

## Does the CAMPFIRE programme ensure economic benefits from wildlife to households in Zimbabwe?

Pierre Kabeya Tchakatumba, Edson Gandiwa, Emmanuel Mwakiwa, Bruce Clegg & Simukayi Nyasha

To cite this article: Pierre Kabeya Tchakatumba, Edson Gandiwa, Emmanuel Mwakiwa, Bruce Clegg & Simukayi Nyasha (2019) Does the CAMPFIRE programme ensure economic benefits from wildlife to households in Zimbabwe?, *Ecosystems and People*, 15:1, 119-135, DOI: 10.1080/26395916.2019.1599070

To link to this article: <https://doi.org/10.1080/26395916.2019.1599070>



© 2019 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



View supplementary material [↗](#)



Published online: 21 Apr 2019.



Submit your article to this journal [↗](#)



Article views: 9



View Crossmark data [↗](#)

RESEARCH



## Does the CAMPFIRE programme ensure economic benefits from wildlife to households in Zimbabwe?

Pierre Kabeya Tchakatumba<sup>a</sup>, Edson Gandiwa<sup>b</sup>, Emmanuel Mwakiwa<sup>a</sup>, Bruce Clegg<sup>c</sup> and Simukayi Nyasha<sup>d</sup>

<sup>a</sup>Department of Agricultural Economics and Extension, University of Zimbabwe, Harare, Zimbabwe; <sup>b</sup>School of Wildlife, Ecology and Conservation, Chinhoyi University of Technology, Chinhoyi, Zimbabwe; <sup>c</sup>Research Department, The Malilangwe Trust, Chiredzi, Zimbabwe; <sup>d</sup>Scientific Services, Zimbabwe Parks and Wildlife Management Authority, Harare, Zimbabwe

### ABSTRACT

This study was conducted in three districts of the southern lowveld of Zimbabwe to assess the economic impact of CAMPFIRE among rural households in the area. Data were collected through surveys from households ( $n = 569$ ) and key informant interviews from ward councillors from 10 communities, and historical data from the district offices between September and November 2014. Results showed that households were incentivised through direct and indirect economic benefits. The direct economic benefits were small but the households appreciated the infrastructural facilities from CAMPFIRE. About 3% of surveyed households felt that CAMPFIRE contributed to a reduction in human-wildlife conflicts. Both direct and indirect benefits deteriorated after donor withdrawal beginning 2003, as evidenced by a sharp decline in household dividends, and an increase in human-wildlife conflicts and incidences of illegal hunting. However, given that households still benefit from CAMPFIRE, more than a decade after donor withdrawal is an indication of its resilience. Revitalising the CAMPFIRE model is crucial given its benefits for households at the grassroots and its contribution to conservation. Improving transparency and providing tenure security for the hunting area in CAMPFIRE would increase effective ownership of the programme at the household level and promote its sustainability.

### ARTICLE HISTORY

Received 29 November 2016  
Accepted 19 March 2019

### EDITED BY

Alexander van Oudenhoven

### KEYWORDS


CAMPFIRE; donor; economic benefits; household; sustainability; Zimbabwe

## 1. Introduction

Following independence in 1980, Zimbabwe inherited from Southern Rhodesia environmental laws that provided privileged access to wildlife resources particular groups and sectors, while denying others access to the same resources even if those resources were outside national parks and wildlife sanctuaries (Baldus 2009; Roe et al. 2009; Reid 2016). Those laws were often resented by marginalised rural people, who viewed them as discriminatory and an impediment to benefits of local natural resources. Moreover, the local people felt that the needs or values of wildlife were given precedence over their needs. As a result, human and wildlife conflicts became inherent in communal areas interfacing with protected areas (Maveneke 1998; Murphy 2010). In order to mitigate the ongoing ecological disaster fostered by human-wildlife conflicts, and correct the discriminations in dealing with conservation issues (ART 2006; Taylor 2009), the Zimbabwe's Department of National Parks and Wildlife Management (now Zimbabwe Parks and Wildlife Management Authority hereafter referred to as 'Park Authorities' in this paper) initiated the Communal Area Management Programme For Indigenous Resources (CAMPFIRE) in the late 1980s (Martin 1986). The programme was promoted by and

received substantial support from donors, mainly the United States Agency for International Development and the Norwegian Agency for International Development, from 1989 to 2003 (Taylor 2009). CAMPFIRE is a Community-Based Natural Resource Management Programme (referred to as 'community-based programme' in this paper) built on the assumption that involving local people in economic benefits and management of wildlife will help ensure the long-term sustainability of the resource and its habitat, and enhance rural livelihoods and rural development (Hasler 1999; Balint and Mashinya 2006; Harrison 2015). The cornerstone of CAMPFIRE is the devolution of rights to manage, use, dispose of, and benefit from wildlife resources (Taylor 2006; Krause and Zambonino 2013). In this regard, households at community (i.e. ward and village) level were the intended ultimate beneficiaries of the programme, as sufficient revenue must accrue to local individuals, at the household level, to raise their interest in resource management and conservation (Emerton 1999; Taylor 2009). However, the Government of Zimbabwe was only prepared to devolve Appropriate Authority to the rural district councils (referred to as district councils in this paper), the lowest accountable local level of the federal government (Logan and Moseley 2002). Acting on behalf of its constituent communities, the district

**CONTACT** Pierre Kabeya Tchakatumba  [petertchaka@gmail.com](mailto:petertchaka@gmail.com)

 Supplemental data for this article can be accessed [here](#).

© 2019 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

councils sell safari operators access to wildlife. In turn, safari operators sell sport hunting opportunities, mostly to foreigners (Cruise 2015; Cooney et al. 2017). The returns to commercial safari operations (hunters inclusive) are the least well understood, because their profit margins are not known (Frost and Bond 2008). Among all stakeholders of the CAMPFIRE (such as Government, district councils, councillors, CAMPFIRE Association, safari operators, hunters, communities, and households), financial records were only available for three stakeholders, namely the district councils, the CAMPFIRE Association and the communities (or wards). The accepted but non-binding guideline (Figure 1), was that at least 50% of the wildlife revenues was to be paid to the communities (or wards). The CAMPFIRE Association (which represents all CAMPFIRE district councils) receives 4% of gross revenue as a levy. District councils receive a maximum of 15% of gross revenue as a levy. The remaining percentage is allocated to wildlife management, such as habitat management, fire control, monitoring, or hiring of game scouts (Bond et al. 2009; Mazambani and Dembetembe 2010). The degree of conditionality between what the CAMPFIRE communities provide and the payments they receive varies with the kind of contractual arrangement between the safari operator and the district council, and how the district council decide to disburse the funds (Frost and Bond 2008). The contractual arrangement between the safari operator and the district council defined the relationship between the safari operator, the district councils and the communities or wards in terms of hunting ethics, monitoring and infrastructural investment and in some cases employment (Bond and Frost 2005; Schröter et al. 2014). Since these contractual arrangements clearly specified the rights and obligations of all parties, including an implied conditionality in the link between service provision and

payment, they were, in effect but not in name, payments for ecosystem services (Bond and Frost 2005; Reid 2016).

Wildlife provides many ecosystem services in the form of trophy hunting, meat, medicinal products, aesthetic enjoyment, and inspiration. Only a small portion of these ecosystem services are targeted by CAMPFIRE through trophy hunting and ecotourism, which generates hunting fees, meat, skins, and other more general revenues derived from tourism. According to Taylor (2009), the revenue earned by district councils with Appropriate Authority between 1989 and 2006 totalled nearly US \$30 million. Ninety percent of this revenue was earned from the lease of sport hunting rights to commercial safari operators. The remaining revenue came from the lease of tourism rights (2%), ivory sales and sale of hides (6%) and other minor miscellaneous transactions such as crocodile and ostrich eggs and firewood (2%).

### 1.1. CAMPFIRE programme context and donor funding

CAMPFIRE made significant contributions to wildlife conservation from 1989 to 2003 (Taylor 2009). Technical and other support was provided mainly by the United States Agency for International Development from 1989 to 2003 for a total amount of US\$28 million (Taylor 2009; Mazambani and Dembetembe 2010). In the paper, this is referred to as the 'donor era.' This support contributed, among other activities, to start-up advances to communities in 1989 and 1996/1997 (Logan and Moseley 2002). The Norwegian Agency for International Development provided additional funding through World Wildlife Fund to support CAMPFIRE in local-level natural resource management techniques and capacity building, from 1994 to 2002 for a total amount of US\$ 2.2 million

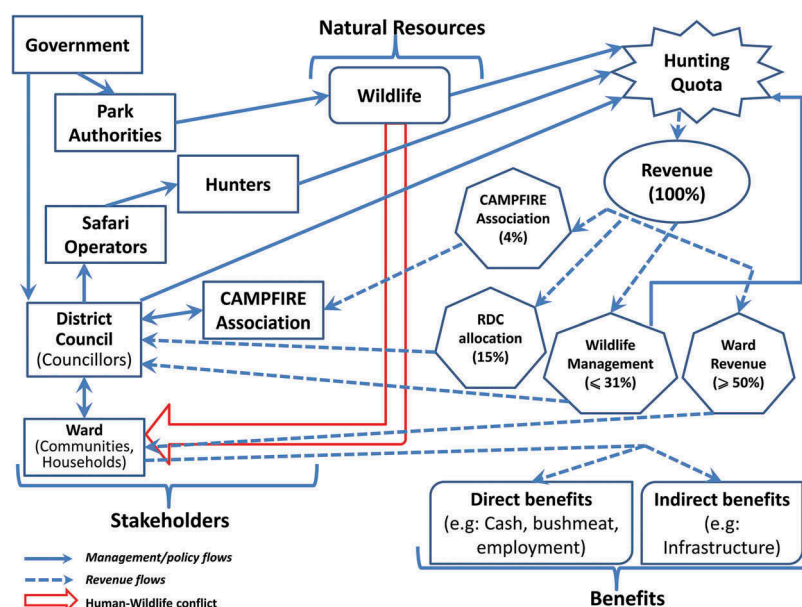


Figure 1. CAMPFIRE resource, stakeholder and revenue flow conceptual framework.

