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# Impacts of Public-Private Partnership on Local Livelihoods and Natural Resource Dynamics: Perceptions from Eastern Zambia

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Received: 22 February 2014; in revised form: 16 May 2014 / Accepted: 3 June 2014 /

Published: 13 June 2014

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**Abstract:** This study evaluated the long-term implications of a Public-Private Partnership (PPP) on livelihoods and natural resource (NR) dynamics under a market-oriented approach to conservation. Drawing examples from the Luangwa Valley in eastern Zambia, the study sought to answer questions on two closely interrelated aspects. These included the contribution of PPP to sustainable livelihoods in and around Protected Areas (PAs) and its impacts on natural resources in Game Management Areas (GMAs). Quantitative data were collected from PPP participating and non-PPP households using standardized structured interviews, while qualitative data were obtained from three chiefdoms using semi-structured interviews and focus group discussions. Taking the case of Community Markets for Conservation (COMACO) in eastern Zambia, results of this study showed that PPP contributed to sustainable livelihoods and overall natural resources management through varied ways. These include promotion of conservation farming, agroforestry, poacher transformation (individuals who have given up poaching due to PPP interventions) and provision of markets for the produce of participating households. Further, impacts of PPP on soil fertility, crop, and honey yields were statistically significant ( $p < 0.05$ ). A combination of increased crop productivity and household incomes has seen a 40-fold increase in poacher transformation. The results of this study suggest that PPPs, if well-structured, have the potential to address both livelihoods and enterprise needs with an ultimate benefit of promoting both sustainable livelihoods and natural resources management around PAs in tropical Africa.

**Keywords:** Community Based Natural Resources Management (CBNRM); partnership; crop farming; participation; local community; conservation

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## 1. Introduction: Public-Private Partnerships

In the last three decades, Community-based Natural Resources Management (CBNRM) has been adopted as a panacea for achieving sustainable Natural Resources Management (NRM) and wider rural economic development in East and Southern Africa [1]. However, CBNRM programs have been marred with failure in many countries as they have not achieved the intended goal of enhancing local community livelihoods [2]. Communal Areas Management Program for Indigenous Resources (CAMPFIRE) is one such model that has been criticized as meeting only conservation objectives at the expense of rural social and economic development [3]. Additionally, cases of state agencies and managers allocating limited funds to CBNRM land-based economy programs in preference to tourism infrastructure have been highlighted in some countries [3,4]. The realization that CBNRM had failed to deliver on its promise of balancing NRM with poverty alleviation has led many countries to turn towards the concepts of Public-Private Partnerships (PPPs) in natural resources conservation.

PPPs represent a significant departure from the traditional CBNRM, as they place emphasis on forming partnerships with local communities in which business-oriented approaches assume significance in the management of natural resources (NR) [5,6]. Thus, as opposed to CBNRM, PPPs enable the involvement of private companies in the conservation agenda even when cooperation is still maintained with governments and international organizations [6]. Therefore, the business organizations build on the traditional CBNRM methods in implementing their projects. The approach under PPP is that of market/growth orientation, in which activities are no longer exclusively community-based but rather aim to spur large-scale socio-economic development and creation of livelihood benefits that are an incentive for conservation [3,7].

The history of PPPs spans centuries, and they have been in existence since the days of the Roman Empire [8]. The idea of PPPs started becoming common in most parts of the world around 30 years ago [8]. Although there is no universal definition of PPPs, they have become ubiquitous to the point whereby the United Nations (UN) agencies highly regard them as a means to achieve more efficiency and effectiveness [9]. Borrini-Feyerabend and Sanwith [10] use partnership as a concept to imply a voluntary process by which partners impartially share among themselves the functions, rights, and responsibilities for conservation of the protected area and related resources. For the purpose of this study, a PPP is defined as “...the joint definition of specific goals, and a clear assignment of responsibilities and areas of competence between the partners in the pursuit of a general endeavour” [11] (p. 416). In this partnership arrangement, the public constitutes local communities and agencies tied to the state, whereas private actors are independent of the state operating under a free market economic system. The private actors may come from any background, including Community Based Organizations (CBOs), Non-Governmental Organizations (NGOs) or business companies. Thus, PPP is a mechanism aimed at helping the private actors enable maximization of profits in the use of natural resources while providing temporal and locally based benefits for the public actors.

Thus, given constantly changing, social, economic, and political environments in the face of globalization and fiscal constraints, PPPs have become attractive to many countries. Additionally, PPPs are linked to neoliberalism that purports government inefficiencies and hence justifies the involvement of the private sector to complement public efforts under free market economies [12]. Against this background, PPPs in conservation, involving businesses and communities, are becoming common in sub-Saharan Africa. In particular, PPPs in conservation have been implemented in countries where the emphasis is to develop wildlife-based tourism. Most importantly, these models aim at making local communities living around nature reserves key stakeholders who are expected to participate and receive benefits from managing resources.

