Can local communities afford full control over wildlife conservation? The Case of CAMPFIRE in Zimbabwe

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Abstract

Wildlife is widely becoming an important vehicle for rural development in most third-world countries across the globe. Policymakers are usually not informed about the needs and wants of poor rural households and roll out programmes that are not tailor made to suit their desires, which often result in policy failure. We use a survey-based choice experiment in this paper to investigate household preferences for various attributes of a wildlife management scheme. The survey was administered in CAMPFIRE communities around the Gonarezhou National Park in Zimbabwe. Respondents showed great willingness to move from the status quo to a regime that gives them full control over wildlife. Thus, our results speak to increased devolution of wildlife management from the rural district councils into the hands of sub-district producer communities. The WTP for the new regime is more than twice the WTP for the old regime. Furthermore, our results support the idea that government programmes and development projects should not be imposed on local communities, but should be informed by programme beneficiaries through research in order to capture their needs and wants. Finally, our results demonstrate that poachers and those who are generally good in extracting resources from the environment will oppose change.

1 Introduction

Wildlife conservation is increasingly becoming important for the livelihoods of poor rural households living adjacent to national parks in Southern Africa (Ntuli and Muchapondwa, 2017). There is great potential for rural economies in the

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region to grow faster than the status quo through both consumptive and non-consumptive tourism. Despite this fact, most rural economies in the region are struggling to cope with high unemployment, incessant poverty and inequality, while poaching continues unabated. These problems are exacerbated by the marginalization of indigenous communities through laws and policies inherited from the colonial epoch, and as such deriving substantial benefits from conservation becomes extremely difficult. As a result, there is increasing pressure from interest groups to involve local communities in wildlife conservation. Although there has been an effort to integrate local communities in wildlife management, the outcome has not been favourable in some parts of the region. Several studies done in the region documented either limited success or failure in community wildlife conservation (e.g., Lindsey 2014; Benjaminsen 2013; Balint and Mashinya 2008; 2006; Goldman 2003).

Scholars argue that problems associated with community wildlife conservation are inherent in the design of most Integrated Conservation and Development Programmes (ICDP) in developing countries (Garnett et al. 2007; Hughes and Flintan 2001). Furthermore, policies are fervently designed and endorsed without consulting other important stakeholders such as local communities. In addition to nonalignment of incentives, government and donor funded projects frequently fail because of lack of ownership, which occur when local communities are side-lined during project conception, design and implementation (Campbell and Vainio-Mattila, 2003). Quite often, policymakers and development practitioner are concerned with the supply side interventions, yet communities have their own way of perceiving costs and benefits associated with that intervention. The assumption is that rural communities will embrace any project simply because they are poor and their options are limited, but evidence proves otherwise. Like with many other sectors, it is unclear what CAMPFIRE communities really want. Specifically we ask, do CAMPFIRE communities care about increased devolution of NRM and authority that will allow them to manage wildlife on their own with minimal state interference? If they do, how much are they willing to pay for different policy attributes in order to move to a seemingly better position? Alternatively, what are the specific components of a CBNRM model that CAMPFIRE communities would prefer?

To differentiate our study form previous studies, we focused our attention on the wildlife sector to study household preferences for various attributes of a wildlife management scheme in the context of a developing country. In addition to the choices they make, the characteristics of decision-maker is important for the study. Thus we combine a choice experiment and a CVM in the form of a scope test to examine these preferences. It is not clear how CAMPFIRE communities would react when facing an option with more rights compared to status quo, but at a cost. Our results provide pragmatic evidence to policymakers and rural development practitioners alike about the preferences of local communities and feed into future policy reforms in the wildlife sector.

In order to gain insight into these issues, we designed and conducted a choice experiment survey in communities around the Gonarezhou National Park in Zimbabwe. Unlike in most countries in the region, the government of Zim-

babwe handed over appropriation and management rights to local communities through their respective Rural District Councils (RDCs) in a partial devolution exercise, which started during the mid-1980s (Murombedzi, 1999). CAMPFIRE is an interesting case because the government seems reluctant to take the devolution exercise to a next step and handover appropriation authority from RDC to community level as previously envisioned by the CAMPFIRE programme. Muchapondwa (2003) reported that CAMPFIRE seemed to work as poaching initially subsided, but later on gained momentum due to lack of incentives since the design of the scheme was not adhered to and the programme not implemented in full. Furthermore, some communities, e.g., Mahenye CAMPFIRE community[1], has decided to go through the court system in order to seek independence from RDC and to acquire appropriation rights because of the slow pace the process has being going and unwillingness to hand over power by the state.

The rest of the paper is structured as follows. Section 2 describes the design of the choice experiment and attributes. Section 3 presents the econometric framework. The results are discussed in section 4, and Section 5 concludes the paper.

2 Design of the choice experiment

To define policy relevant attributes of a wildlife management scheme, a qualitative review of existing literature and expert opinion[2] were sought. The levels of the selected attributes were then refined from the additional information obtained from focus group discussion and previous experience of the researcher on management of CAMPFIRE. A structured questionnaire was used to collect this information. The questionnaires had various sections on socio economic characteristics of households and the alternative policy scenarios. The attributes identified and their levels are presented in table 1.

To elicit household preferences, the study used the choice experiment approach. In the introduction of the experiment, respondents are told that the government of Zimbabwe has proposed to completely handover authority from the Rural District Council (RDC) to the local communities as a possible solution to the problem of poaching bedevilling most CAMPFIRE projects across the country. This means that local communities will now manage wildlife on their own with minimum interference from the state, i.e., engage safari operators, collect revenues, recruit game guards, provide remuneration, carryout patrols, provide watering points, game cropping, live animal sales, and animal counting among other things. There is also a need to have permanent offices where communities can be contacted, to recruit paid staff and to carryout proper

[1] Mahenye CAMPFIRE community is one of the most successful projects in the Study area. It is one of the first projects to benefit through the CAMPFIRE programmes when it was instituted by the government during the mid-1980 and received a lot of donor support.