(Taylor 2009). The donor funding, coupled with revenues from the sale of wildlife resources, allowed the programme to subsidise household income and develop infrastructural facilities. Households were also incentivised through employment opportunities and nutrition through bushmeat provision.

Although CAMPFIRE experienced growth and progress in the 1990s, its progress stalled after 2003, when the United States Agency for International Development withdrew its funding, the period referred to here as the 'post-donor era' (Taylor 2009). This coincided with unmatched period of political, economic, and social uncertainty in Zimbabwe. The most prominent features were the political stalemate generated by (1) the land reform and the illegal invasion of private land; (2) hyperinflation which resulted in a collapse of most of the private and public infrastructures (including infrastructures related to wildlife management); and (3) the withdrawal of bilateral donor funds (Mapedza and Bond 2006). In general, communally managed ecotourism projects and programs that were reliant on strong clientele from Europe and America as well as donor support from the same countries failed (Chimhowu et al. 2010).

### 1.2. Objectives of the study

A number of studies assessed CAMPFIRE benefits in the southern lowveld, mainly at ward level, with little focus at household level (Roe et al. 2009; Gandiwa et al. 2013; Zunza 2014). There has been little analysis of the impact the wider project processes have had on the local households involved and whether the project has achieved its aim of providing significant wildlife economic benefits to households in order to improve wildlife conservation (Harrison 2015). It is unclear as to what extent individual households have benefited from payments from wildlife during and after the donor era (Child et al. 2003; Mashinya 2007). Thus, the main objective of this study is to make a comparative analysis of the impact of CAMPFIRE as an economic incentive to households through economic benefits derived from wildlife during both the donor and post-donor funding eras. Specific objectives were to: (1) undertake a comparative analysis of the allocation of CAMPFIRE revenues among the main stakeholders (namely the district council, the CAMPFIRE Association, and the community (or ward)), during both the donor and post-donor eras, and monitor the average household-level impact from such benefit distributions, (2) estimate the contribution of economic benefits derived from wildlife resources to the overall household income, (3) determine households' perception on infrastructure development derived from CAMPFIRE revenues, (4) assess the extent of human-wildlife conflict, based on district council records, ward councillors' interviews and household perceptions, during both the donor and post-donor eras, and (5) assess households' perceptions on the sustainability of

CAMPFIRE. Given the considerable biophysical and socio-economic variability between district councils involved in CAMPFIRE (Taylor 2009), an attempt has been made to contrast the districts of the study area (the southern lowveld of Zimbabwe), whenever possible, in order to provide a holistic perspective of the health of community-based programme in the area. In this paper, we mainly focused on the CAMPFIRE's direct economic benefits (such as cash dividends, employment opportunities and bushmeat provision, subsidised tillage, and drought relief) and some indirect benefits (such as infrastructural facilities) (Hasler 1999). We acknowledge that there are other beneficial aspects to CAMPFIRE, such as inspiration and cultural values derived from nature; however, they are not covered within the scope of this paper.

## 2. Methods

### 2.1. Conceptual framework

The conceptual framework for the CAMPFIRE natural resources, stakeholders and revenue flows is shown in Figure 1. The framework shows the CAMPFIRE stakeholders interactions as they derive benefits from the natural resource utilisation. The natural resource is the wildlife. A resource must have a measurable value to the community so that the benefit of managing a resource exceeds the cost (Child et al. 2003; Chevallier 2016). According to Emerton's (1999) rationale, sufficient revenue must accrue to local individuals, at the household level, to raise their interest in resource management and conservation. The stakeholders of the CAMPFIRE are the national Government, Park Authorities, district councils, councillors, CAMPFIRE Association, safari operators, hunters, communities, and households (Figure 1). CAMPFIRE benefits through revenues are derived from wildlife resources and shared among three main stakeholders, namely the district councils, the CAMPFIRE Association, and the communities (or wards) (Figure 1; Taylor 2009). It is that revenue allocated to communities through Ward Wildlife Management Committees which is intended to provide the economic incentive for households to participate in the collective management of wildlife (Taylor 2009). According to Hasler (1999) and Mazambani and Dembetembe (2010), households can benefit directly from the CAMPFIRE programme through cash dividends, subsidised tillage, drought relief and employment opportunities (which entail salaries for resource monitors, allowances for committee members), or indirect benefits through infrastructural development (grinding mills, schools, clinics, boreholes, fence repairs and maintenance). Bushmeat provision is also another part of direct economic benefit to communities. Emerton (1999) has further highlighted that community-based programme initiatives must also fare well in comparison with other land-use options such as agriculture and livestock.



Human-wildlife conflict poses a threat to the management of wildlife (Figure 1). Moreover, communities that bear the additional cost of human-wildlife conflict must also be compensated (Emerton 1999; Chevallier 2016). Wildlife can pose a significant threat to local populations in the form of competition for resources, livestock predation, crop damage, injuries and even fatalities to humans (Emerton 1999; Jones 2015; Zisadza-Gandiwa et al. 2016). Thus, in order to ensure the sustainability of the CAMPFIRE programme, there is need for mechanisms that accrue benefits from wildlife, mitigate the extent of human-wildlife conflict, compensate for loss or damage, and that respond to land disputes. This requires a relevant devolution of wildlife management, based on transparency in the allocation of CAMPFIRE revenues among the main stakeholders and tenure security for the hunting area (Emerton 1999; Jones and Erdmann 2013). As data for a deeper econometric analysis was not readily available, the present study has used a simplified version of Emerton's (1999) rationale by comparing household's perceptions on CAMPFIRE benefits (based on Hasler's (1999) classification: direct economic benefits and indirect economic benefits) on one hand, with household perceptions on the extent of human-wildlife conflict on the other hand. Moreover, in order to evaluate the sustainability of the programme, we have assessed households' perceptions on which stakeholders benefit the most from CAMPFIRE, the constraints and challenges faced by the programme, and whether CAMPFIRE should continue. This overall assessment was further strengthened through triangulation; secondary data from district councils records, for the donor and post-donor eras, on the allocation of CAMPFIRE revenues among the main stakeholders, the provision of CAMPFIRE employments, and the extent of human-wildlife conflict, coupled with

interviews with ward councillors, were analysed in addition to the household survey responses to get a consistent and full assessment report on CAMPFIRE issues.

## 2.2. Study sites

The study focused on the districts of Chipinge, Chiredzi and Beitbridge, as these are the main CAMPFIRE areas in the southern lowveld of Zimbabwe (Figure 2). The study site is located between longitude 29°E-33°E and between latitude 20°S-22.5°S and lies within a savannah landscape. The area is located in the South and South-East of Zimbabwe. Figure 2 shows location of the study site in Zimbabwe. Two communities were selected from Chipinge (wards 29 and 30; the only wards to be involved in CAMPFIRE), and four communities each from Chiredzi (wards 6, 8, 13 and 15) and Beitbridge (wards 1, 2, 6 and 8), making a total of 10 selected communities (or wards). Unlike in certain districts such as Nkayi and Lupane districts (in the Matabeleland North Province) where people were a lot more negative about the implementation of CAMPFIRE (Alexander and McGregor 2000), local people in the southern lowveld have been more appreciative of the programme from its outset (Child 2004; Machena et al. 2017).

Zimbabwe is divided into five agro-ecological zones according to rainfall and crop production potential. Natural Regions IV and V are the low potential areas receiving less than 450 mm of rainfall annually (Chikodzi et al. 2013). The three study districts fall under agro-ecological regions IV and V and hence have low agricultural potential. Precipitation is typically low and erratic, soils are poor and malaria is widespread (Vorlauffer 2002). The study area is of conservation importance since it is part of the Great Limpopo Transfrontier

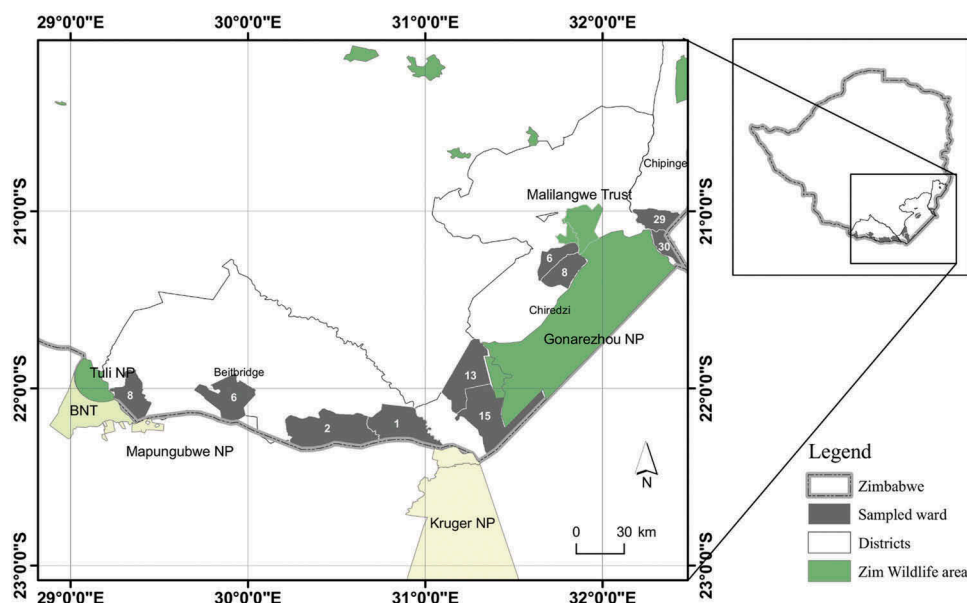


Figure 2. CAMPFIRE wards sampled in Chipinge, Chiredzi and Beitbridge districts of southern Zimbabwe.