According to Igoe and Brockington [13], conservation-business partnerships are growing in number all in the context of hybrid governance. The increased corporate funding of conservation organizations is a clear reflection of their growth. They, however, view this approach as “neoliberal conservation” in which presumed benefits for both conservation and livelihoods around protected areas hardly materialize [13] (p. 440). However, many authors have demonstrated worsening poverty levels under some PPPs owing to alienation of local people from natural resources on which their livelihoods were anchored [13,14]. The conclusions of these studies are that the problem is largely because the creation of PPPs in most sub-Saharan countries was not community-driven but rather a process spearheaded by transnational conservation organizations. Moreover, there are strong assertions that partnerships involving conservation NGOs, private enterprise, and public actors have only worked to exclude people from their lands in much of sub-Saharan Africa [13,14]. Nevertheless, the conclusions drawn by Igoe and Croucher [14] are only valid in the context of PPPs that are set up around Protected Areas (PAs) in which communities have been officially granted rights to management and utilization of natural resources. These conclusions may not hold for countries such as Zambia, where CBNRM and PPPs operate in GMAs where local communities have access to land and related resources under the customary land tenure system. Put together, the authors above suggest that there were gaps in understanding of markets and private sector strategies as either working for CBNRM or not.

Therefore, Community Markets for Conservation (COMACO) [15], a limited private company by guarantee that operates in eastern Zambia, presented a good case study of answering the question of whether PPP contributes both to NRM and poverty alleviation. COMACO was selected on the basis of it being a PPP that operates in GMAs by engaging in business partnerships with local communities that comply with sustainable NRM. The COMACO model developed by the Wildlife Conservation Society (WCS) in partnership with the Zambia Wildlife Authority (ZAWA), District Councils and Community Resources Boards (CRBs) has been in existence since the year 2001. This model aims at helping households living around wildlife and forest protected areas to achieve food security and increase household incomes so as to reduce human practices that are harmful to the natural environment. COMACO was formed using lessons learnt from previous CBNRM models [16].

The COMACO model combines agricultural markets and natural resource conservation. Primarily COMACO can be viewed as an agricultural food processing business that markets organic, high value-added products derived from commodities grown by participating local communities. The business model of COMACO centers on the general understanding that urban-based consumers provide the much-needed economic engine that drives better rural incomes and increased food security. The expected positive benefit of such a strong market-centered relationship is a favorable

impact on biodiversity conservation and rural livelihoods. The outstanding characteristic of the COMACO design is its financial compensation scheme that rewards producers for adopting land use practices that reduce negative impacts on biodiversity.

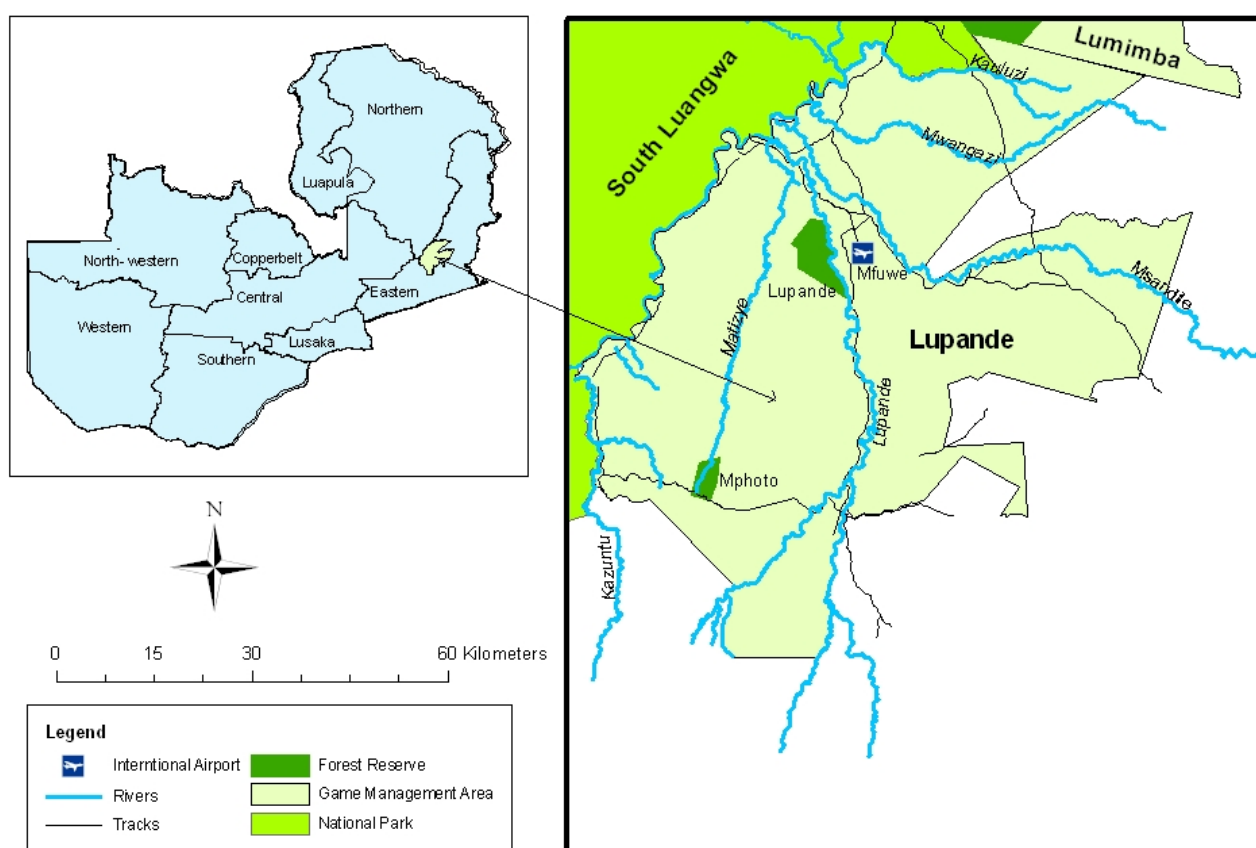
Therefore, the main objectives of this study were to evaluate the impacts of the PPP model on the livelihoods of participating rural communities; and to examine the contribution of PPP to sustainable NRM in and around PAs.