[2] Expert opinion include key informant interviews with community leadership, local authorities (such as RDC, park authorities) and NGOs working with local communities.

accounting procedures. However, the policy has a cost implication that must be incurred by the CAMPFIRE communities themselves. In addition to this, CAMPFIRE communities will now be asked to pay a levy to the RDC. The community can choose to maintain the status quo, but there is an additional requirement that they need to commit more effort in order to curb poaching if they decide to do so. Although not realistic, this assumption is meant to make the status quo less obvious or appealing in the eyes of the community since there is a trade-off between labour invested in anti-poaching enforcement and private activities. This was meant to avoid a situation where respondents would choose the status quo as the default option without comparing it to the given option.

This exercise comes with a cost to the government, but due to economic hardships the funds are not available to execute such a programme. So communities are asked to contribute towards this cause for them to enjoy the benefits. Due to the subjective nature of verbal description, to ensure understanding and scenario acceptance of the exercise, each attribute level was visualized through digital manipulation of a control picture depicting the levels of the attribute. This was to make sure that changes in the attribute levels are easily depictable to handle biases that may arise due to differences in levels of education. In addition, respondents were also asked if they support such a programme and how much they are willing to contribute towards both the new and old regime. Contribution can be either monetary or non-monetary, e.g., grain or labour.

The questionnaire was presented to a random sample of 350 households. To facilitate the interview, we provided each respondent with a separate fact card describing the attributes in their local language. Each option provides local communities with a certain degree of autonomy. Figure 1 gives an example of the choice experiment scenarios that were presented to the respondents. With 4 attributes varying across 3 levels each and 1 attribute varying across 5 levels, there were 135 ($3^4 \times 5^1$) possible combinations of the attributes and their levels. In order to minimize bias, a full factorial orthogonal design of 24 alternative profiles was created using NGENE software from the full set of possible combinations. The software produced an efficient design with 1 status quo and 2 non-status quo alternatives per choice set, and four choice sets arranged in six survey blocks. Respondents were randomly assigned one of the six versions of the questionnaire. Our design is such that the proposed levels in the status quo also appear in the new policy scenarios. However, we introduce a level in the policy scenarios which does not appear in the status quo. If we consider figure 1, the end result is that there is no difference between option 1 and the status quo in terms of 'governance', but the difference is in terms of attributes that matter for conservation.

In figure 2, respondents were then asked to choose between two options in order to measure willingness to change, i.e., an option which provides CAMPFIRE communities with full autonomy versus the baseline scenario (status quo). Respondents were told that the status quo has been temporarily withdrawn, but they have the option to buy it back. However, by choosing the status quo, we assume that respondents know exactly what they are buying.

Willingness to change is defined as the difference between the status quo

and the option representing willing to move to a new CAMPFIRE programme, which provides fully autonomy in this case. Thus willingness to change can take on both negative and positive values depending on the respondent's vote for the two programmes. For completeness, respondents have the option to choose neither the baseline nor the alternative, in which case the willingness to pay for both programmes is zero. This special case will be treated the same as choosing the baseline scenario in the analysis simply because households cannot choose to opt out in a community project. However, we asked respondents questions to know the reason why they have a zero WTP so that we can control for genuine and non-genuine zeros. Respondents sometimes report zero willingness to pay as a way of protesting that they do not prefer the status quo (Hanley et al. 2009). The option in figure 2 was carefully designed in such a way that it closely resembles the conservancy community[3] which is known to achieve superior outcomes (Ntuli and Muchapondwa, 2018). Measuring willingness to change will provide answers, from the point of view of the beneficiaries, to the question on increased devolution in CAMPFIRE projects, which has been the subject of discussion among scholars for many decades.

Alternatively, we can think of this exercise as a scope test where we would like to see whether people's preferences are well behaved. The status quo offers relatively fewer rights than the new option. If respondents think that the new CAMPFIRE is a good they pay more and if they view it as a bad they pay less. The concept of WTC we introduced here is more about how to vote for a change from an inferior good with less quantity to a seemingly superior good with more quantity. What is changing in these two descriptions of CAMPFIRE is increased devolution, i.e., appropriation rights, monitoring, collective choice rules and governance. In reforming CAMPFIRE, there is a need to understand what supports devolution. For example, what are the characteristics of a respondent who tends to support the need for a new CAMPFIRE? Why are these people refusing something which theoretically would benefit the whole community?

Appropriation rights

The appropriation rights doctrine states that rights are determined by priority of beneficial use (Oeltjen and Fischer 1978; Simms 1989). As with all CAMPFIRE communities, the government handed over appropriation rights to RDC fearing that wildlife might be decimated by local communities if they are given full control. According to the programme documents, local communities were assumed to learn over time, while the devolution exercise occurred in phases and eventually appropriation rights handed over to communities (Murombedzi, 1999; 2000). However, this did not happen because the government did not want to lose an important source of revenue. Most RDCs in areas where wildlife conservation is an important activity rely heavily on wildlife income. About 51% of the income generated by CAMPFIRE projects goes to the community, 3% to the CAMPFIRE association, while the remainder (46%) is retained by the respective RDCs (Ntuli and Muchapondwa, 2017a). The CAMPFIRE association

[3]The conservancy community is comprised of private game farms, who come together, dissolve their internal boundaries and manage wildlife as a common pool resource since wildlife is a fugitive resource and in order to enjoy economies of scale (Ntuli and Muchapondwa, 2018).

is now a white elephant because it no longer serves the interests of CAMPFIRE communities and difficult to dispose of (Balint and Mashinya 2008).

Appropriation rights usually decide who has the right to income. In the case of CAMPFIRE, appropriation rights belong to the RDCs alone. As a result, the RDC has monopoly to engage safari operators, to collect revenue from trophy hunting activities in the communities in question and to decide on the distribution of benefits, while local communities are viewed as mere beneficiaries of the programme. In comparison, under the conservancy community, appropriation rights belong to the whole group. Ntuli and Muchapondwa (2017b) suggested that this major difference might be responsible for the discrepancies in outcomes between the two communities.

The final decision about development in rural areas rests in the hands of the RDC whether on private or communal land. This means any proposal to embark on a development project passes through the RDC, who will then give green light to the project. Unlike on private land, development on communal land is further constrained by the fact that the land belongs to the state and hence the community does not have final say. Moreover, private-public partnerships involving CAMPFIRE communities are constraint by the bureaucratic process involved and paper work, which increases transaction costs. In most cases a development projects can take several years before it is finally approved by the RDC.