Source: Zimbabwe Surveyor General (2015).

Conservation Area, and has state protected areas, private conservancies and several CAMPFIRE areas.

Chipinge district is located to the extreme south of Manicaland province. Out of its 30 wards only two are involved in CAMPFIRE, and were therefore purposively sampled: ward 29 (Mutandahwe) and ward 30 (Mahenye), which share borders with Mozambique to the east, and Chiredzi district (mainly Gonarezhou National Park) to the West. At the time of this research, the two wards of Chipinge had an estimated population of 16,620, mainly Shangaan speaking people (Jaka 2009; ZIMSTAT 2012). The two wards fall in the semi-arid agro ecological regions IV and V (Jaka 2009), and are suitable for semi-extensive farming of drought-resistant crops and livestock production. The fully subsistence-oriented production of maize (*Zea mays*) and sorghum (*Sorghum bicolor*) in Chipinge produces only low yields, which are further reduced by frequent damage by wildlife, mainly elephants from the Gonarezhou National Park (Vorlauffer 2002; Zunza 2014).

Chiredzi and Beitbridge districts are both located in ecological region V, which is suitable for extensive farming and livestock ranching due to limited rainfall (Manjengwa et al. 2010; Chikodzi et al. 2013). Most people grow drought-tolerant sorghum. The black and red clay soils found in Chiredzi are also appropriate for sugar cane (*Saccharum officinarum*). Chiredzi district is located in the south-eastern part of Masvingo province (Chibisa et al. 2010), and comprises 32 wards of which 11 are involved in CAMPFIRE. Since wards 29 and 30 in Chipinge are located on the eastern part of Gonarezhou National Park, we intended to select wards in Chiredzi that border the northern and western parts of Gonarezhou National Park to have a holistic assessment of community-based programme around the park among other things, households benefits from CAMPFIRE and the extent of human-wildlife conflict. Therefore, out of the 11 wards, and based on their accessibility, four were purposively selected on the northern (wards 6 and 8) and western (wards 13 and 15) part of Gonarezhou National Park, representing an estimated population of 28,018 people at the time of this research ([ZIMSTAT] Zimbabwe National Statistics Agency 2012), who speak mainly Shangaan (Manjengwa et al. 2010; Gandiwa et al. 2013). The area is suitable for wildlife conservation, with Gonarezhou National Park (505,300 ha) and Malilangwe Wildlife Reserve (39,376 ha) as the main wildlife areas, representing more than 30% of the total district area (Child et al. 2003).

Beitbridge district is part of Matebeleland South province and consists of two parts: Beitbridge East, and Beitbridge West. The district encompasses 15 wards with seven wards involved in CAMPFIRE. In order to have a holistic assessment of the programme in Beitbridge, and based on their accessibility, two wards each were purposively selected for sampling, from

Beitbridge East (wards 1 and 2), and Beitbridge West (wards 6 and 8). The four wards represent an estimated population of 19,676 people at the time of this research ([ZIMSTAT] Zimbabwe National Statistics Agency 2012) of diverse culture and languages that include, Venda (wards 2 and 6), Shangaan (ward 1) and Sotho in ward 8 (Manjengwa et al. 2010). The district is of conservation importance – with vital wildlife corridors – since it is part of the Great Limpopo Transfrontier Conservation Area in the east (which encompasses Zimbabwe, Mozambique and South Africa), and the Greater Mapungubwe Transfrontier Conservation Area in the west (which involves Zimbabwe, Botswana and South Africa). It also includes the Tuli Safari Area, and some private wildlife estates such as the Nottingham Estate and the Sentinel Ranch that use the CAMPFIRE model to manage their wildlife resources (CESVI Zimbabwe 2002; Zisadza-Gandiwa et al. 2016).

### 2.3. Sample size and sampling criteria

A minimum effective sample size of 385 households targeting at least 50% of CAMPFIRE participating households was required (Cochran 1977). Nevertheless, after factoring in a non-response rate of 35.8%, 600 households were the target of the study. From each selected community (or ward) in the three districts, two villages were purposively designated given their accessibility, making a total of 20 villages from which 30 households each were randomly sampled. This resulted in the following number of targeted households per district: 120 in Chipinge, and 240 each in Chiredzi and Beitbridge. In the end, a total of 569 households who participated in the household survey were selected using stratified sampling by district as follows: 121 in Chipinge, 251 in Chiredzi and 197 in Beitbridge. This translates a non-response rate of 0.0% each in Chipinge and Chiredzi, and 17.9% in Beitbridge. The highest non-response rate in Beitbridge may be explained by the fact that the survey in Beitbridge was conducted in November, when local people expect rains, and tend to become busier with farming and casual labour activities.

### 2.4. Data collection

A team of trained enumerators, comprising three females holding University Bachelor's Degrees in Agriculture, and two males holding a Bachelor's degree in Agriculture and a Master of Science degree in Agricultural and Applied Economics, conducted household interviews from the 4<sup>th</sup> of September to the 22<sup>nd</sup> of November 2014. Research approval was granted by the Ministry of Local Government, Public Works and National Housing. The traditional leaders and councilors were consulted as key informants to understand

how the community benefited from the CAMPFIRE programme. The households were first told about the objectives of the survey before the interviews commenced. The data for donor (1989–2003) (Taylor 2009) and post-donor era (2004–2014) were collected using a cross-sectional design to assess the extent of CAMPFIRE benefits and human-wildlife conflict at household level during and after the donor funding era. Triangulation was done to validate the household data against the ward and district council's data. However, not all variables on the use or allocation of CAMPFIRE revenues and the extent of human-wildlife conflict were consistently recorded in all the districts since the inception of the programme, especially Beitbridge where data are only available from 2009 to 2014. The enumerators used structured questionnaires to collect socio-economic data related to CAMPFIRE. We specifically addressed the following topics: (1) Household characteristics, (2) household asset and income, (3) CAMPFIRE direct and indirect economic benefits to household (CAMPFIRE dividends received in the following periods: donor (1989–2003) and post-donor (2004–2014) eras; CAMPFIRE employment and game meat distribution; household perceptions on infrastructural development), (4) CAMPFIRE issues (household perceptions on the prevalence of human-wildlife conflict before, during and after the donor era rated on a three-point Likert scale (less prevalent, prevalent and more prevalent), illegal hunting), (5) CAMPFIRE sustainability (people benefiting the most from CAMPFIRE, CAMPFIRE constraints and challenges, whether CAMPFIRE should continue). Data were also collected at ward and district council level, through in-depth interviews and semi-structured questionnaires with respective ward councillors in their respective wards and district council CAMPFIRE officers. Semi-structured questionnaires included questions on allocation of CAMPFIRE revenues among the main stakeholders (district council, CAMPFIRE Association and communities or ward) during both donor and post-donor eras, household dividends derived from community or ward allocation, employment benefits and district council records on the extent of human-wildlife conflict in the southern lowveld. However, these data were collected only for the 10 selected communities (or wards). Further details on the questionnaires at household, ward and district council levels are provided in [Appendix V](#) in the Supplementary files.

## 2.5. Data analysis

Data capture and cleaning were done in Statistical Package for Social Sciences version 16 statistical software (IBM, New York, USA). Average annual allocation of the CAMPFIRE revenue among the main

stakeholders (district council, CAMPFIRE Association, and community or ward), divided into donor (1989–2003) and post-donor (2004–2014) eras, was analysed. Data during donor era were available from 1991 to 2003 in both Chipinge and Chiredzi; but not available for Beitbridge. Data during post-donor era were available in Chipinge and Chiredzi from 2004 to 2014, and in Beitbridge from 2009 to 2014. The percentage contribution of CAMPFIRE wildlife income to the total household income was computed for only 2014. To determine the differences in average household wildlife incomes in the three districts, a Kruskal-Wallis test for differences in mean ranks was used, followed by a multiple comparison test to investigate the specific differences between the three districts. In addition, tests of association between categorical variables like household satisfaction with infrastructure developments versus spatial location (the districts) were conducted using the Chi-Square tests. For human-wildlife conflict, multiple response tabulations were produced based on district council records and household perceptions. Number of times cash dividends were received by households from CAMPFIRE programme from 1989 to 2014 and average size of dividends were recorded using the following sequences: 1989–1999 (before the inflation), 2000–2008 (the Zimbabwe dollar inflation era) and 2009–2014 (the multi-currency era). Average number of employment per year on full- and part-time was recorded and analysed using the following sequences: 1989–1999, 2000–2003, 2004–2008 and 2009–2014. Beitbridge was again lacking records from 1989 to 2008. Discussions held with key informants were analysed through content analysis and presented in a box (Box 1).

### Box 1. Prevalence of human-wildlife conflict in Beitbridge.

*The land use pattern in Beitbridge does not provide any buffer zone between wildlife habitat and human settlement, often the same area being used for both wildlife management and agriculture.*

(Interview with Beitbridge RDC CAMPFIRE Officer)

*Most wild animals in Beitbridge are migratory, with crop raiding (during the cropping season) and livestock predation (mainly during the dry season) as the main types of conflict. The cropping season extends from December to March, whereas the dry season runs from April to November. This situation is exacerbated (mainly in Beitbridge West) by human settlement and agricultural expansion into wildlife habitat.*

*The district is prone to commercial poaching as it shares borders with South Africa, Botswana and Mozambique.*

(Interview with Beitbridge ward 8 councillor)

## 3. Results

Results showed that households were incentivised through the direct economic benefits of the programme (cash dividends, employment opportunities and bushmeat provision), and the indirect economic benefits (infrastructural facilities).