## 2. Methods

### 2.1. Study Area

The study was conducted in Lupande GMA (4840 km<sup>2</sup>) in the Luangwa Valley of eastern Zambia (Figure 1). Lupande GMA is located between longitudes 30°30'0" E and 32°30'0" E and has a latitudinal range of 13°0'0" S to 13°45'0" S [2].

**Figure 1.** Location of Lupande Game Management Area (GMA) in eastern Zambia. Adapted from [17].



Lupande GMA comprises six chiefdoms namely: Jumbe; Kakumbi; Malama; Mnkhanya; Msoro; and Nsefu, with an estimated population of 45,000 inhabitants [2]. According to the Central Statistical Office (CSO) preliminary report for the 2010 Census of Population and Housing, the total number of households in the six chiefdoms is 7662 [18]. Lupande GMA has six local chiefs who constitute the highest level of traditional authority at chiefdom level. Villages are led by respective headmen and local chiefs.

## 2.2. Sampling Design

Two types of non-random probability sampling were used in this research. This included the use of purposeful and non-random exponential discriminate snowball sampling designs. Purposeful sampling was used based on existing organizational leaders and PPP participating households. This is because, as Gray [19] notes, purposeful samples are the best to use when identified sub-groups are most likely going to significantly differ in their answers to questions. Also, purposeful sampling was used in order to include specific groups since some of them were a smaller proportion of the target population that would otherwise have been missed if simple random sampling were used. Thus, the target population was divided into three categories of actors as follows:

- I. COMACO (Regional Extension Officer, Data Analyst, Extension officers) and ZAWA officers.
- II. Community Institutions (Traditional Leaders, *i.e.*, Local Chiefs and Community Resources Boards).
- III. COMACO (PPP) Registered Household Producers (farmers, beekeepers, gardeners, poultry producers) and non-COMACO participants.

## 2.3. Sample Size

The sample size for this study comprised 120 respondents derived from three groups of actors of the target population (Table 1).

**Table 1.** Number of Research Respondents.

Actors	Affiliation	Number of respondents
I	COMACO	7
II	Community Institutions	13
III	Households	100
Total	—	120

Within the third group of actors, non-random exponential discriminate snowball sampling was used to identify non-PPP households that formed the basis for determining the significance of PPP impacts on natural resources. The exponential discriminate snowball sampling technique relied on the referrals provided by PPP participants to select non-PPP members. However, the process was discriminate in order to achieve a balance in the number of households to interview between the two groups. Thus, though one PPP participant would refer to multiple non-PPP participants, the researcher would select only one to interview after which another PPP member would be chosen purposively. This process was repeated for all the three chiefdoms and consequently an equal number (50) of households from each group (*i.e.*, PPP and non-PPP) was selected. The technique was also employed because PPP had a high participation rate [16] in the valley, which made it easier for PPP respondents to assist the researchers with identifying and interviewing non-participating households.

The sample size of the first and second categories of actors was largely determined by the concept of saturation in qualitative research [20]. This concept relates to a point of diminishing return, implying that as data collection progresses, more data does not necessarily generate new information, but leads to attainment of “meaning” regarding the phenomenon under investigation. In the third stratum, the sample size was determined by the questions and objectives of this study. Also, the size

was meant to achieve statistical generalizability or representativeness since it was well over the widely recommended size of 30 cases for a study with mixed methods sampling designs [20,21]. Moreover, the sample size was also to a lesser extent influenced by resource constraints (time and money).

## 2.4. Data Collection Protocols

### 2.4.1. Qualitative Data

Qualitative data were collected using semi-structured interviews and focus group discussions. Semi-structured interviews were used to collect data from private actors in COMACO *i.e.*, the data analyst and extension officers as well as from public actors who included traditional leaders and ZAWA officers. Semi-structured interviews were used in accordance with the suggestion by Gray [19], whereby the protocol permits probing of perceptions or views in instances where respondents have to expand on their responses. In this way, it was possible for extension officers, ZAWA officials, and the local chiefs to not only provide subjective meanings that they ascribed to the impacts of PPP, but also give new insights that helped to answer the research questions (Table 2).

Focus group discussions were conducted with all three Community Resources Boards (CRBs) involved in the study. This is in line with the recommendation of Longhurst [22], whose method allows respondents in a group to explore a topic from as many angles as possible while the researcher moderates the discussion to avoid delving into issues that are not of interest to his/her research. Moreover, Onwuegbuzie and Collins [20] suggest that a study must have a minimum of three focus group discussions to generate sufficient data, and this was applied in this research. For all the discussions, thematic issues regarding impacts of PPP in comparison to CBNRM were discussed with CRBs as summarized in Table 2. Other qualitative data were collected through COMACO reports, published, and unpublished reports.

**Table 2.** Summary of the Themes and Methods used in Evaluating Public-Private Partnership (PPP) and Community-based Natural Resources Management (CBNRM).