Monitoring and enforcement

Besides deriving substantial benefits, another important dimension of CAMPFIRE is to engage local communities so that they can protect wildlife. CAMPFIRE communities are required to have a wildlife management committee and constitution in order to participate in the programme. The wildlife management committee is responsible for monitoring resources be it finance, project assets or wildlife. As part of the wildlife management committee, there is a special subcommittee referred to as resource monitors dedicated to anti-poaching enforcement. The CAMPFIRE model also allows members of the community to monitor each other and external poachers. There is little evidence of the use of punishment in CAMPFIRE communities to reduce poaching activities.

Anti-poaching enforcement is not effective because of lack of adequate incentives and insufficient resources to fight poaching. Poaching normally happens outside when wildlife is roaming in the community's conservation area. It is perpetrated by both local communities (Gandiwa et al. 2013; Gandiwa 2011) and external commercial poachers (Ntuli and Muchapondwa 2015; Muchapondwa 2003). Local communities are normally involved in subsistence poaching of the small plains game, while commercial poachers hunt valuable wildlife such as elephants and rhinos for trophies. Furthermore, CAMPFIRE communities are known to provide escort and vital information about wild animal movements to commercial poachers and get meagre remuneration in return. They sometimes use crude measures to protect their fields and livestock by killing elephants, leopards and lions using cyanide poisoning and wire snares. All this happens while the community turns a blind eye. When we look at the conservancy community on the other hand, we observe that they conduct patrols using armed

and well trained game guards.

Collective choice rules

These are rules made by a community in order to manage or protect a common pool resource (CPR). A subset of collective choice rules referred to as operational rules is concerned with regulating the use of resource by community members. Ostrom (2007) define operational rules as rules that guide individual decisions, strategies, monitoring, enforcement and benefits. Operational rules state who is eligible to harvest a resource, the type of gear that should be used during extraction, where and what time of the year? Since operational rules are made in the collective choice arena, so change in the operational level has to come from the collective choice level. There is evidence across the globe of local communities that have managed to develop robust CPR institutions or rules to manage their resources efficiently and sustainably (Ostrom et al. 2007; Agrawal 2001). In the case of CAMPFIRE communities, such rules are either not clearly defined or known by community members because they just inherited a constitution that was developed by their respective RDCs. Very few CAMPFIRE communities developed their own constitution, while most members of the community did not participate in the constitution making process. As a result, the rules that apply in CAMPFIRE projects were designed by different institutions such as the RDC, park authorities and traditional institutions, although the latter is mainly confined to other natural resources other than wildlife.

Governance

Wildlife governance spells out how wildlife should be managed starting at national level policies to local institutions at community-level and must involve all stakeholders. It encompasses all aspects of wildlife conservation including management discussed above and many other issues. Wildlife management is defined as the guidance of decision-making processes and the implementation of practices to purposefully influence the interactions among and between people, wildlife and their habitats to achieve impacts valued by stakeholders (Riley et al., 2002). Wildlife governance is best understood in terms of 10 principles suggested by Decker et al. (2016) and these are highlighted in Table 2.

The definition of wildlife management is very broad and includes the provisioning of watering points and food in times of droughts, disease control, game cropping, live animal sales and animal counting among other things. Out of about 25 CAMPFIRE communities identified in the study area, only Mahenye CAMPFIRE community use armed and well trained game guards during patrols. The capacity of the state to provide monitoring and enforcement outside the national park is severely limited by budgetary constraints. Patrols are critical for the success of wildlife conservation inside the conservancies (Ntuli and Muchapondwa, 2018). Local communities can also use proceeds from wildlife conservation to drill boreholes in their jurisdiction that will serve as watering points for both wildlife and livestock.

The RDC partially accounts for wildlife revenues collected from safari operators, money distributed to other stakeholders, but there is hardly any accounting of how this money is used. The RDC claim that this income is used for training CAMPFIRE communities, carryout patrols, and pay salaries for CAMPFIRE

officers housed within the RDC and other administrative duties. Evidence on the ground show that the RDC conducted few training sessions and later on abandoned the programme. There is huge potential to increase revenue for CAMPFIRE communities if they were to operate independently, as the conservancy community, and pay a levy to the RDC (Frost and Bond 2008). No proper accounting is done by the CAMPFIRE communities after getting wildlife income (Ntuli 2015).

3 Research Methods

Study area and data

This study collected primary data from 350 respondents using a household questionnaire. The household survey was conducted between June and August 2017 with local communities living adjacent to the Gonarezhou National Park in Zimbabwe. It forms part of the Great Limpopo Trans-frontier Park linking Gonarezhou with the Kruger National Park in South Africa and the Limpopo National Park in Mozambique. The park has approximately 5053 km^2 of conservation land and is the country's second largest game reserve after Hwange National Park. The park is located in natural region V, which is very dry with very low agricultural potential. The mean annual rainfall for the area is about 499 mm with average maximum monthly temperature ranging from 25.9^0C in winter to over 36^0C in summer, while the average monthly minimum temperature ranges from 9^0C to 24^0C in winter and summer respectively. The vegetation of the ecosystem is a typical semi-arid savanna and is dominated by Colophospermum mopane woodlands (Gandiwa and Kativu, 2009; Gandiwa, 2011). Fig. 3 shows the map of GNP and the communal areas bordering the national park.

The study area is located approximately 146 km away from Chiredzi town, relatively sparsely populated with an average population density of about 26 persons per square kilometre and predominantly occupied by Shangani people. The population structure is made up mostly of the elderly and women. Both migration and population growth rates are high. Due to proximity to the border most young men and sometimes children of school going age migrate to South Africa in search of greener pastures (Ntuli and Muchapondwa 2018). While men stay for longer periods away from home at a time, most women are engaged in cross border trading in South Africa and Mozambique. The study area has got one of the lowest literacy rates in the Zimbabwe because of high school dropout rates, shortage of schools and opportunities for you girls and boys to work on farms in South Africa so that they can feed their families back at home. The mode of production of peasant farmers in both communal areas is primarily subsistence in nature. They grow crops such as maize, sorghum, millet, round nuts, ground nuts and rapoko. As a result, livestock is the most viable activity since the area is dry. Poor households in the study area also depend heavily on environmental resources and subsistence poaching of small plains game in order to get the much needed nutrients (Ntuli and Muchapondwa 2017).

