

Does trophy hunting remain a profitable business model for conserving biodiversity in Cameroon?

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SUMMARY

In Central Africa, trophy hunting constitutes an incentive-based approach for sustainable wildlife management. We collected data from the wildlife administration, safari hunting enterprises and local wildlife management committees, to provide an order of magnitude of the financial performance of this sector in Cameroon. In 2012, trophy hunting was likely to generate an annual turnover of € 7.5 million and its added value could amount to only 0.0001% of GDP although these hunting zones cover 12% of the national territory. The profit margin for professional guides had become negative, with a net annual profit around € -0.7 million. The severe crisis in the trophy hunting sector is mainly due to an increase in the management costs of the hunting zones and the diminishing price of hunting safaris. The State plays a crucial role in enhancing the financial attractiveness of trophy hunting by the restoration of security in the Northern region and by technical measures to (1) clarify the allocation process for hunting areas, (2) simplify regulations and (3) establish an incentives system for law enforcement at national and local levels.

Keywords: sport hunting, sustainable wildlife management, hunting zone, conservation

La chasse sportive reste-t-elle un modèle rentable pour conserver la biodiversité au Cameroun?

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En Afrique centrale, la chasse sportive constitue une approche incitative pour la gestion durable de la faune sauvage. Nous avons collecté des données auprès de l'administration en charge de la faune, des entreprises de safari de chasse et des comités locaux de gestion de la faune pour produire un ordre de grandeur des performances financières de ce secteur au Cameroun. En 2012, la chasse sportive a probablement généré un chiffre d'affaires annuel autour de 7.5 millions d'Euros et sa valeur ajoutée a pu contribuer à seulement 0.0001% du PIB, alors que les zones de chasse sportive couvrent 12% du territoire national. La marge de profit des guides professionnels était devenue négative, avec un profit annuel autour de -0.7 million d'Euros. La crise sévère que traverse le secteur de la chasse sportive est principalement due à une augmentation des coûts de gestion des zones de chasse et au prix décroissant de ces safaris. L'Etat joue un rôle crucial pour rehausser l'attractivité de ce secteur en rétablissant la sécurité dans la région Nord et par des mesures techniques visant à (1) clarifier le processus d'allocation des zones de chasse, (2) simplifier la réglementation et (3) établir un système incitatif de mise en œuvre de la loi aux échelles nationale et locale.

¿Es la caza de trofeo un modelo económico rentable para la conservación de la biodiversidad en Camerún?

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En África central, la caza de trofeo consiste en un enfoque basado en incentivos para la gestión sostenible de la fauna. Compilamos datos de la administración pública a cargo de la fauna, de empresas de safari y caza, y de comités locales de gestión de la fauna, para proveer un orden de magnitud del desempeño financiero de este sector en Camerún. En 2012, la caza de trofeo podía generar una facturación anual de € 7.5 millón y su valor agregado podía ascender a solamente 0.0001% del PIB, a pesar de que esas áreas de caza cubren el 12% del territorio nacional. El margen de ganancia para los guías profesionales se volvió negativo, con una ganancia anual neta de aproximadamente € -0.7 millón. La crisis severa en el sector de la caza de trofeo se debe esencialmente a un incremento de los costos de gestión en las zonas de caza y a una disminución del precio de los safaris de caza. El Estado juega un papel crucial mejorando el atractivo financiero de la caza de trofeo a través de la restauración de la seguridad en la región Norte y de medidas técnicas para (1) aclarar el proceso de atribución de áreas de caza, (2) simplificar regulaciones y (3) establecer un sistema de incentivos para la aplicación de leyes a nivel nacional y local.

INTRODUCTION

Wildlife conservation takes various forms, from exclusionary national parks to community-managed ecosystems. The national park is the oldest model in Central Africa for formally organizing the conservation of nature. The objective of protecting iconic species and landscapes justified the creation of the first national park – the Virunga national park – in 1925 and of most parks throughout the twentieth century in Central Africa (Devers and Vande weghe 2007). They were created by the States with little regard to the interests of local communities. Restrictions to customary uses of natural resources were expected to be offset by income from tourism and, more recently, by payments for environmental services. Classic applications of such top-down conservation strategies in Central Africa have been widely contested due to their impact on the social and economic condition of communities and their limited contribution to the protection of natural resources (Cernea and Schmidt-Soltau 2006, Njiforti and Tchamba 1993).