Research participants	Themes of interview and questions	Methods
PPP and Non-PPP households (public actors)	<ul style="list-style-type: none"> <li>Perceived impacts of PPP/CBNRM on livelihoods and natural resources</li> <li>Crop productivity and incomes</li> <li>Poacher transformations</li> </ul>	<ul style="list-style-type: none"> <li>Structured interviews</li> <li>Community Markets for Conservation (COMACO) reports</li> </ul>
Traditional leaders, Zambia Wildlife Authority (ZAWA) officers & Community Resources Boards (CRBs) (public actors)	<ul style="list-style-type: none"> <li>Perceived, observed and compared impacts of PPP and CBNRM on livelihoods and natural resources</li> </ul>	<ul style="list-style-type: none"> <li>Semi-structured interviews</li> <li>Focus group discussions</li> </ul>
Data analyst, regional & chiefdom extension officers (private actors)	<ul style="list-style-type: none"> <li>Experienced and perceived impacts of PPP on farming and natural resources</li> </ul>	<ul style="list-style-type: none"> <li>Semi-structured interviews</li> </ul>

#### 2.4.2. Quantitative Data

Structured interviews were also employed in collecting quantitative data from households. Each respective group of households was asked standardized questions (Table 2), and the responses were recorded on the same question schedule for each respondent. As recommended by Gray [19], the researcher's tone of voice was the same for each question to avoid influencing responses.

Methodological triangulation in data collection allowed the researchers to maximize understanding of impacts of PPP from different sources (*i.e.*, respondents) and to cancel out potential weaknesses of each particular protocol with the strengths of another. Additionally, some research questions and objectives of this study implied the use of mixed methods. This is because despite being inductive or deductive, case study or experimental, it is common in practice to use multiple methods in research [21,23].

Given that the PPP in the Luangwa Valley has been operational for over 10 years, measures of its impacts on soils, forests, and animal species should ideally have relied upon the use of ecological sampling at different time intervals. However, this could not be applied due to the short time frame for data collection and lack of adequate resources required to undertake such tests. Rather, measures of these natural resources as well as those of crop yields, honey, and livestock production were based on the individual households' perceptions and experiences. Therefore, PPP participating and non-PPP households provided responses that addressed the research question relating to impacts on livelihoods and natural resources. Non-PPP households served as a control group to determine significant differences in their responses compared to those provided by households falling under PPP.

However, basing the study on perceptions may potentially introduce an error that could set some limitations on the results. This could arise when PPP households' judgments fail to take account of positive accumulative impacts that other previous conservation organizations may have created on their livelihoods and natural resources prior to inception of COMACO. To eliminate this possible error, the researchers focused on intervention measures set up by COMACO and on guiding the household interviewees to focus on what they observed in relation to their activities under PPP over the period of its existence.

#### 2.5. Data Analyses

Qualitative data analysis employed the use of Nvivo 10 (Nvivo version 10, QSR International Pty Ltd., Victoria, Australia). The Statistical Package for the Social Sciences (SPSS) (Version 16, IBM, New York, USA) was also used for quantitative data analysis.

Interpretative Phenomenological Analysis (IPA) (Birkbeck, University of London, London, UK) [24] was adopted as a framework for analyzing qualitative data. IPA allows a detailed exploration of the way in which respondents make meaning of their real-life experiences or phenomena [25]. Further, IPA enabled the researchers to provide additional interpretation of the various perspectives and views of the participants regarding impacts of conservation PPP on local livelihoods and natural resources. The framework was also the surest way to help answer the study's research questions in the context of a case study approach.

Independent-Samples *t*-tests [26] were used to show levels of significance in responses, which occurred between PPP registered and non-PPP households. This was applied to common variables for

both categories of households. Using SPSS 16, Independent-Samples *t*-tests allowed comparisons of the mean scores for PPP and non-PPP households. Also, *t*-tests enabled enhanced understanding of which communities between PPP and non-PPP had experienced and witnessed positive or negative long-term changes of natural resource stocks.