Empirical model

This paper combines two analytic approaches or models. For the first analysis we run choice experiments and use both multinomial logit and conditional logit models for comparison purposes. In the second analysis, we use CVM to model willingness to change from a seemingly suboptimal regime (the status quo) to one that is optimal, i.e., a regime that give local communities full autonomy (Ntuli and Muchapondwa 2017). The theoretical basis of choice experiments hinges on the characteristic of goods theory (Lancaster 1966) and random utility theory (Mansky 1977; McFadden 1974) as its building blocks. The former theory states that people derive utility from the attributes of a commodity in addition to mere consumption of the physical units of a good, while the latter suggests that by observing a consumer choice we cannot tell all the predictors of his utility. Louviere et al. (2000) provides a detailed discussion of the conceptual framework and underpinnings of the choice experiment approach in terms of an individual's decision making and choice processes. In principle, respondents are asked to choose the alternative they would prefer. Mansky (1977) suggested that we can decompose the utility of consumer i from alternative j, u_{ij} into observable,v_{ij} and unobservable ε_{ij} components, i.e.,

$$u_{ij} = v_{ij} + \varepsilon_{ij} \tag{1}$$

The consumer will only choose alternative k over another one j from a set S if he derives a higher utility from k compared to j. Alternative k is chosen over alternative j, if $U_{ik} > U_{ij}$. The probability of a consumer choosing alternative k over j all comprising of a set S is can be expressed as:

$$\begin{aligned} p(k|S) &= p\left[(u_{ik}) > (u_{ij})\right] \quad \forall k \neq j \\ &= p\left[(v_{ik} - v_{ij}) > (\varepsilon_{ij} - \varepsilon_{ik})\right] \quad \forall k \neq j \end{aligned} \tag{2}$$

In other words, the difference in the systematic utility of alternative k and j exceeds the difference in the random utility of alternative k and j. The difference in the observed utility is attributed to the difference in the attributes between alternative k and j. The observable part is defined as a function of the attributes of the alternative and those of the respondent,

$$v_{ik} = X_{ik}\gamma + Z_i\delta. \tag{3}$$

Macfadden (1973) shows that a conditional logit model can be used to analyze the consumer choice with the attributes of the good or service acting as the predictors, and a ratio of the coefficients of attributes and prices used to recover the marginal willingness to pay for an attribute. Qin et al. (2009) estimated a random parameter logit (RPL) model to investigate farmers' preferences for various property-rights attributes of a forestland contract in China. The popularity of the RPL model rests on the fact that unobserved heterogeneity preference is accounted for in economic analysis by allowing model parameters to vary among individuals. Furthermore, the independence of irrelevant alternative (IIA) assumption is relaxed with this model. Although sharing the same theoretical foundation with the contingent valuation method, the choice experiment approach focuses on respondent preferences regarding the attributes of the

scenarios in the design, rather than on specific scenarios (Dambala and Koch 2012; Qin et al. 2009).

To model willingness to change, we define the dependent variable as the difference between willingness to pay for the baseline and the new option. We assume that willingness to change is a latent variable and what we can observe are the willingness to pay for the baseline and the new option, i.e., willingness to move from one state to another is unobservable. The logit model is used to model the probability that a respondent is willing to move to a new state all other things held constant. Suppose,

$$WTC_i^* = x_i\beta + \varepsilon_i \tag{4}$$

where $WTC_i^* = WTP_1 - WTP_2$. The dependent variable is thus transformed into a binary variable which takes on the following values:

$$WTC_i = \left\{ \begin{array}{l} 1 \; if \; WTC_i^* > 0 \\ 0 \; if \; WTC_i^* \leq 0 \end{array} \right\} \tag{5}$$

It follows that:

$$\begin{aligned} \Pr(WTC_i = 1 \mid x_i) &= \Pr(x_i\beta + \varepsilon_i > \mid x_i) \\ &= \Pr(-\varepsilon_i < x_i\beta) \end{aligned} \tag{6}$$

By symmetry of ε_i, we have

$$\begin{aligned} &= \Pr(\varepsilon_i < x_i\beta) \\ &= F(x_i\beta) \end{aligned} \tag{7}$$

Assume that $\varepsilon_i ¡\sim \Lambda(0,1)$we have

$$\Pr(WTC_i = 1 \mid x_i) = \frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)} \tag{8}$$

It follows immediately that

$$\begin{aligned} \Pr(WTC_i = 0 \mid x_i) &= 1 - \tfrac{\exp(x_i\beta)}{1+\exp(x_i\beta)} \\ &= \tfrac{1}{1+\exp(x_i\beta)} \end{aligned} \tag{9}$$

So that

$$\frac{\Pr(WTC_i = 1 \mid x_i)}{\Pr(WTC_i = 0 \mid x_i)} = \exp(x_i\beta) \tag{10}$$

The odds ratio that $WTC_i = 1$ is thus given by

$$\frac{\Pr(WTC_i = 1)}{\Pr(WTC_i = 0)} = \frac{\pi_i}{1 - \pi_i} \tag{11}$$

And for the logit model, it follows that

$$\ln odd(WTC_i = 1 \mid x_i) = x_i\beta \tag{12}$$

It is important to note that the latter is not a substitute of the former analysis, but rather complements the results reported under standard CE studies.

4 Results and discussion

4.1 Descriptive statistics

This section provides a characterization of the sampled respondents. The average household size, number of years in school and age of the respondents are 7 household members, 6.5 years and 38 years respectively. About 7% of the respondents indicated that they are employed, while only 32% of the respondents are male. The study area is characterised by very poor female headed households with primary level of education, i.e., grade seven or lower. Due to its proximity to the border, most men (including children) find it easy and worthwhile to cross the border into South Africa in search of menial jobs to feed the families (Ntuli and Muchapondwa 2017). The CAMPFIRE programme was established with these communities in mind so that they can benefit from wildlife conservation (Murombedzi 1999).