### 3.1. CAMPFIRE direct economic benefits to households

#### 3.1.1. Allocation of the CAMPFIRE revenue during donor and post-donor era

Payments to wards in Chipinge, Chiredzi and Beitbridge follow the producer-ward principle – that payments are based on the proportion of revenue from hunting within a ward. During donor era, Chiredzi had the highest average annual total ward allocation of US\$67,722 (SD = US\$41,606.47), representing 63.75% of the total CAMPFIRE revenue in Chiredzi; whereas during post-donor era, Chipinge had the highest average annual total ward allocation of US\$27,093 (SD = US\$20,705.18), representing 54.56% of the total CAMPFIRE revenue in Chipinge (Table 1). (See Appendix I in the Supplementary files).

Overall, the CAMPFIRE revenue allocation prioritises ward allocation (community benefits) as the first, compared to other stakeholders (district council and CAMPFIRE Association), during the donor era (Chipinge, 51.92%; Chiredzi, 63.75%) and post-donor era (Chipinge, 54.56%; Chiredzi, 51.85%); except in Beitbridge. The percentage allocated to wards and district council in Beitbridge were the same (48% each, the remaining 4% being allocated to CAMPFIRE Association). According to Chipinge and Chiredzi district council, the producer communities should get not less than 50% of the CAMPFIRE revenues; the remaining percentage being shared between the council and CAMPFIRE Association. Beitbridge council, on the other hand, has stated that the percentage allocated to wards and district council were the same, i.e. 48% each, the remaining 4% being allocated to CAMPFIRE Association; and these figures seem to agree with our results. Furthermore, there was no significant association between the spatial location (the district) and the percentage allocated to stakeholders

(district council, CAMPFIRE Association and wards) for both the donor era (Fischer's exact  $p = 0.209$ ) and the post-donor era (Fischer's exact  $p = 0.896$ ).

#### 3.1.2. District council records of household CAMPFIRE dividends

There was no subsidised tillage nor drought relief provided to households in any of the three districts. Beitbridge district did not provide cash dividends to households for the period 2009–2014 but focused rather on community development projects. District council data on cash dividends for the period prior to 2009 were not readily available. Though Chiredzi district also focused on community development projects, cash dividends were sometimes provided to households. However, details of cash disbursement were not readily available. Chipinge district records show that the average household daily dividend per capita has decreased from the donor to post-donor era, and was far below the international poverty line of US\$ 1/day during the two eras (See Appendix I in the Supplementary files.).

#### 3.1.3. Local people's estimates of size of dividends from 1989 to 2014

There was a perceived general decrease in payment of household dividends from the donor to post-donor era, especially in Chipinge where the average size of dividend has dropped to zero for the period 2009–2014 (See Appendix I).

#### 3.1.4. Contribution of income from CAMPFIRE wildlife to the total household income

The percentage contribution of annual income from CAMPFIRE's wildlife to the total household income

**Table 1.** Average annual CAMPFIRE revenue allocations (in US\$) during donor and post-donor era with standard deviation.

District	Donor era allocations (1991–2003) in US\$			Post-donor era allocations (1991–2014) in US\$		
	RDC (SD)	CA (SD)	Wards (SD)	RDC (SD)	CA (SD)	Wards (SD)
Chipinge	38,957 (23,655.35)	4531.2 (4468.75)	46,955 (22,331.63)	20,557 (14,979.81)	2009.9 (1455.813)	27,093 (20,705.18)
Chiredzi	35,987 (21,583.95)	2515.3 (1767.169)	67,722 (41,606.47)	60,536 (39,314.14)	5484.6 (3351.374)	71,095 (41,639.48)
Beitbridge	–	–	–	25,794 (11,125.77)	2149.5 (927.1475)	25,794 (11,125.77)

RDC :Rural District Council; CA: CAMPFIRE Association; – means data not available.

**Table 2.** Percentage contribution of income from CAMPFIRE wildlife to the total household income for the post-donor 2014 snapshot in the sampled locations.

Source of Income in USD (average per year)	Chipinge (n = 121)	Chiredzi (n = 251)	Beitbridge (n = 197)	SL (n = 569)
	Amount in US\$ (% of total household income)			Total average per year in US\$ Standard Error Mean
Wildlife	0.01 (0.00)	4.01 (0.47)	1.02 (0.05)	1.77 0.24
Rentals	0.37 (0.04)	18.69 (2.17)	152.00 (7.63)	60.83 0.244***
Remittances	50.41 (5.97)	62.73 (7.29)	194.00 (9.74)	105.44 23.56***
Livestock sales	121.00 (14.30)	125 (14.50)	249.00 (12.50)	167.07 17.27***
Casual labour	156.00 (18.40)	151.00 (17.60)	427 (21.50)	247.46 27.80***
Salaries and wages	517.00 (61.20)	499.00 (58.00)	966.00 (48.60)	664.53 81.30***
Total	844.52 (100)	860.38 (100)	1988.10 (100)	

\*\*\* Significant at 1% (Overall, in the sampled locations incomes from other sources were significantly higher ( $p < 0.01$ ) than that derived from CAMPFIRE wildlife).



was found to be less than 0.5% across the three districts for the post-donor 2014 snapshot (Table 2). On the other hand, wildlife revenue at district and ward level for 2014 were respectively as follows: Chipinge (US\$ 29,130.50; US\$ 39,077.50), Chiredzi (US\$ 69,840.63; US\$ 75,913.73) and Beitbridge (US\$ 46,154.88; US\$ 46,154.88). These aggregate amounts are considerable, compared to what is trickling down to households.

On the other hand, mean ranks of annual wildlife income stratified by district (see Table A2 in Appendix I) is statistically significant ( $\chi^2_{(2)} = 105.07$ ,  $p < 0.001$ ). A multiple comparison test indicated that while annual wildlife income for households in Chipinge and Beitbridge is not significantly different ( $p > 0.05$ ), households in both Chipinge and Beitbridge have wildlife incomes significantly lower than that of households in Chiredzi (see Table A3 in Appendix I). Generally, Beitbridge district had relatively higher household income (Table 2). Among different sources of income, salaries and wages outside of the programme were recorded as the highest source of income. On average, mean ranks of annual household income stratified by district is statistically significant ( $\chi^2 = 32.858$ ,  $p < 0.001$ ) (see Table A4 in Appendix I), with households in both Chipinge and Chiredzi having incomes significantly lower than that of households in Beitbridge ( $p < 0.05$ ) (see Table A5 in Appendix I).

### 3.1.5. CAMPFIRE employment benefits

CAMPFIRE related employment across the three districts has increased over time (Table 3). CAMPFIRE has employed full-time an average of 12 people per year in Chipinge and Beitbridge from 2009 to 2014, and eight people in Chiredzi for the same period. Relatively higher employment gains are on part-time basis. Chipinge recorded the highest average of 30 people employed on part-time basis from 2009 to 2014, followed by Chiredzi (18 people) and Beitbridge (10 people). Further, household surveys across the three districts have shown that the percentage of households who never benefited from CAMPFIRE employments either on full- or part-time basis is very high: Chipinge

(94.12%, 90.833%), Chiredzi (94.02%, 93.23%) and Beitbridge (97.46%, 100%).

### 3.1.6. Game meat distribution

Game meat distribution has been reported as benefiting households to some extent in Chiredzi district ( $n = 251$ , 47%) unlike in Chipinge ( $n = 121$ , 8.3%) and Beitbridge ( $n = 197$ , 1.0%). Beitbridge council has indicated that 70% of every animal killed is allocated to the community (the remaining 30% being given to the safari operator). However, this allegation seems to be contradicted by household perceptions and calls for more transparency in meat distribution. The same observation applies for Chipinge where the council stipulated that all the meat was distributed to the community by the traditional leadership. However, the district councils do not record details on how the aforementioned wildlife resource is distributed, nor on how it contributes to household nutrition/food security.

## 3.2 CAMPFIRE indirect economic benefits to households

### 3.2.1. Household perception on CAMPFIRE infrastructure development by district

Households' perceptions on infrastructure development were significant and consistently associated with the district spatial location (Table 4). The respondents' perceptions were that CAMPFIRE has managed to build or renovate schools in Chiredzi (68.1%) and Beitbridge (73.1%) but not in Chipinge (36.4%). The respondents observed that CAMPFIRE programme has successfully installed and maintained grinding mills in Chipinge (85.1%) and Chiredzi (92.4%) but not in Beitbridge (27.9%). However, very little has been done for building or maintaining clinics, roads, and boreholes. Respondents indicated that little has been done on household access (at most 20.7% benefited) to the purchased trucks and the overall maintenance of these trucks is poor and does not really benefit the community at household level, but rather benefit the district council and the ward councillors.

## 3.3. Prevalence of human-wildlife conflict

### 3.3.1. District council records on the prevalence of human-wildlife conflict

District council data indicate that the extent of human-wildlife conflict in Chiredzi has worsened for all the types of conflict during post-donor era (Table 5). These conflicts include carnivores killing livestock (from 16.4% to 83.6%), wildlife injuring or killing humans (from 7.9% to 92.1%), and wildlife species raiding crops (from 15.6% to 84.4%). On the contrary, the situation seems to have improved in Chipinge during the post-donor era, with carnivores killing livestock

**Table 3.** CAMPFIRE employment (full and part-time) over time.

Type of employment	Years	Number employed (%) per district		
		Chiping	Chiredzi	Beitbridge
Full time	1989–1999	2 (6.5)	1 (5.0)	–
	2000–2003	4 (12.9)	5 (25.0)	–
	2004–2008	13 (41.9)	6 (30.0)	–
	2009–2014	12 (38.7)	8 (40)	12
<b>Total</b>		31 (100)	20 (100)	
Part time	1989–1999	2 (2.4)	6 (10.7)	–
	2000–2003	25 (30.5)	18 (32.1)	–
	2004–2008	25 (30.5)	14 (25.0)	–
	2009–2014	30 (36.6)	18 (32.1)	10
<b>Total</b>		82 (100)	56 (100)	

Notes: values in parenthesis reflect the percentage average frequency of number of people employed; – means data not available.