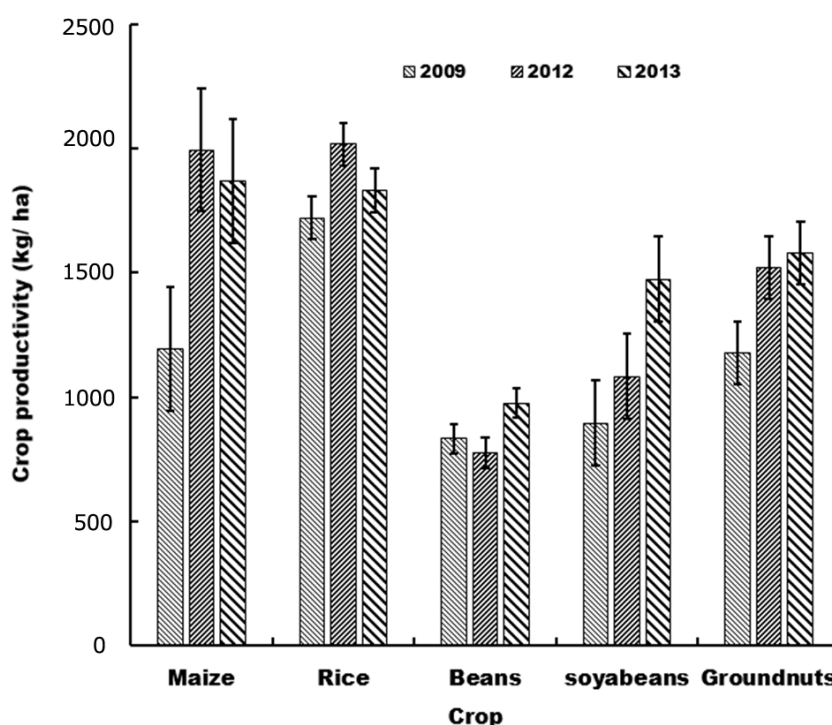
### 3. Results

#### 3.1. Impact of PPP on Livelihoods of Participating Communities

##### 3.1.1. Crop Yields

Cash crops grown by PPP farmers included maize, rice, organic cotton, sunflower, and groundnuts. Crop yield per land equivalent ratio in the last five years has significantly increased under PPP (Figure 2).

**Figure 2.** Average crop yield per hectare for PPP participating households. Adapted from [27].



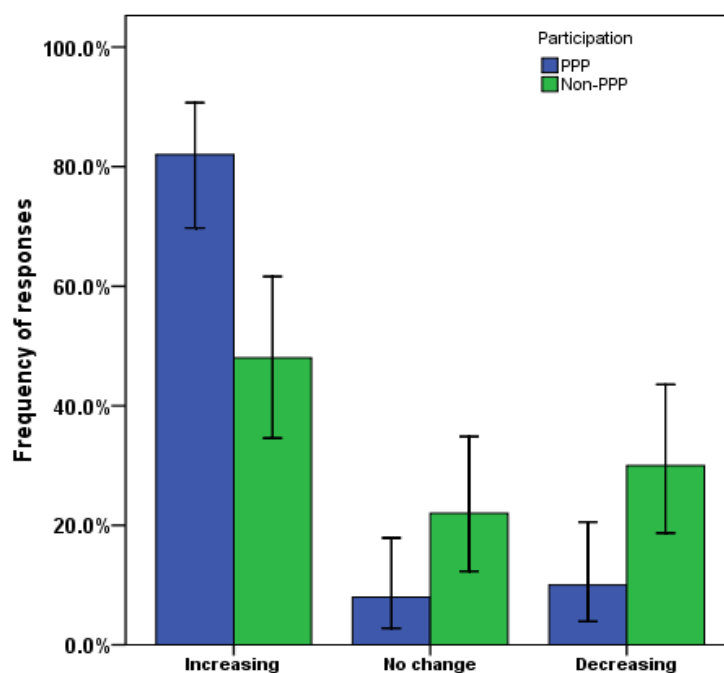
The five key crops showed a trend of increasing yield per land equivalent ratio (Figure 2). Of the five crops, Maize, Groundnuts, and Soya beans experienced substantial increases in crop yield per hectare. Crop yield per hectare for Rice and Beans did not change significantly over the same period.

Over the last ten years, PPP participating farmers perceived that there had been a significant (Independent-samples *t*-test,  $p < 0.05$ ) change in crop yields in Lupande GMA. On the contrary, non-PPP farmers had experienced a significant reduction in crop yield (Figure 3).

Eighty-three percent (83%) of the respondents under PPP perceived their crop yield to have increased. Less than 20% of PPP participating communities had observed no change or decreasing crop yields (Figure 3). However, only 48% of the non-PPP respondents observed an increase in crop yields. Twenty percent (20%) of the non-PPP households observed no increase, with over 30% experiencing a decrease in crop yields.



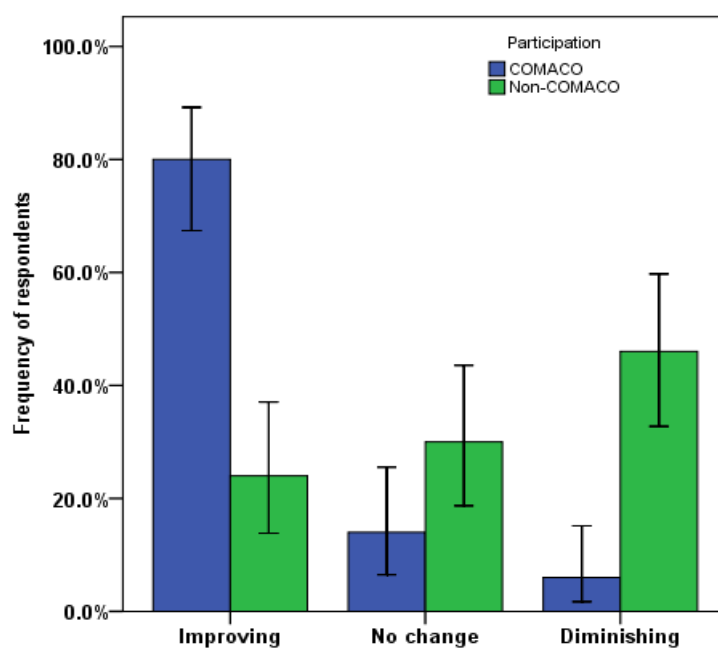
**Figure 3.** Local communities' perceptions of long-term changes in crop yields in Lupande GMA. Error bars: 95% Confidence Interval.