When respondents were asked if they support a new CAMPFIRE programme that gives then full autonomy and appropriation rights to wildlife, 95.3% answered yes, while 88.3% confirmed that they are willing to contribute towards the new programme. Approximately 78.3% of the respondents voted in favour of the new CAMPFIRE programme, while 20% supported the status quo. Of the 20% who supported the status quo, most respondents were very pessimistic about the ability of CAMPFIRE communities to manage wildlife on their own with minimal or no state interference at all. Factors that may affect a new CAMPFIRE programme that gives local communities autonomy include lack of knowhow or training, lack of resources and poor CPR institutions (Ntuli and Muchapondwa 2018). These statistics demonstrate that a greater proportion of the local communities support complete devolution of wildlife manage and are prepared to continue with the conservation works that the state has been doing. These results support other studies done in the region (e.g., Ntuli and Muchapondwa 2018; Benjaminsen et al. 2013; Kreuter et al 2010) and elsewhere in the world (Ostrom et al. 2007; Agrawal 2001; Agrawal and Gibson 1999). Furthermore, the mean WTP for the status quo (8.5) is much lower compared to the mean WTP for the new CAMPFIRE (18.4) and the difference is positive and statistically significant at 1% level of significance. This could mean that communities are willing to move from the old to a new CAMPFIRE which gives then full autonomy. Ntuli and Muchapondwa (2017) found that training has a positive and significant impact on both welfare and conservation outcomes.

Very few respondents (15.3%) indicated that they received training that is related to wildlife management. This seems to suggest that a new CAMPFIRE programme should be accompanied by training in order to achieve the desired goals. The mean number of poaching incidences is 1.32, while the mean number of times that the respondent has actually consumed bush-meat at home within the past 12 months is 2.35. About 35.4% indicated that there are threatened species in their villages where they come from. These figures, though subjective, provides evidence of poaching, utilization of wildlife (game meat) and resource overexploitation by CAMPFIRE communities in the study area. About 32.0%

reported that they belong to community organization and 88.9% confirmed the existence of a wildlife management committee (WMC) suggesting that there are some institutions in place to foster cooperation in various community activities such as wildlife conservation. However, in some communities poaching is still rampant due to institutional failure. In a study that examines the role of local institutions on community wildlife conservation in Zimbabwe, Ntuli and Muchapondwa (2018) demonstrated that there is more cooperation in areas where there are good institutions in place and vice versa.

We constructed an index that measures expertise or resource dependence by asking the respondents a number of questions and then used factor analysis to recover the variable since it is latent. For example, we asked respondent if they consider themselves or anyone in the family a hunter or fishermen, if they harvested a wide variety of environmental resources (wild fruits, vegetables, firewood, poles, grass, honey, e.tc) from the conservation area. The results show that the level of expertise in the sample is about 37.6, which also suggest natural resource dependence by some members of the community.

4.2 Model Estimation Results

The study employed NLOGIT 4.0 and Stata version 13 for estimation of the models. All the attributes were dummy coded except the cost attributes. To obtain estimates that are uncorrelated to the model intercept, the attributes were effect coded (see Louvier et al. 2000 and Hensher et al 2005). This implies that one level attribute is dropped as the base category. The estimated coefficients will therefore show respondents preference for change from the omitted level to greater utility level (Bergmann et al 2006).

To control for difference between Status Quo and non-Status Quo alternatives we included a dummy equal to one for status quo and zero for the other options. This was also because the two alternatives other than the status quo had same sign and almost equal magnitude. The inclusion of the dummy also measures some propensity to choose zero cost option or protest behaviour. We therefore tested for status quo bias. Table 1 shows the frequency with which each alternative was selected.

The status quo bias is significantly large approximately 25%. This shows that a significant proportion of the respondents would prefer the status quo to the other policy options may be because of the cost implications.

4.2.1 *Multinomial logit Results and Conditional Logit (CL) Model*

The estimation results for the various models are presented in table 3. The model estimation results for both multinomial logit and conditional logit models are not significantly different from one another both in terms of sign and magnitude. The interpretation is therefore basically the same. If the IIA assumption does not hold then CL model would yield biased estimates. We employed the Hausman and McFadden test under the null hypothesis of no violation to test the IIA assumption (Hausman 1984). The Hausman and McFadden test results

are shown in Table 3. The results reveal no violation of the IIA assumption. However, this test has been contested for giving inconsistent results (see vijverberg2011). We choose the CL model over the MNL because the latter does not take into account the fact that the data is entered in panel data format, i.e., that one person made choices a couple of times.

We therefore proceed to interpret the conditional logit estimation results. The conditional logit model estimation results are shown in table 4. Our results show that the coefficient for the variable measuring the difference between status quo and non-status quo alternatives (ASC), or the status quo bias as it is commonly referred to in the literature, is positive and highly significant confirming the presence of the status quo bias. Respondents who voted for the status quo option were asked to give their reasons and this information indicate that most respondents genuinely supported the status quo. According to their answers, the main reason for the bias is that most respondents who voted for the status quo were not sure about their capability to manage wildlife on their own.

Holding everything else equal, CAMPFIRE communities would be prefer policy options that would guarantee them appropriation rights provided by communities and safari operators as opposed to RDC/Park agency. Since 2011, there has been an attempt by Mahenye CAMPFIRE to strip the RDC of the appropriation rights through courts, but the system has been very slow to adjudicate favourable outcome on this matter (Ntuli 2015). Scholars argue that the devolution exercise was incomplete since appropriation rights stayed in the hands of the RDC for a long time instead of being passed on to local communities as planned (Murombedzi 1999). The idea was that the RDC would get the appropriation rights first and manage wildlife on behalf of local communities, while they are learning. However, this phase never came to an end as wildlife conservation became an important source of revenue for the RDC. As a result, this resulted in frustration on the side of the community as other stakeholders regarded them as spectators. They would also prefer monitoring and enforcement mechanism enforced by armed guards and resource monitors as opposed to RDCs. In terms of collective choice rules we found that communities would prefer unanimous and majority decision in terms of choice rules as opposed to choice rules imposed by elders or external bodies. This supports the idea in the literature that externally imposed rules and regulations reduce cooperation, while communities that endogenized punishment cooperate more (Ntuli and Muchapondwa 2017; Cardenas 2004; Cardenas et al 2000; Murphy and Cardenas 2004).

However, when it comes to governance issues, the CL results revealed that communities would prefer policy options that would ensure governance is left to WMC and traditional institutions as opposed to RDCs. Traditionally, most governments in Southern Africa used a top-down and straight jacket governance approach to wildlife because they viewed local communities as enemies (Murombedzi 2003). Even today, traditional wildlife governance structures inherited from the colonial epoch exclude local communities and traditional leadership to the extent that they don't have a saying in as far as wildlife management

is concerned. This puts wildlife conservation at risk because local communities lack the mandate and ability to protect the resource even if they are the once living with it (Gandiwa 2013; Jones 2006; Murombedzi 1997). Ostrom (2007) argue that local communities have a lower cost of monitoring and enforcement compared to the state.