In the 1980s, Integrated Conservation Development Programmes (ICDPs) were widely adopted to attempt to combine the conservation of biodiversity with community development in protected areas (Pretty and Smith 2004, Western and Wright 1994). While positions have varied tremendously, both conservationists and social scientists have criticized ICDPs (Brandon and Wells 1992, Brechin *et al.* 2002), contributing to their declining popularity (Spiteri and Nepal 2006, Sunderland *et al.* 2008). In Central Africa, Binot and Joiris (2007) highlighted the challenges faced by these programmes in valuing customary tenure and decision-making processes. Wilkie *et al.* (2001) and Sandker *et al.* (2009) emphasized the need for substantial, permanent and long-term funding to support this approach, which is still rare in Central Africa.

Community-based natural resources management is also the basis for recent attempts to conserve nature by using traditional ecological knowledge and bring direct benefits to communities (Balint 2006, Hayes 2006, Sayer *et al.* 2005, Spiteri and Nepal 2006). Yet in Central Africa, apart from a few successes like the Tayna Nature Reserve in DRC (Vagheni Kakule 2008), formal community-based management of natural resources has often resulted in a deterioration of natural capital, as so far shown in the community forests of Cameroon (Bruggeman *et al.* 2015, Cuny *et al.* 2004). The negative impacts of local use on forest environments on a local scale have led to disenchantment with community-based approaches (Hackel 1999, Sunderland *et al.* 2008).

As an alternative to these three strategies for nature conservation, trophy hunting – also known as sport or safari hunting – can also contribute to wildlife protection, but its performance is poorly known in Central Africa (Lindsey *et al.* 2007, Roulet 2004, Wilkie and Carpenter 1999). Trophy hunting is run by private operators who lease hunting areas and camps from the State, market and sell hunts to – usually wealthy foreign – clients, and employ local staff to organize safaris. In Central Africa, trophy hunting has been practised since the beginning of the 20th century, first in association

with commercial hunting, but as a separate activity in the 1930s with the appearance of specialized hunting guides (Roulet 2004). This activity has continued since then in many countries of Central Africa. In Cameroon, the requirement to maximize foreign currency income and to increase tax revenues, related to the implementation of the Structural Adjustment Plans from the late 1980s, prompted the State to expand this land-use (Topa *et al.* 2009). In the northern region of Cameroon for instance, the area of formally leased hunting zones occupied 2.61 million ha in 2011, which was 3.6 times larger than the area in 1968 when hunting zones were first established (Yasuda 2012).

In Cameroon, there are two main types of sport hunting areas. The Hunting Zones (HZ) constitute the first category: according to article No. 92 of the Forest Act, they are defined as permanent forest areas of the national domain that are designated as protected areas reserved for professional hunting. They can be exploited by the administration in charge of wildlife but, in most cases, the Cameroon State delegates management to the hunting guides through five-year leases, while (formally) retaining certain functions such as the anti-poaching (Robinson 2008). Management is regulated by a simple management plan which specifies detailed rules for each leased hunting area (Egbe 2001, Mayaka *et al.* 2005). In addition, hunting guides must comply with specifications that include social clauses. The tenants are also required to provide local residents with social amenities (mostly employment) to the extent possible.

The second category of sport hunting areas is the Community-Managed Hunting Zone (CMHZ). Unlike HZs, which are located in the permanent forest estate, CMHZs extend into both the non-permanent forest estate and in certain categories of the permanent estate like logging concessions (Vermeulen *et al.* 2009). This concept is not defined in the 1994 Forest and Wildlife Law, but resulted from a review of the notion of hunting territories provided for in Decree No. 95/466/PM dated 20 July 1995 (Egbe 2001). The CMHZ concept appeared during the establishment of the “Mambele Convention” in June 1999 and was formally endorsed by the Ministerial Decree No. 1236 dated 20 September 2000 (Assembe Mvondo 2006). It is an attempt at community-based conservation to ensure the long-term survival of animal species by involving local people in wildlife management and allowing communities to derive economic benefits from wildlife resources (Baker 2007). To that end, local wildlife management committees (*Comités de Valorisation des Ressources Fauniques* – COVAREF) were established for the CMHZs. They are first supposed to co-manage CMHZs with the hunting guides selected by the wildlife administration. Secondly, COVAREFs receive a portion of taxes paid by hunting guides to be used to support local development.