**Table 4.** Household perception on CAMPFIRE infrastructure development by district ( $n = 569$ ).

	Chipinge ( <i>n</i> = 121)	Chiredzi ( <i>n</i> = 251)	Beitbridge ( <i>n</i> = 197)	
Infrastructure	Built or Renovated (%)			Chi-square value
School (Social)	36.4	68.1	73.1	48.32***
Clinic (Social)	17.4	21.5	46.2	42.92***
Roads (Social)	13.2	4.0	5.6	11.88***
Borehole (Social)	16.5	5.6	9.6	11.63***
Grinding mill (Commercial)	85.1	92.4	27.9	212.3***
Trucks (Commercial)	25.6	20.3	3.6	27.15***

\*\*\*  $p < 0.05$ **Table 5.** Frequency of human-wildlife conflicts during donor and post-donor era.

Type of Conflict	Chipinge			Chiredzi		
	Frequency (%)			Frequency (%)		
	Donor era	Post-donor era	Total	Donor era	Post-donor era	Total
Carnivores attacking and killing livestock	4 (80.0)	1 (20)	5 (100)	9 (16.4)	46 (83.6)	55
Wildlife attacking or killing humans	0	0	0	3 (7.9)	35 (92.1)	38
Species raiding crops	76 (55.9)	60 (44.1)	136 (100)	12 (15.6)	65 (84.4)	77

(from 80% to 20%), wildlife injuring or killing humans (no conflict reported), and species raiding crops (from 55.9% to 44.1%).

Although district council data were not readily available for Beitbridge during the time of our study, key informant interviews from district council CAMPFIRE officer and ward councillors indicated that the human-wildlife conflict in Beitbridge is worsened by human encroaching into wildlife areas (see Box 1).

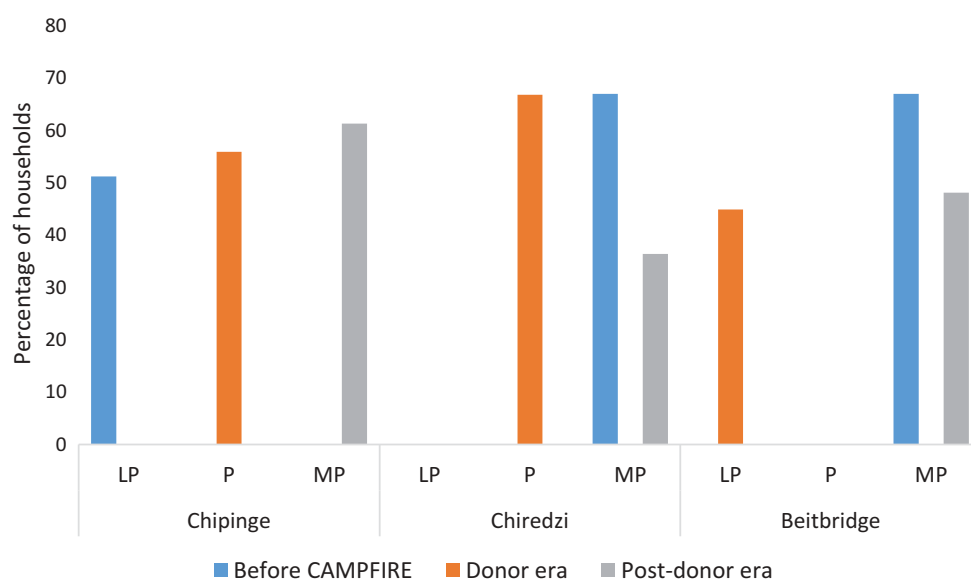
### 3.3.2. Household perception on the prevalence of human-wildlife conflict

Analysis of household perceptions concerning prevalence of human-wildlife conflict across the three districts (Figure 3) – before, during and after donor era- shows that Chiredzi and Beitbridge districts have similar

household perceptions, i.e. the prevalence of human-wildlife conflict improved during donor era, and deteriorated during the post-donor era. Also, there is a significant association between the spatial location (district) and the household perception on the prevalence of human-wildlife conflict ( $p < 0.001$ ). In particular, household perceptions in Chipinge district show that the prevalence of human-wildlife conflict has deteriorated further from donor to post-donor era, which is in contradiction to district council data found in records.

### 3.3.3. Household perception on illegal hunting

The main reasons for illegal hunting among local communities in the southern lowveld were for meat and income generation. In particular, 53.6% of the respondents attributed poaching to the need for bushmeat,

**Figure 3.** Household perception of the prevalence of the human-wildlife conflict in the three districts (on a Likert scale: LP: less prevalent; P: prevalent; MP: more prevalent).

while 46.4% thought that poaching was done to secure household income. In Chipinge, 56.1% attributed poaching to the need for meat as compared to 43.9% who indicated income. This pattern is similar in Chiredzi with 61.8% as compared to 38.2% and unlike in Beitbridge which has 46.7% as compared to 53.3%. Also interviews held with ward councillors in Beitbridge have implied that the district is prone to commercial poaching as it shares borders with South Africa, Botswana and Mozambique. The number of respondents on illegal hunting was low (135 out of 559) and may underline a natural fear to be suspected of poaching despite the study's guarantees of confidentiality.

### 3.4. CAMPFIRE sustainability

#### 3.4.1. People benefiting the most from CAMPFIRE

The southern lowveld perception at household level is that they are the least to benefit from CAMPFIRE as compared to other stakeholders (safari operators, hunters, Government, district council, and ward councillors). The proportion of people who think that individual households are benefiting the most from CAMPFIRE was very little across the three districts: Chipinge ( $n = 116$ , 0.9%), Chiredzi ( $n = 238$ , 0.4%), and Beitbridge ( $n = 147$ , 4.1%); however, there was a significant ( $p < 0.001$ ) association between the spatial location (the district) and the household perception (see [Appendix IV](#) in the Supplementary files).

#### 3.4.2. CAMPFIRE constraints and suggested solutions

Local people are calling for transparency in the income allocation (Chipinge, 86.7%; Beitbridge, 29.8%; Chiredzi, 28.5%), proper management (Chiredzi, 48.8%; Beitbridge, 35.8%; Chipinge, 1.7%), and empowerment and capacity building of CAMPFIRE officers at local level (Beitbridge, 56.1%; Chiredzi, 25.2%; Chipinge, 8.3%).

#### 3.4.3. The future of CAMPFIRE

Despite all the shortcomings of the CAMPFIRE programme, the vast majority of the southern lowveld households opted for its continuation: Chipinge (83.5%), Chiredzi (86.4%) and Beitbridge (86.7%). The overall underlying expectation is the improvement of community development project (60.7%) and wildlife conservation (23.9%). However, 12.2% of the respondents think that CAMPFIRE is not of any help. A small proportion of the respondents (3.2%) think that CAMPFIRE can provide protection from wildlife threats.

## 4. Discussion

The southern lowveld CAMPFIRE revenue allocation gives priority to community level benefits compared to other stakeholders (district council and CAMPFIRE Association), except for Beitbridge where the percentage of benefits allocated to wards and district council are the same. The positive findings, in terms of prioritising the community, agrees with CAMPFIRE guideline which recommends that at least 50% of the revenues should be paid to the communities (Frost and Bond 2008; Taylor 2009). The fact that Beitbridge is allocating less than 50% (i.e. 48%) to the community underlines the fact that there is no legal basis for district councils to comply with the CAMPFIRE principles, and their compliance is a matter of choice (Machena et al. 2017). It is therefore important to monitor not only the percentage of total CAMPFIRE revenues which is being devolved to communities, but also the average household-level impact from such benefit distributions (Child et al. 2003; Taylor 2009; Reid 2016).

### 4.1. Average household-level impact from CAMPFIRE benefit distributions

#### 4.1.1. Distribution of cash dividends to households

Though Beitbridge district has not provided cash dividends to households for the period 2009–2014, focusing mainly on community development projects, secondary data have however shown evidence that Beitbridge district used to provide cash dividends to households at the inception of the programme (Peterson 1991; Child 2004). The district is no longer providing cash dividends at household level so as to maximise on community projects. In contrast, though Chiredzi district also focuses on community development projects, cash dividends were sometimes provided to households. Child et al. (2003) mentioned that CAMPFIRE infrastructure development projects in Chiredzi such as grinding mills, schools and roads, were being developed in the district, each village having a CAMPFIRE committee with a bank account, with the possibility of receiving cash dividend. Currently, the bank account is held either at village or ward level, depending on the kind of agreement between the local community in the producer ward and the district council.

Chipinge district has been hailed as one of the best case studies of CAMPFIRE in Zimbabwe, mainly for a successful implementation of the programme in Mahenye during donor era, with cash dividends regularly disbursed to households (Child 2004; [ART] African Resources Trust 2006; Gandiwa et al. 2013).

However, there was a sharp decrease in terms of cash paid to households from donor to post-donor era which is a potential disincentive at household level which could impede wildlife conservation. Gandiwa et al. (2013) has noted that since 2000, the Mahenye community has experienced challenges with CAMPFIRE because local people have been receiving few benefits and there has been less involvement of local people in decision-making processes related to CAMPFIRE. These challenges have reportedly been associated to: changes in chieftainship, involvement of the new chief in determining the composition of the CAMPFIRE committee in 2001, election of a new ward councillor, and lack of transparency in tendering the hunting concession. All these factors may lead to a potential loss of social capital (Pretty and Smith 2004) that could affect negatively the programme, as is the case in the Kenyan and the Cambodian community-based programme models (Machena et al. 2017).