### 3.1.2. Local Communities' Perceptions on Long-Term Changes in Soil Fertility

While communities participating in PPP perceived to have experienced significant (Independent-samples *t*-test,  $p < 0.05$ ) positive long-term changes in soil fertility, the non-PPP farmers perceived to have experienced long-term reductions in soil fertility status (Figure 4).

**Figure 4.** Local communities' perceptions of long-term changes in soil fertility under PPP and non-PPP scenarios.

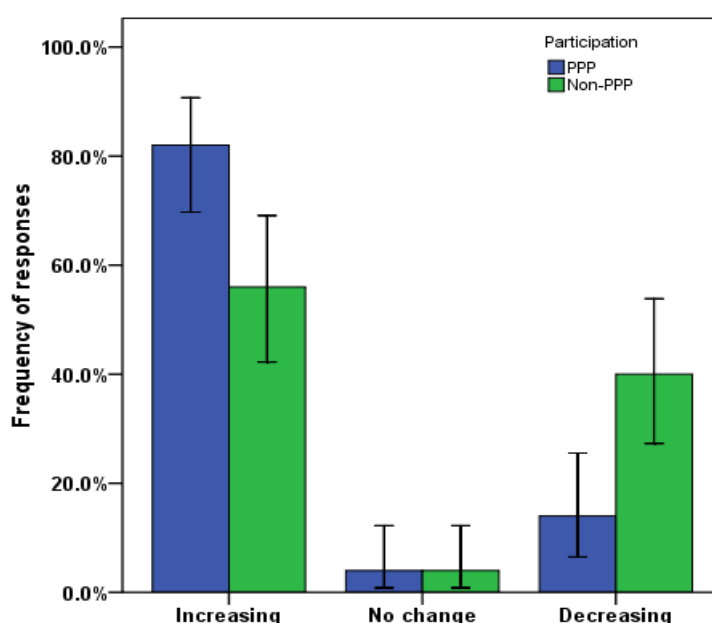


More than three quarters of the respondents under PPP had observed an increase in soil fertility status since the inception of the COMACO PPP (Figure 4). On the contrary, only 22% of non-PPP farmers perceived their soil fertility status to have changed over the same period. Over 40% of the non-PPP farmers observed a significant decline in soil fertility status.

### 3.1.3. Honey Yields

Under PPP, participating communities have observed significant (Independent-samples *t*-test,  $p < 0.05$ ) increases in honey yields over the past ten years (Figure 5). By contrast, communities who are not under PPP have witnessed a significant decline in honey production over the same period.

**Figure 5.** Changes of honey yields in Lupande GMA.



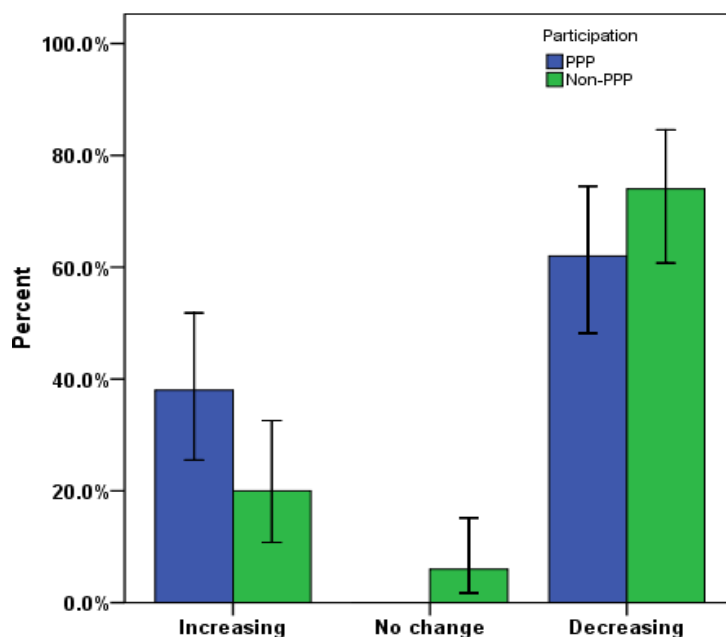
About 80% of PPP participating respondents had observed an increase in honey production. Only 3% of the respondents had not observed any increases in their honey production since the inception of the PPP. By contrast, only 57% of the non-PPP households had observed increases in honey production. Furthermore, about 40% of the non-PPP households observed a decrease in honey production.