4.2.2 *The Random Parameter Logit Model*

Despite the non-violation of the IIA assumption, since preferences are heterogeneous, there is need to account for the heterogeneity in preferences. We performed appropriate tests of the distribution of model parameters and our results were consistent with distribution underlying the use of a RPL model. We estimated the Random Parameter Logit (RPL) model (see Train 1998) which also handles unobserved heterogeneity and thus more superior to the CL model because it only accounts for observed heterogeneity. The assumption is that people's preferences with respect to the attributes (and the proposed programs) differ, but we cannot observed what is causing these differences. We treated all attributes as random except the cost. The results are presented in table 5. The RPL model revealed significantly large derived standard deviation for App_com, App_Saf, Col_UN, Col_MJ, Gov_MJ. This reveals that our data supports choice specific heterogeneity for these attributes.

4.2.3 *Willingness to pay Estimates*

We present WTP estimates from the conditional logit model since it is more superior to the multinomial logit model estimates, i.e., the multinomial logit model does not allow the fact that with stated choice data, each decision maker responds to multiple choice tasks and also imposes a constant error variance assumption across all alternatives across the model. The WTP are presented in table 4. The WTP estimates from the conditional logit model differ significantly at 0.05 significance level or less. The positive willingness to pay values for an attribute indicates that the average respondent would experience an improvement in welfare with an increase in the level of attributes and would therefore choose an intervention that maximizes his or her utility.

The mean WTP results corroborates the idea that communities are willing to pay more for policy options where appropriation rights are vested on the communities themselves as opposed to the RDC/park agency. Alternatively, taking RDC as the base category, if we change appropriation rights from RDC to the community, respondents are willing to pay $95.09 for the most preferred option. This is a once off payment since we are dealing with a very poor communities comprising of less educated and unemployed women and children. If the community cannot have appropriation rights, then the second best solution would be to give the appropriation rights to safari operators. Respondents believe that they will work better with safari operators in the absence of RDC. In addition to returning a larger share of the revenue, the RDC is viewed as an impediment to public-private partnerships involving safari operators and local communities

(Ntuli and Muchapondwa 2017).

The results also revealed that communities are willing to pay more for policy options where monitoring and enforcement is conducted by resource monitors as opposed to RDC. If this ideal situation is not possible, then the second best solution would be to use armed guards. The results also reveal that communities have high preference for options that would guarantee them that the collective choice rules will be based on unanimous decision. Again, if this is not attainable, the second best solution is collective choice rules based on majority vote. In terms of governance the results revealed that communities would be willing to pay more for policy options where the governance of the natural resource is conducted by WMC as opposed to RDC, while the second best scenario would be the case where the governance is actually done by traditional leaders. Overall, our results demonstrate that respondents prefer those institutions where they are in charge and for the government, it is a vote of no confidence.

4.3 Modelling willingness to change (WTC) using a logit model

Table 5 shows the results of the logit model after removing a few observations that we suspected to be non-genuine zeros, i.e., respondents were protesting. We do not believe that dropping these observations will affect our results in any way. Our results reveal that the willingness to change from the status quo to alternative policy scenarios are influenced by the following factors; age, gender, training related to wildlife management, employment, membership to community organization, whether there are threatened species in the area, consumed bushmeat, number of poaching incidences, wildlife intrusion or damages, wildlife income, WMC and expertise or environmental resource dependence. However, no evidence was found of the influence of education on willingness to change. This could be a result of the fact that most people in the study area have at most primary level of education and a significant proportion do not finish school due to employment opportunities in South Africa (Ntuli 2015). With primary level of education there is less variability compared to the situation where the sampled respondents have primary, secondary and tertiary level of education.

Specifically, the results revealed that the likelihood of changing from the status quo to the alternative policy scenario decreases with: age, whether respondent consumed bushmeat within the past 12 months and expertise. This can be explained by the fact that the old who have benefited from the wildlife resources will be less likely to accept change since they may not be sure of what may come with the change. A respondent who has the expertise to harvest environmental resources and consumed bushmeat within the past 12 months resists change because he or she is more dependent on the environment. These respondents feared the possibility that they will not benefit from harvesting environmental resources such as wildlife once the system changes because of the better institutions that comes with the new programme. Poachers and those who are generally good in extracting resources from the environment will oppose change for two main reasons. First, the new regime might make it more difficult

to harvest resources due to improved institutions. Second, these are the people who are dependent on the resource and are likely to be affected more than other if things change.

On the other hand, willingness to accept change is positively and significantly influenced by variables such as gender, employment status, training, membership to community organization, whether wildlife species are threatened in the area or not, number of poaching incidences, when respondent's family has suffered wildlife intrusion in the past 12 months, wildlife income and existence of a WMC in the village where respondent resides. We found that male respondents are more likely to move from the status quo to another policy alternative. This could be explained by the risk loving behaviour of most men with the belief that the grass is always greener on the other side. Our results seem to suggest that being employed affect respondent's preferences for a better CAMPFIRE programme that can protect wildlife, maybe through the income effect. Furthermore, respondents that are employed are more likely to accept change since they are less dependent on environmental resources and poaching. Previous studies have shown that respondents or households with high income have a higher WTP suggesting that they care more about nature (Lamsal et al. 2015; Duan et al. 2014; Maloma and Sekatane 2014).

Training enhances understanding of the importance of wildlife conservation in the community. Ntuli and Muchapondwa (2018) and Uetake (2014) found evidence of the role of training in stabilizing large scale collective action, which in turn lead to improved conservation outcomes. Both membership to community organization and existence of a WMC strengthen the respondent's willingness to accept change because sound institutions reinforce good behaviour, which also translate into better welfare and conservation outcomes. In other words, if people benefit from good institution, they demand better institutions (Ostrom 2007; Agrawal 2001). Similarly, those who suffered from wildlife intrusions in the past might demand improved institutions hoping to get compensation in future. Respondents anticipate a better future and increased benefits from wildlife conservation to be associated with a new CAMPFIRE programme if they have autonomy are able to dictate how the game is played. In the current CAMPFIRE, local communities are relegated to mere spectators, while state apparatus run the show (Murombedzi 1999). As expected, the results of the WTC model supports the results reported under standard CE model discussed earlier.