#### 4.1.2. *CAMPFIRE employment benefits*

According to our survey results, CAMPFIRE's full and part-time employment at local level have increased from 1989 to 2014 across the three districts. Basic employment is a clear and vital requirement for human well-being (Summers et al. 2012; Jax and Heink 2016). However, the percentage of households who never benefited from CAMPFIRE employments either on full- or part-time basis is very high (See Appendix II in the Supplementary files). According to an International Union for Conservation of Nature report (IUCN/PACO 2009), trophy hunting industry in Africa employs few people, and does not provide significant benefits to the communities where it occurs. Across Africa, there are only about 15,000 hunting-related jobs (Cruise 2015), which represents less than 0.01% of the population of the six main game-hunting countries (South Africa, Zimbabwe, Zambia, Mozambique, Namibia, and Tanzania). Despite these shortcomings, Mazambani and Dembetembe (2010) have pointed out that the empowerment of producer communities in wildlife management had the positive impact on employment creation, with positive effect of protecting 56,000 km<sup>2</sup> of buffer zones around national parks and forest reserves (See Appendix III in the Supplementary files).

#### 4.1.3. *CAMPFIRE as a payment for ecosystem services scheme at household level*

Our study has shown that CAMPFIRE has considerable experience with a range of household-level incentive mechanisms. The programme can be assimilated to a payment for ecosystem services

scheme applicable at household level. In this regard, Frost and Bond (2008) have noted that financial benefits from wildlife-based activities can be considered at four levels: the safari operators; rural district councils; wards; and households. Direct payments to households were strongly encouraged on the basis that they created the most tangible and direct link between people and wildlife (Child 2004; Bond et al. 2009). As such, the CAMPFIRE philosophy has been widely adopted in the southern African region and beyond; and one of the best illustration can be found in the community-based programme in Namibia (Bond et al. 2009). Nevertheless, CAMPFIRE direct payments of wildlife benefits to households, though strongly encouraged at the inception of the programme (Child 2004; Bond et al. 2009), seems to have decreased over time, especially during post-donor era. Overall, the average household daily dividend per capita, across the three districts, was far below the international poverty line of US\$ 1/day (Sachs 2005), even during donor era. The fact that incomes in the southern lowveld from other household sources, such as live-stock sales, casual labour, salaries and wages, were significantly higher than revenue from CAMPFIRE wildlife for the 2014 snapshot underlines the sensitive issue of human-wildlife conflict, and the high transaction cost associated with wildlife conservation, especially in Beitbridge where the average economic revenues seem a lot higher than in the two other districts. Moreover, livestock predation can be resented by local people as a negative contribution from nature (Small et al. 2017), a cost that outweighs wildlife benefits, leading to an increase of human-wildlife conflict.

## 4.2. *Human-wildlife conflict and poaching in the southern lowveld*

### 4.2.1. *Human-wildlife conflict in the southern lowveld*

Human-wildlife conflicts are a complex and global problem, and are occurring in many countries where human and wildlife requirements have spatial overlaps (Le Bel et al. 2011; Zisadza-Gandiwa et al. 2016). Only a small proportion of the respondents (3.2%) thought that CAMPFIRE can provide protection from wildlife threats as the extent of predation and crop raiding is alarming, mostly during post-donor era. Although Chipinge district council records have shown an improvement of human-wildlife conflict from donor to post-donor era, household perceptions contradicted the case, presenting instead a deterioration of human-



wildlife conflict after the donor withdrew. This inadequacy may be attributed to poor data records on the part of resource monitors. Overall, the prevalence of human-wildlife conflict in the southern lowveld seems to have improved during donor era, and deteriorated during post-donor era. Human-wildlife conflicts can be managed through prevention, protection and mitigation strategies (Lamarque et al. 2009). In an attempt to implement proactive conflict reduction, solar-powered electric fences were constructed out of donor funding and local community contribution to protect crops and homes in the 1990s, in various CAMPFIRE districts. Nevertheless, in most districts (the southern lowveld inclusive), these fences are now disused due to a shorter life-span (CAMPFIRE Association 2018). The reporting system from the ground is inefficient and resource monitors are failing to provide a quick response, to secure livelihoods and well-being. Thus, we can assume that the contribution of CAMPFIRE, as a payment for ecosystem services scheme in the southern lowveld, to reduce the conservation costs and potentially increase the benefits (monetary or not) at household or community level, was more perceptible during the donor era. The shortcomings of the post-donor era may relate to the withdrawal of bilateral donor funds (affecting local-level natural resource management techniques and capacity building), coupled with the subsequent hyperinflation which resulted in a collapse of most of the private and public infrastructures (including infrastructures related to wildlife management). Unlike in countries such as Botswana (Chevallier 2016), the situation in Zimbabwe may be exacerbated by the Park Authorities policy which does not provide any compensation to local people whose well-being (security, basic and economic needs) is put at stake by wildlife (Díaz et al. 2015; Jax and Heink 2016).

#### 4.2.2. Poaching in the southern lowveld

In the same context, this study argues that poaching was widespread in the southern lowveld as a means to enable local communities to respond to the basic need for meat consumption and household income. This scenario can affect negatively the conditionality of the CAMPFIRE's payment for ecosystem services scheme, as any long-term declines in wildlife (and the aesthetic qualities of the landscape) will threaten the viability of the transactions between the safari operators on the one hand, and the district councils and local communities on the other hand (Frost and Bond 2008). The situation seems to be aggravated by some Zimbabwean political elites who were involving in poaching operations too, mainly of elephant

(*Loxodonta africana*), which is the major species for trophy hunting (Vira and Ewing 2014; Aljazeera news 2018). Moreover, Machena et al. (2017) argue that law enforcement capacity in the CAMPFIRE programme is weak at all levels due to the rapid rise in international wildlife trafficking. In this context, Anderson and Jooste (2014) have pointed out that a booming wildlife black market trade worth hundreds of millions of dollars is fuelling corruption in Africa's ports, customs offices, and security forces. This development is providing new revenues for insurgent groups and criminal networks across the continent, as evidenced in the northern and eastern parts of the Democratic Republic of Congo (Mukulumanya et al. 2014; Vira and Ewing 2014). More specifically, elephant poaching in Africa is a result of an orchestrated international poaching syndicate, and calls for an integrated mitigating strategy at the local, national and regional levels (Vira and Ewing 2014).

#### 4.3. Perceptions on wildlife economic benefits vs. the extent of human-wildlife conflict

The main findings discussed in our study, based on Emerton's (1999) paradigm, show that household perceived benefits in the southern lowveld have deteriorated from the donor to post-donor era (see Appendix I), while the perceived costs have increased (increases in human-wildlife conflict and illegal hunting incidences). The perception at the household level is that they are the least to benefit from CAMPFIRE, as compared to other stakeholders, mainly safari operators, hunters, district council, Government, and ward councillors. Local people are deploring the lack of transparency related to district council 'top-down' approach with lack of devolution at the community level (Logan and Moseley 2002; Krause and Zambonino 2013), poor remuneration of CAMPFIRE employees, and poor programme management. Stressing the issue of transparency, Child et al. (2003) have reported, based on a Price Waterhouse Coopers audit, that the CAMPFIRE district council financial records across the country were inconsistent, and usually only capture the total disbursements to each community without identifying how communities use revenue. Moreover, Vira and Ewing (2014), and Cruise (2015) have pointed out that in most African countries, the money from hunt fees that trickles down to needy villagers is minimal, due to a top-down management policy, lack of transparency, as well as lack of radical changes on the part of decision makers in addressing local rights or authority over natural resources (Balint and

Mashinya 2006; Dougill et al. 2012; Mukulumanya et al. 2014). This stresses the need to redesign, not only the CAMPFIRE model, but more generally the community-based programme paradigm in developing countries, to ensure that community economic benefits from wildlife are greater than the total costs incurred by communities through living with wildlife (Emerton 1999), and deliver economic incentives at household level for conservation. However, the social benefits of the CAMPFIRE programme in setting up of public infrastructure such as schools and community projects such as grinding mills has been greatly acknowledged as beneficial by the majority of the households, which is a positive development toward the creation of social capital for biodiversity improvement (Pretty and Smith 2004; Cox et al. 2010), and rural people's well-being (Summers et al. 2012).

Since there was a significant association between the spatial location (district) and the household perceptions on, among other indicators, infrastructure development, the prevalence of human-wildlife conflict, people benefiting the most from CAMPFIRE, these results suggest that a 'one size fits all' approach would be irrelevant (Logan and Moseley 2002; Tembo et al. 2009). Taylor (2009) has stressed that there is considerable biophysical and socio-economic variability between district councils involved in CAMPFIRE. In this regard, contrasting three districts in our study, despite limited data in Beitbridge, has helped in providing a holistic perspective of the health of community-based programme in the southern lowveld of Zimbabwe. The fact that the average economic revenues in Beitbridge seem a lot higher than in the two other districts may be explained by the fact that the district shares borders with South Africa in the south, Mozambique in the east, and Botswana in the west, which is an added value in terms of trade and employment opportunities. This may contribute to higher opportunity and transaction costs associated with community-based wildlife management in Beitbridge. Also, interviews held with some ward councillors in the area have shown that the district may be prone to commercial poaching with neighbouring countries. In order to make CAMPFIRE more efficient, decision makers should take into consideration the specificity of each district (issues of limited database inclusive), in dealing with CAMPFIRE, to respond to different ecological and socio-economic characteristics, and local cultural idiosyncrasies. Flexibility and adjustability are hallmarks of a successful rural development program, whether

in Zimbabwe or in other parts of the world (Logan and Moseley 2002).

#### 4.4. CAMPFIRE sustainability

Despite all the shortcomings of the CAMPFIRE programme, the vast majority of our household sample opted for its continuation, which is an indication of the programme resilience despite a severe national economic depression. Nevertheless, the fact that 12.2% of the respondents think that CAMPFIRE is not of any help should challenge all involved, and may be interpreted as a progressive lack of trust in the programme (Alexander and McGregor 2000; Guerbois et al. 2013) and an alarming loss of social capital (Pretty and Smith 2004). Overall, local people's option for the continuation of CAMPFIRE may be justified by the fact that the southern lowveld does not offer other viable land use options apart wildlife management, since it belongs mainly to ecological regions IV and V (Reid 2016).

