.02$ n.s.	$r = -0.01$ n.s.	$r = -0.04$ n.s.	$r = 0.09$ n.s.
Number of years in village	$r = 0.17$ n.s.	$r = 0.33$ $p < 0.001$	$r = 0.06$ n.s.	$r = -0.18$ $p < 0.01$
Household size	$r = -0.08$ n.s.	$r = 0.01$ n.s.	$r = 0.04$ n.s.	$r = -0.04$ n.s.
Number of livestock	$r = 0.29$ $p < 0.05$	$r = -0.11$ n.s.	$r = 0.04$ n.s.	$r = 0.17$ $p < 0.01$
Level of income	$r = 0.18$ n.s.	$r = -0.07$ n.s.	$r = -0.02$ n.s.	$r = 0.03$ n.s.