## 3.2. Impacts of PPP on Natural Resources and Incomes

### 3.2.1. Changes of Forest Stocks

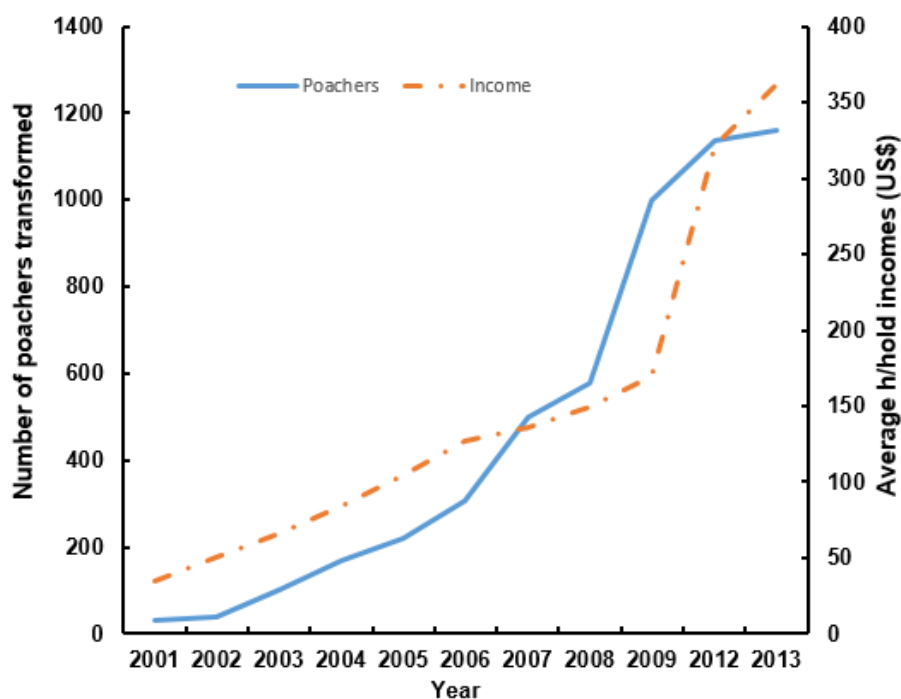
There were no significant (Independent-samples *t*-test,  $p > 0.05$ ) differences in local communities' perceptions in the long-term changes of forest stocks. Generally, over 60% of the respondents under both PPP and non-PPP observed a decline in forest stocks (Figure 6).

While only 40% of the PPP households observed an increase in forest stocking, only 20% of the non-PPP observed an increase in their forest stocks (Figure 6). Generally, both communities claimed to have experienced a decline of forest stocks as a result of charcoal production and unsustainable wood fuel extraction to meet household energy needs.

**Figure 6.** Household perception of long-term changes in forest stocks in Lupande GMA.

### 3.2.2. Changes in Wildlife Poaching and Household Incomes

Since launching the poacher-transformation program in Lupande GMA, a total of 204,650 snares and 115 muzzle loader guns have been surrendered to COMACO voluntarily. The number of poachers transformed has increased by almost 40-fold in the last decade (Figure 7). From inception to the year 2013, the number of poachers transformed ranged from 30 in the year 2001 to 1159 in the year 2013.

**Figure 7.** Trends in poacher transformation and average household incomes since inception of COMACO PPP in Lupande GMA. Adapted from [27].

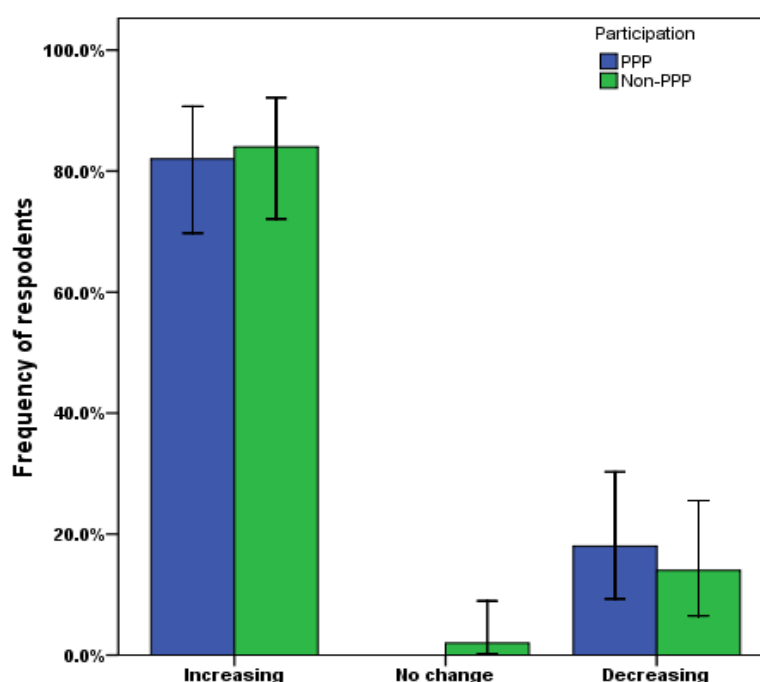
Household income levels under PPP participating communities have significantly ( $p < 0.05$ ) increased since the inception of COMACO in 2001 (Figure 7). Household incomes have increased by more than 10-fold in the last 12 years from an average of US\$ 35 in the year 2001 to US\$ 362 per annum per household in the year 2013 (Figure 7). On average, PPP participating households moved from less than a dollar per day in the year 2011 to nearly one dollar per day by 2013.

### 3.2.3. Wildlife Population Dynamics

Less than 20% of both PPP and non-PPP respondents indicated that there had been a decrease in wildlife populations since the inception of COMACO, while over 80% of both communities perceived an increase (Figure 8).

Overall, local communities' perceptions on wildlife populations in Lupande GMA were that there was no significant (Independent-samples  $t$ -test,  $p > 0.05$ ) difference in long-term changes of wildlife over the whole landscape (Figure 8).