### 5. Conclusion and recommendations

CAMPFIRE programme can be assimilated to a payment for ecosystem services scheme with financial benefits from wildlife-based activities being considered at four levels: the safari operators; rural district councils; communities; and households. The aggregate amounts allocated to district councils and communities are considerable as compared to what is trickling down directly to households, yet they are the ones bearing the highest opportunity and transaction costs of wildlife management. Households were incentivised through direct economic benefits (monetary dividends, employment opportunities and bushmeat provision), and indirect economic benefits/socio-economic benefits (infrastructural facilities). The direct economic benefits have been limited; however, the households appreciated the infrastructural facilities from CAMPFIRE. Some households, although limited in number, feel that the programme is assisting in management of the human-wildlife conflict. Both the direct economic benefits and socio-economic benefits have been worsened by the donor withdrawal, with a sharp decrease in household dividends, an increased prevalence of human-wildlife conflict, and a rampant illegal hunting for meat and income generation. CAMPFIRE needs to be redesigned by addressing some flaws in the programme design. Like many community-based programme in Africa, CAMPFIRE principle of devolution exists in form but not in practice and has been co-opted or undermined by locally powerful bureaucratic actors, mainly the district council, ignoring some important

features of the local context (Cox et al. 2010). For community-based programme to secure impact at scale, it should embed mandate empowered local institutions in a broader institutional and policy framework that supports devolution of rights and responsibilities to local people when it comes to wildlife management (Reid 2016). This can practically be achieved in the ward context by implementing full devolution of authority to the community level, with safeguards to maintain good governance and adequate capacity (Balint and Mashinya 2006). Further, land tenure (or the lack of it) was often central to whether the goals of community-based programme could be achieved (Mukulumanya et al. 2014; Bluwstein et al. 2016; Reid 2016). Also poaching can be mitigated by implementation of graduated sanctions at local level, and international enforcement at regional levels in as much as Zimbabwe is part of the Great Limpopo Transfrontier Conservation Area and Greater Mapungubwe Transfrontier Conservation Area. Moreover, the Park Authorities should avail relevant CAMPFIRE hunting concession maps to ensure that there are clear boundaries that define the wildlife resource system (buffer zones inclusive). Lack of adequate data on wildlife management activities (e.g., human-wildlife conflict, poaching, financial issues) on the African continent in general (Chevallier 2016), and in the country in particular (Machena et al. 2017), is a general problem. Data collection, monitoring and data management are central to an objective understanding of the functioning of any community-based programme model (Jrg et al. 2016; Machena et al. 2017).

The fact that the majority of the households have acknowledged that they are still benefiting from CAMPFIRE public infrastructure and community projects, even after the withdrawal of the donor, now more than a decade later, is a positive development toward the creation of social capital for biodiversity improvement. This may result in increasing the effective ownership of the programme at household level and add to its sustainability. As stated by Cox et al. (2010), the real 'glue' that keeps an institution alive over time are the social mechanisms, i.e., trust, legitimacy, and transparency. In this regard, implementing blockchain technologies in the management of the programme could contribute significantly to the CAMPFIRE programme's effectiveness and provide transparency that is so desperately needed. Despite the limited direct economic benefits at household level, the households indicated that they wanted the programme to continue mainly because they are appreciating the socio-economic benefits. Since wildlife management on

its own cannot sustain rural people well-being but needs to be accompanied by other socio-economic activities, decision makers should come up with innovative solutions that address the agricultural limitations related to agro-ecological regions IV and V. Implementing aquaponics projects in local communities interfacing with protected areas, for instance, may contribute to poverty alleviation through provision of food and income from fish and crop production. Such milestone may also contribute to poaching mitigation. In addition, since the donors abruptly abandoned the programme, there is need for the government to further support the programme through funding and capacity building at district, ward and household levels. In this regards, decision makers should ensure that CAMPFIRE becomes an equitable and financially sustainable payment for ecosystem services scheme that provides tangible incentives that contribute to household well-being.

## Acknowledgments

This work was supported by the Malilangwe Trust (Chiredzi-Zimbabwe). We would like to thank the Ministry of Local Government, Public Works and National Housing for approving this study and Mr George Nyandoro for his technical support through the process of data cleaning and analysis. Comments and suggestions from anonymous reviewers and editors are highly appreciated. We would like to extend our heartfelt gratitude to Mr Bothwell Chikosi (BFC Consultancy) for availing BFC consultancy premises to support the research processes.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the The Malilangwe Trust; P. Bag 7085 Chiredzi, Zimbabwe [The contract does not have a grant number].

## ORCID

Pierre Kabeya Tchakatumba  <http://orcid.org/0000-0001-8159-643X>

## References

- Alexander J, McGregor J. 2000. Wildlife and politics: CAMPFIRE in Zimbabwe. *Dev Change*. 31(3):605–627. doi:10.1111/dech.2000.31.issue-3.
- Aljazeera news. 2018. March 24. Zimbabwe investigates Grace Mugabe for illegal ivory smuggling. Former first lady's ties to ivory smuggling ring under

- investigation after undercover mission by wildlife photographer; [accessed 2018 Apr 19]. <https://www.aljazeera.com/news/2018/03/zimbabwe-investigates-grace-mugabe-illegal-ivory-smuggling-180324095145029.html>.
- [ART] African Resources Trust. 2006. The Mahenye community conservation initiatives. Best practice case study in community conservation.
- Anderson B, Jooste J. 2014. Wildlife poaching: Africa's surging trafficking threat. National Defense Univ Fort Mcnair DC Africa Center For Strategic Studies. <http://www.dtic.mil/dtic/tr/fulltext/u2/a609335.pdf>.
- Baldus RD. 2009. A practical summary of experiences after three decades of community-based wildlife conservation in Africa "What are the lessons learnt?" FAO Technical Series publications No. 5. <http://www.wildlife-baldus.com/download/cbnrm.pdf>.
- Balint PJ, Mashinya J. 2006. The decline of a model community-based conservation project: governance, capacity, and devolution in Mahenye, Zimbabwe. *Geoforum*. 37:805–815. doi:10.1016/j.geoforum.2005.01.011.
- Bluwstein J, Moyo F, Kicheleri RP. 2016. Austere conservation: understanding conflicts over resource governance in Tanzanian wildlife management areas. *Conserv Soc*. 14(3):218. doi:10.4103/0972-4923.191156.
- Bond I, Frost PG. 2005, Jun. CAMPFIRE and the payment for environmental services. In: Workshop: Payments for Environmental Services (PES)—Methods and Design in Developed and Developing Countries, Titisee, Germany. p. 15–18.
- Bond I, Grieg-Gran M, Wertz-Kanounnikoff S, Hazlewood P, Wunder S, Angelsen A. 2009. Incentives to sustain forest ecosystem services: a review and lessons for REDD (No. Natural Resources Issues no. 16, p. 47p). London (UK): IIED.
- CAMPFIRE Association. 2018. CAMPFIRE Philosophy and Human-Wildlife Conflict; [accessed 2018 Apr 19]. <http://campfirezimbabwe.org/index.php/projects-t/13-human-wildlife-conflict>.
- CESVI Zimbabwe. 2002. The sengwe corridor concept paper; VERSION: April 2002. Southern Lowveld Project; CESVI/MAE/AID 5063.
- Chevallier R. 2016. The state of community-based natural resource management in Southern Africa: assessing progress and looking ahead. South Africa: Governance of Africa's Resources Programme. SAIIA. SAIIA Occasional Paper No 240.
- Chibisa P, Ruzive A, Mandipa CT. 2010. The 2000–2004 fast track land reform program and biodiversity issues in the middle save conservancy. *Int J Sustainable Dev Afr*. 12(6):74–100.
- Chikodzi D, Zinhiva H, Simba FM, Murwendo T. 2013. Reclassification of agroecological zones in Zimbabwe—the rationale, methods and expected benefits: the case of Masvingo Province. *Int J Sustainable Dev Afr*. 15 (1):104–116.
- Child B. 2004. Building the campfire paradigm: helping villagers protect African wildlife. *PERC Rep*. 22:2.
- Child B, Jones B, Mazambani D, Mlalazi A, Moinuddin H. 2003. Final evaluation report: Zimbabwe natural resources management program—USAID/Zimbabwe Strategic Objective No. 1. Washington (DC): USAID. [http://pdf.usaid.gov/pdf\\_docs/pdact554.pdf](http://pdf.usaid.gov/pdf_docs/pdact554.pdf)
- Chimhowu A, Manjengwa J, Feresu S. 2010. Moving forward in Zimbabwe: reducing poverty and promoting growth. Harare: IES/BWPI.
- Cochran WG. 1977. Sampling techniques (3rd Ed.). New York: John Wiley and Sons.
- Cooney R, Freese C, Dublin H, Roe D, Mallon D, Knight M, Emslie R, Pani M, Booth V, Mahoney S, et al. 2017. The baby and the bathwater: trophy hunting, conservation and rural livelihoods. *Unasylva*. 68(1):249.
- Cox M, Arnold G, Tomás SV. 2010. A review of design principles for community-based natural resource management. *Ecol Soc*. 15(4). <http://www.ecologyandsociety.org/vol15/iss4/art38/>.
- Cruise A. 2015 Nov 17. Is trophy hunting helping save African elephants? *Wildlife Watch* (National Geographic); [accessed 2017 Jul 24]. <http://news.nationalgeographic.com/2015/11/151715-conservation-trophy-hunting-elephants-tusks-poaching-zimbabwe-namibia/>.
- Díaz S, Demissew S, Carabias J, Joly C, Lonsdale M, Ash N, Larigauderie A, Adhikari JR, Arico S, Báldi ABartuska A. 2015. The IPBES conceptual framework—connecting nature and people. *Curr Opin Environ Sustain*. 14:1–16.
- Dougill AJ, Stringer LC, Leventon J, Riddell M, Rueff H, Spracklen DV, Butt E. 2012. Lessons from community-based payment for ecosystem service schemes: from forests to rangelands. *Philos Trans R Soc London Ser B*. 367(1606):3178–3190. doi:10.1098/rstb.2011.0418.
- Emerton L. 1999. The nature of benefits and the benefits of nature: why wildlife conservation has not economically benefitted communities in Africa. Manchester (UK): Crawford House, Precinct Centre.
- Frost PGH, Bond I. 2008. The CAMPFIRE program in Zimbabwe: payments for wildlife Services. *Ecol Econ*. 65:776–787. doi:10.1016/j.ecolecon.2007.09.018.
- Gandiwa E, Ima H, Lokhorst AM, Prins HHT, Leeuwis C. 2013. CAMPFIRE and human-wildlife conflicts in communities adjacent to the northern Gonarezhou National Park, Zimbabwe. *Ecol Soc*. 18:7. doi:10.5751/ES-05817-180407.
- Guerbois C, Dufour AB, Mtare G, Fritz H. 2013. Insights for integrated conservation from attitudes of people toward protected areas near Hwange National Park, Zimbabwe. *Conserv Biol*. 27(4):844–855. doi:10.1111/cobi.12108.
- Harrison EP. 2015. Impacts of natural resource management programmes on rural livelihoods in Zimbabwe—the ongoing legacies of CAMPFIRE. In: PSA Conference, Arcata, CA.
- Hasler R. 1999. An overview of the social, ecological and economic achievements and challenges of Zimbabwe's CAMPFIRE programme. *Evaluating Eden Series Discussion Paper No 3*. IIED, London, UK.
- Jaka E. 2009. The impact of protracted food aid on Chipinge District communities in Zimbabwe [MSc Dissertation]. Bloemfontein: University of the Free State.
- Jax K, Heink U. 2016. Human Well-Being In: Potschin M, Jax K, editors. *OpenNESS ecosystem services reference book*. EC FP7 grant agreement no. 308428. [www.opennessproject.eu/library/reference-book](http://www.opennessproject.eu/library/reference-book)
- Jones BTB. 2015. Community conservation in Africa. Successes and failures – lessons for the current poaching crisis. Barcelona paper-BJ. <http://centrestudisafricans.org/wp-content/uploads/2015/11/Barcelona-paper-BJ-final.pdf>
- Jones BTB, Erdmann TK. 2013. Community based natural resource management in southern Africa. Washington (DC, US): USAID. A decision-makers' guide.