Our results call for further reforms in the wildlife sector in order to accommodate rural households in the development fraternity and a paradigm shift in the traditional way we view communities, i.e., not just as mere beneficiaries, but consider them as important stakeholder with vested interests in conservation. From a policy perspective, it is therefore imperative to consider both demand and supply side of an intervention.

5 Conclusion

The results of both the choice experiment and CVM support each other. Our results speak to increased devolution of natural resource management and transfer of appropriation rights from the RDC into the hands of CAMPFIRE communities. In our analysis, respondents showed great willingness to move from the status quo to a new CAMPFIRE that give them full control over wildlife activities. In the first model, we examined the attributes that respondents care about in a CAMPFIRE project, while in the second model examined the characteristics of respondents that are more likely to change from the old regime that is seemingly suboptimal to a new regime that is optimal. Holding everything else equal, campfire communities would be prefer policy options that would guarantee them appropriation rights provided by communities and safari operators as opposed to RDC/Park agency. They would also prefer monitoring and enforcement mechanism enforced by armed guards and resource monitors as opposed to RDCs. In terms of collective choice rules we found that communities would prefer unanimous and majority decision as opposed to choice rules imposed by elders or external bodies. However, when it comes to governance issues, the CL results revealed that communities would prefer policy options that would ensure governance is left to WMC and traditional institutions as opposed to RDCs and park authorities.

The WTP for the new CAMPFIRE is more than two times the WTP for the old regime. The logit model results for willingness to change reveal that the movement from the status quo to an alternative policy scenario is positively influenced by gender, training related to wildlife management, employment status, membership to community organization, whether there are threatened species in the area, number of poaching incidences, wildlife intrusion or damages, wildlife income and existence of the WMC in the village where respondent come from. Willingness to change is negatively and significantly influenced by the age of the respondent, whether respondent consumed bushmeat within the past 12 months and his or her expertise. Poachers and those who are generally good in extracting resources from the environment will oppose change.

Furthermore, our results suggest that government programmes and development projects should not be imposed on local communities, but informed by programme beneficiaries through research in order to capture their needs and wants. No matter how brilliant the ideas might be, most development projects fail because they are not demand driven. Policymakers, development practitioners and scholars come up with interventions that they believe the community will accept simply because they are poor, yet these intervention fail to achieve the desired goals because of lack of ownership, credibility, trust and participation. Communities do not identify with the project because they were not part of it from the beginning, i.e., they were not consulted by the authorities.

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Table 1: Important attributes of a wildlife management scheme

Attributes	Levels		
Appropriation rights (X1)	Community [1]	Safari operator [2]	RDC/ Park Agency [3]
Monitoring & Enforcement (X2)	Resource monitors [1]	Armed Guards [2]	RDC [3]
Collective choice rules (X3)	Unanimous [1]	Majority [2]	Elders/ External body [3]
Governance (X4)	WMC [1]	Traditional institutions [2]	RDC [3]
Costs	0,	6, 12, 18,	24

Source: key informant interviews 2017

Table 2: Wildlife Governance Principles

P1.	Wildlife governance will be adaptable and responsive to citizens' current needs and interests, while also being forward-looking to conserve options of future generations.
P2.	Wildlife governance will seek and incorporate multiple and diverse perspectives.
P3.	Wildlife governance will apply social and ecological science, citizens' knowledge, and trust administrators' judgment.
P4.	Wildlife governance will produce multiple, sustainable benefits for all beneficiaries.
P5.	Wildlife governance will ensure that trust administrators are responsible for maintaining trust resources and allocating benefits from the trust.
P6.	Wildlife governance will be publicly accessible and transparent.
P7.	Wildlife governance will ensure that trust administrators are publicly accountable.
P8.	Wildlife governance will include means for citizens to become informed and engaged in decision making.
P9.	Wildlife governance will include opportunities for trust administrators to meet their obligations in partnerships with non-governmental entities.
P10.	Wildlife governance will facilitate collaboration and coordination across ecological, jurisdictional and ownership boundaries.

Source: Decker et al. (2016)

Table 2: Characterization of the respondents

Variable	N	Mean	Std. Dev.
Age of the respondent	4308	38.01	14.03
Gender of the respondent [0=female, 1=male]	4308	0.324	0.468
Education (no. of years in school)	4308	6.451	4.089
Employment status [0=unemployed, 1=employment]	4308	0.075	0.624
Do you support this new CAMPFIRE program? [0, 1]	4308	0.953	0.300
Would you be will to pay something? [0, 1]	4308	0.883	0.385
Choice of CAMPFIRE [0=status quo, 1=new option]	4308	0.783	0.745
WTP1 for the status quo	4308	8.546	11.56
WTP2 for the new option	4308	18.42	21.29
Difference (WTP2 – WTP1)***	4308	9.880	25.95
Membership to community organization	4308	0.320	0.501
Received training related to wildlife management [0, 1]	4308	0.153	0.360
No. of poaching incidences in the past 12 months	4308	1.317	3.598
How many time did you eat bush-meat in the past 12 months?	4308	2.346	4.759
Do you think there are threatened species in this area? [0, 1]	4308	0.354	0.638
Existence of Wildlife Management Committee (WMC) [0, 1]	4308	0.889	0.505
Expertise (index between 0 and 1)	4308	0.376	0.277

*** Statistically significant at 1% level of significance.

Source: survey data, Jun - Aug 2017

Table 2: Choice Frequency by CAMPFIRE households

Choice	**Frequency**	**Percent**
Option A	486	34.91
Option B	560	40.23
Option C Status Quo	346	24.86
Total	**1392**	**100.00**

Source: survey data, Jun - Aug 2017

Table 3: Violation of the IIA assumption

Alternative dropped	**Chi Square**	**P-value**	**Comment**
A	35.63	0.0001	No violation
B	21.64	0.0171	No violation
C (Status quo)	25.07	0.0029	No violation