**Figure 8.** Perceptions of wildlife dynamics in Lupande GMA.



## 4. Discussion

It has been proposed that NR conservation-based PPP models can promote indirect involvement of resource-poor communities in the sustainable management of natural resources in PAs through implementing substitute livelihood activities [28–30]. In eastern Zambia, PPP has had a positive impact on the livelihoods of participating resource-poor rural communities. Since its inception, participating resource-poor rural communities under PPP have seen their domestic incomes rise more than ten-fold in the last decade. This finding suggests that rural poverty among the participating communities is reducing. The most plausible explanations for this increase in domestic household incomes among the participating communities are a combination of improvements in crop productivity, agricultural crop diversification, and provision of an efficient crop marketing system

under PPP. Since the birth of PPP, the average crop yield per land equivalent ratio has increased. This increase in crop yield per land equivalent ratio is not surprising given the numerous soil nutrient improvement initiatives that have been promoted under the COMACO PPP model. In general, PPP has promoted and encouraged its farmers to practice conservation farming (CF) as well as agroforestry (AF) as the main wheels for soil fertility management. The roles of CF and AF in soil fertility improvement have been demonstrated by many authors [31–33].

Availability of a ready crop market plays a pivotal role in providing incentives and disincentives for farmers to invest their time in producing agricultural crops [34]. As expected, the provision of a ready conservation-based agricultural crop market under the Lupande GMA PPP has given impetus to farmers to adopt farming technologies that are compatible with sustainable natural resource management. The most interesting aspect of the PPP model being piloted in eastern Zambia is the provision of a ready market for the produce of farmers, beekeepers and gardeners. By providing markets for the crops and other produce produced by participating communities, incomes are channeled directly to individual households, and this creates an incentive to conserve biodiversity [35–38].

Therefore, unlike the traditional CBNRM that has been criticized for not being inclusive, especially in remote areas due to high transaction costs [7,39], PPP model in eastern Zambia addresses these challenges by taking markets closer to where producers live. This is irrespective of the great physical distances from major urban markets. In the process, Conservation Trading Centers (CTCs) have been established around the Luangwa Valley to facilitate easy transportation of produce to processing plants and local green markets. This also clearly shows how the PPP model eases government's financial burdens not only through the provision of food storage facilities and processing plants, but also through the supply of inputs (e.g., production equipment and crop seeds) to rural communities.

Although in other countries, sustainable NRM has been achieved through community based tourism related projects (e.g., safari hunting and eco-tourism) in the buffer zones of PAs, PPP model in eastern Zambia offers unique opportunities for local communities in PAs to get “self-employed”. This has been attained through diversified small-scale livelihood activities as opposed to major tourism projects that sideline local people [14].

Many authors have linked natural resource degradation with poverty [28–30]. It has been proposed that the major challenge in improving biodiversity management lies in overcoming the structural factors that drive the high poverty levels in the tropics [30]. There is sufficient evidence demonstrating that geographical areas that experience rapid biodiversity loss appear to be closely correlated with persistent extreme poverty in the tropics [40]. Findings of this study show that there is a positive relationship between poacher transformation and changes in domestic incomes. In the last ten years, the number of people who have been transformed from poaching into COMACO initiative has grown by more than 40-fold. The increase in the number of poachers transformed can be attributed to improvements in the quality of livelihoods as a result of increases in disposable income among the participating communities. These findings are consistent with others who too have observed a direct link between quality of rural livelihoods and environmental management [41,42]. Lewis *et al.* [16] demonstrated an increase in wildlife populations in Lupande GMA since the inception of the COMACO PPP.

In Africa, most rural communities living around PAs largely depend on natural resources for their livelihoods [43]. These resources provide a wide range of foods and goods such as timber, medicines,

fodder, and woodfuel among others. In eastern Zambia, most rural communities relied on natural resources for their survival even when it meant obtaining them illegally (e.g., through poaching and charcoal production). Unlike under the conventional CBNRM model, PPP model in eastern Zambia targets individuals who are involved in unsustainable livelihood practices and provides skills training in activities such as beekeeping, livestock production, and gardening. This approach potentially gives PPP participants an incentive to conserve soils and wildlife since they are kept away from practicing environmentally harmful activities.

However, given the limitations of perception surveys, the results of this study may have to be interpreted with some caution. The conclusions drawn from this study may not, therefore, be over generalized to represent all PPPs in similar settings.

## 5. Conclusions

The findings of this study indicate that public-private conservation partnership can lead to outcomes that appear to enhance livelihoods and conservation of soils as perceived by local communities. By encouraging diversified streams of livelihood activities, the eastern Zambia PPP model is achieving both food security and protection of ecosystems. Although many factors will interact to determine the management of natural resources in GMAs under neo-liberal or free market mechanisms, results from this study suggest that PPP approaches and activities may play a crucial role in NR conservation. Empirical data from this study shows that sustainable NRM is best enhanced when private actors in a PPP link rural livelihood activities to urban and more profitable markets. Success in conservation can be scored when PPPs select livelihood activities that are environmentally friendly and suit local social, cultural, economic, and ecological conditions. Natural resources are likely to be well conserved when individual households and local communities (public actors) in and around PAs engage in actions that are directed at reducing rural poverty among the participating communities.

## Acknowledgments

We are thankful to the Community Markets for Conservation officials for facilitating the collection of primary data. Special gratitude is also extended to all anonymous reviewers who constructively critiqued the paper before submission for publication. Further, we acknowledge Zambia Wildlife Authority (ZAWA) officers, local chiefs as well as all respondents who participated in the study.

## Author Contributions

While Muleba Nshimbi is the lead author of this paper, Royd Vinya played significant supervisory roles ranging from the planning stages of the research project, data collection, and analysis to writing the final article.

## Conflicts of Interest

The authors declare no conflict of interest.

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