- Jrg M, Krueger T, Páez CA, Ruiz-Agudelo CA, Bejarano P, Muto T, Arjona F. 2016. Effectiveness of conservation areas for protecting biodiversity and ecosystem services: a multi-criteria approach. *Int J Biodivers Sci Ecosyst Serv Manage.* 13(1):1–13. doi:10.1080/21513732.2016.1200672.
- Krause T, Zambonino H. 2013. More than just trees – animal species diversity and participatory forest monitoring in the Ecuadorian Amazon. *Int J Biodivers Sci Ecosyst Serv Manage.* 9(3):225–238. doi:10.1080/21513732.2013.822930.
- Lamarque F, Anderson J, Fergusson R, Lagrange M, Osei-Owusu Y, Bakker L. 2009. Human-wildlife conflict in Africa: causes, consequences and management strategies (No. 157). Food and Agriculture Organization of the United Nations (FAO).
- Le Bel S, Murwira A, Mukamuri B, Czudek R, Taylor R, La Grange M. 2011. Human wildlife conflicts in southern Africa: riding the whirl wind in Mozambique and in Zimbabwe. In: Jordi López-Pujol, editor. The importance of biological interactions in the study of biodiversity, ISBN: 978-953-307-751-2. InTech. Available from: <http://www.intechopen.com/books/the-importance-of-biologicalinteractions-in-the-study-of-biodiversity/human-wildlife-conflicts-in-southern-africa-riding-the-whirl-wind-inmozambique-and-in-zimbabwe>
- Logan BI, Moseley WG. 2002. The political ecology of poverty alleviation in Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). *Geoforum.* 33(1):1–14. doi:10.1016/S0016-7185(01)00027-6.
- Machena C, Mwakiwa E, Gandiwa E. 2017. Review of the communal areas management programme for indigenous resources (CAMPFIRE) and community based natural resources management (CBNRM) models. Harare: Government of Zimbabwe and European Union.
- Manjengwa J, Kagande S, Givá N, Mabjaia I. 2010. A comparative study of institutional arrangements for small-scale livestock farmers in communities the Great Limpopo Transfrontier Conservation Area (GLTFCA) in Zimbabwe and Mozambique. CASS, University of Zimbabwe. [https://www.wcs-ahead.org/gltfca\\_grants/pdfs/manjengwa\\_final\\_3\\_2010.pdf](https://www.wcs-ahead.org/gltfca_grants/pdfs/manjengwa_final_3_2010.pdf).
- Mapedza E, Bond I. 2006. Political deadlock and devolved wildlife management in Zimbabwe: the case of Nenyunga Ward. *J Environ Dev.* 15(4):407–427. doi:10.1177/1070496506294635.
- Martin RB. 1986. Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). Revised Version. Harare (Zimbabwe): Branch of Terrestrial Ecology, Department of National Parks and Wild Life Management. CAMPFIRE Working Document No. 1/86.
- Mashinya J. 2007. Participation and devolution in Zimbabwe's CAMPFIRE program: findings from local projects in Mahenye and Nyaminyami [Doctoral dissertation]. doi:10.1094/PDIS-91-4-0467B.
- Maveneké TN. 1998, May. Local participation as an instrument for natural resources management under the communal areas management programme for indigenous resources (CAMPFIRE) in Zimbabwe. In: Proceedings of an International Workshop on Community-Based Natural Resource Management (CBNRM), Washington, DC. p. 10–14.
- Mazambani D, Dembetembe P. 2010. Community based natural resources management stocktaking assessment: zimbabwe profile. USAID-DAI, WWF.
- Mukulumanya M, Vermeulen C, Kalinda A, Mate JP. 2014. La gestion communautaire des ressources naturelles à l'Est de la RD Congo: expérience de l'UGADEC. *Parcs & Réserves.* 68(4):11–15.
- Murphy J. 2010. Does community involvement in conservation provide an alternative to fortress conservation? London: African Lion and Environmental Research Trust.
- Peterson John H. 1991. Bottom up development in decentralized common property regimes: the experiences of two district councils in south eastern Zimbabwe. In: International Association for the Study of Common Property, Common Property Conference, Winnipeg. p. 26–29.
- Pretty J, Smith D. 2004. Social capital in biodiversity conservation and management. *Conserv Biol.* 18(3):631–638. doi:10.1111/cbi.2004.18.issue-3.
- Reid H. 2016. Ecosystem-and community-based adaptation: learning from community-based natural resource management. *Clim Dev.* 8(1):4–9. doi:10.1080/17565529.2015.1034233.
- Roe D, Nelson F, Sandbrook C (eds.). 2009. Community management of natural resources in Africa: impacts, experiences and future directions. London (UK): International Institute for Environment and Development. Natural Resource Issues No. 18.
- Sachs JD. 2005. The end of poverty. New York: The Penguin Press; p. 20.
- Schröter M, Zanden EH, Oudenhoven AP, Remme RP, Serna-Chavez HM, Groot RS, Opdam P. 2014. Ecosystem services as a contested concept: a synthesis of critique and counter-arguments. *Conserv Lett.* 7(6):514–523. doi:10.1111/conl.12091.
- Small N, Munday M, Durance I. 2017. The challenge of valuing ecosystem services that have no material benefits. *Global Environ Chang.* 44:57–67. doi:10.1016/j.gloenvcha.2017.03.005
- Summers JK, Smith LM, Case JL, Linthurst RA. 2012. A review of the elements of human well-being with an emphasis on the contribution of ecosystem services. *Ambio.* 41(4):327–340. doi:10.1007/s13280-012-0256-7.
- Taylor RD. 2006. Case study: CAMPFIRE (Communal areas management program for indigenous resources), Zimbabwe. Washington (DC): USAID. USAID-FRAME Paper.
- Taylor RD. 2009. Community based natural resource management in Zimbabwe: the experience of CAMPFIRE. *Biodivers Conserv.* 18(10):2563–2583. doi:10.1007/s10531-009-9612-8.
- Tembo G, Bandyopadhyay S, Pavy JM. 2009. Impact of natural resource conservation policies on household consumption around Zambian national parks. (No. 55055). Michigan State University, Department of Agricultural, Food, and Resource Economics. <http://fsg.afre.msu.edu/zambia/ps35.pdf>
- UICN/PACO. 2009. La grande chasse en Afrique de l'Ouest: quelle contribution à la conservation? Big Game Hunting in West Africa. What is its contribution to conservation?
- [ZIMSTAT] Zimbabwe National Statistics Agency. 2012. Population census national report 2012. Population Census Office, Causeway Harare, Zimbabwe.
- Vira V, Ewing T. 2014. Ivory's curse: the militarization and professionalization of poaching in Africa. Washington, DC. <http://www.africabib.org/http.php?RID=392836777>

- Vorlaufer K. 2002. CAMPFIRE—the political ecology of poverty alleviation, wildlife utilisation and biodiversity conservation in Zimbabwe. *Erdkunde*. 56:184–206. doi:[10.3112/erdkunde.2002.02.06](https://doi.org/10.3112/erdkunde.2002.02.06).
- Zisadza-Gandiwa P, Gandiwa E, Muboko N. 2016. Preliminary assessment of human–wildlife conflicts in Maramani Communal Area, Zimbabwe. *Afr J Ecol*. 54(8):500–503. <http://onlinelibrary.wiley.com/doi/10.1111/aje.12282/epdf>
- Zunza E. 2014. Local Level Benefits of CBNRM: The Case of Mahenye Ward CAMPFIRE, Zimbabwe [MSc Dissertation]. Harare: Center for Applied Social Sciences (CASS): University of Zimbabwe.