Source: survey data, Jun - Aug 2017

Table 4: Multinomial Logit and Conditional Logit Results

VARIABLES	(1) MNL	(2) CLOGIT
ASC	2.728***	2.514***
	(0.466)	(0.459)
App_com	3.307***	3.085***
	(0.299)	(0.294)
App_saf	1.445***	1.327***
	(0.176)	(0.176)
Mon_Rm	1.558***	1.432***
	(0.283)	(0.278)
Mon_AG	0.798***	0.730***
	(0.165)	(0.171)
Col_Un	1.165***	1.065***
	(0.279)	(0.274)
Col_Mj	0.547***	0.456**
	(0.175)	(0.177)
Gov_WM	1.428***	1.337***
	(0.268)	(0.263)
Gov_Tr	0.684***	0.643***
	(0.171)	(0.168)
ce_cost	-0.0358***	-0.0324***
	(0.00940)	(0.00925)
	(0.462)	
Constant	-3.876***	
Log likelihood function		-1902.201
ρ^2		0.107
Observations	4308	4308

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1Source: survey data, Jun - Aug 2017
Source: survey data, Jun - Aug 2017

Table 5: Random Parameter Logit Model Results

Variable	Coefficient	Std error	Coefficient (standard deviation)	Std error
Random parameters in utility function				
App_Com	24.655***	9.794	33.163**	14.677
App_Saf	14.171**	5.960	28.806**	13.821
Mon_RM	13.120**	5.789	7.712	5.081
Mon_AG	7.121**	3.287	3.778	3.693
Col_UN	6.876	4.354	25.161**	11.875
Col_MJ	1.265	2.738	17.738**	8.295
Gov_WM	9.837**	4.464	8.907*	5.361
Gov_TR	0.468	2.012	0.328	4.889
Non Random Parameters utility function				
ASC	18.628	8.520**		
CE_Cost	-0.492	0.203***		
Log likelihood function	-322.518			
ρ^2	0.159			

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: survey data, Jun - Aug 2017

Table 5: Dependent variable: Willingness of Change

	Coefficients	Std. Errors
Age	-0.0120***	-4.22
Gender	0.411***	5.42
Education	-0.0116	-1.18
Training	0.585***	5.72
Employment	0.170***	4.01
Membership	0.261***	3.63
Threatened species	0.352***	6.38
Bushmeat	-0.0207***	-2.84
Poaching incidences	0.114***	8.69
Wildlife intrusion	0.301***	4.45
Wildlife income	0.203**	3.14
WMC	0.199***	2.88
Expertise	-0.0213***	-13.91
Constant	0.0175	0.10
Observations		4248
LR chi2 (15)		534.34
Prob > chi2		0.0000
Pseudo R^2		0.1967

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Fieldwork Data

Table 6: Mean WTP Estimates from the conditional logit model

Attributes	**WTP**	**Confidence interval**
App_com	95.09	55.02-135.17
App_saf	40.91	23.13-58.69
Mon_Rm	44.14	29.65-58.64
Mon_AG	22.50	12.79-32.22
Col_Un	32.81	21.99-43.64
Col_Mj	14.04	5.69-22.39
Gov_WM	41.20	27.47-54.93
Gov_Tr	19.82	10.52-29.12

Source: survey data, Jun - Aug 2017

Figure 1: Example of choice experiment scenario
BLOCK 1

CHOICE SET 4	OPTION 1	OPTION 2	STATUS QUO
Appropriation rights	RDC/ Park Agency 	Community 	RDC 
Monitoring and Enforcement	Community 	RDC/ Park Agency 	RDC/ Park agency 
Collective choice rules	Unanimous 	Elders/ External body 	Elders/External body 
Governance	RDC/ Park Agency 	Community/ WMC 	RDC/ Park agency 
Cost	$6	$18	0
Choice			

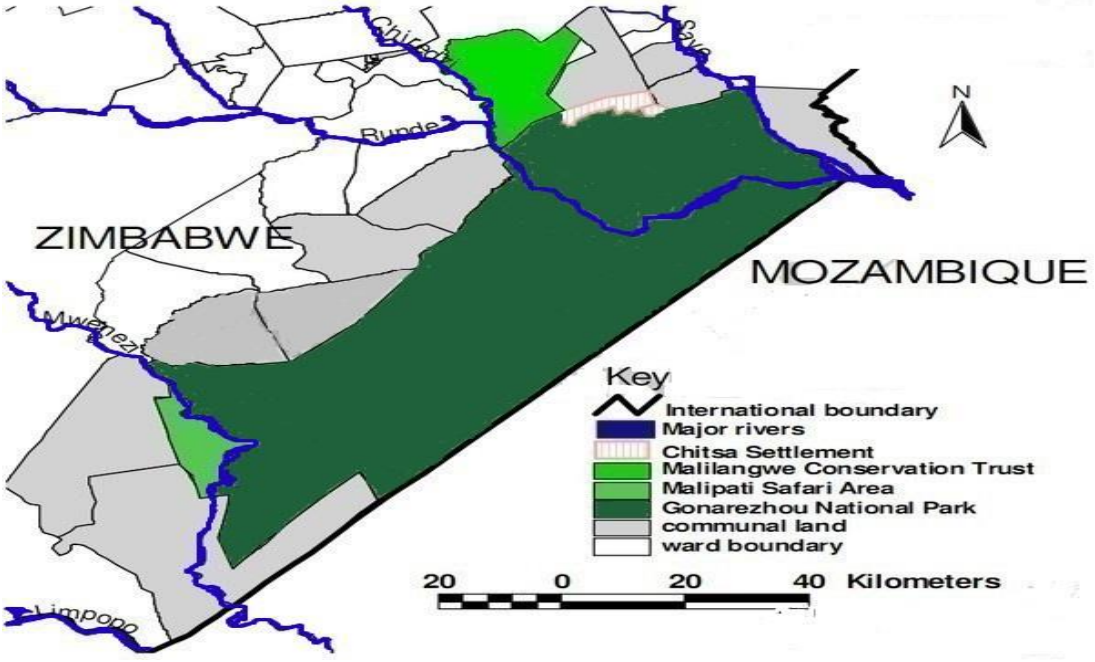
Source: own diagram

Figure 2: Choice experiment scenario

Attributes	STATUS QUO	OPTION
Appropriation rights (right to income)	 46% 51%	 100%
Monitoring and enforcement		
Collective choice rules		
Governance [administrative duties wildlife management]		
Choice		
Willingness to Pay		

Source: own diagram

Figure 3: Map of Gonarezhou National Park in Zimbabwe



Source: Ntuli and Muchapondwa 2017