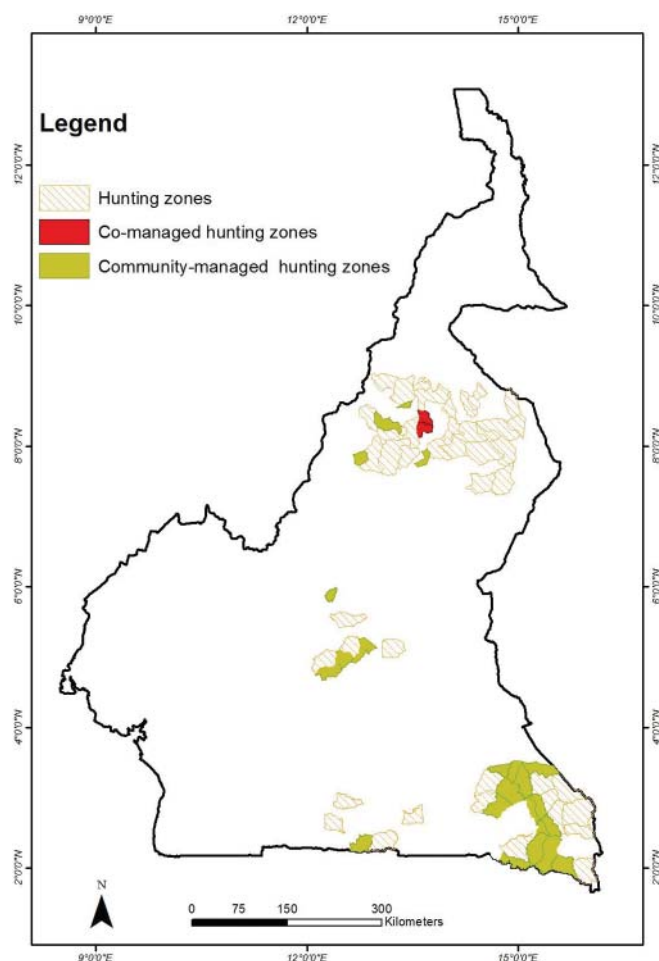
Sport hunting is practiced in Cameroon over large contiguous areas that provide an adequate habitat for wildlife populations. In 2013, Cameroon had 71 HZs, CMHZs and co-managed hunting zones (i.e. HZs with greater involvement of the local population) covering some 5 700 000 ha, more than 12% of the national area (DFAP 2013). These different

TABLE 1 Number and size of hunting zones and community-managed hunting zones in Cameroon

	Savannah regions (North, Adamaoua)	Forest regions (East, South, Centre)
HZ	Number: 26 Surface: 2 384 714 ha	Number: 19 Surface: 1 741 083 ha
CMHZ (and co-managed)	Number: 7 Surface: 283 723 ha	Number: 19 Surface: 1 251 435 ha

hunting areas are divided into savannah in the northern regions and dense forest areas in the southern provinces (Table 1 and Figure 1). In savannah areas, the species most appreciated by trophy hunters are the bush elephant (*Loxodonta africana*), the African buffalo (*Syncerus caffer*) and the large antelopes such as the giant eland (*Taurotragus derbianus*), roan antelope (*Hippotragus equinus*) and hartebeest (*Alcelaphus buselaphus*). In the rainforest zone, bongos (*Tragelaphus euryceros*), forest elephants (*Loxodonta cyclotis*), sitatungas (*Tragelaphus spekei*) or giant hogs (*Hylochoerus meinertzhageni*) are the major hunted species.

FIGURE 1 Location of hunting zones and community-managed hunting zones in Cameroon



Unlike to command-and-control approaches, trophy hunting is an incentive-based and private-led activity for conservation, like payment for environmental services or certification (Ferraro and Kiss 2002). All these mechanisms are gaining importance in the international debate and, in Central Africa, trophy hunting appears to be the most experimented model of deriving regular income from sustainable use of natural resources. For instance, timber certification started in Cameroon in 2005 and only covers 850 000 hectares in 2015. Similarly, actual initiatives of payment for environmental services remain very limited in Central Africa (Lescuyer et al. 2009). In addition, most national parks were created without direct economic justification and none of them in Central Africa is self-funded through ecotourism or other revenues.

The creation of areas dedicated to trophy hunting and the introduction of hunting permits are equivalent to the agency privatizing a space and species that were previously open access resources (Kiss 1990, Swanson 1991). The commodification of certain species and of public lands restricts most local uses, but it provides a financial value to these resources that should allow their sustainable exploitation (Chardonnet 1995, Roulet 2007). On the one hand, instead of being supported by the local population, the conservation effort is paid for by a small number of rich hunters. On the other hand, sport hunting generates income to remunerate the actors who contribute to the protection of the hunting areas (Baker 2007, Robinson 2008, van der Wal and Djoh 2001).

Overall, the success of sport hunting for sustainable wildlife management depends on the level of financial benefits drawn by the main three stakeholders: the hunting guides must make an acceptable profit, the State must at least maintain the global tax amount and the local population must procure a significant share of the revenues. Several publications in the 1990s and 2000s (Baker 2007, Chardonnet 1995, Lindsey et al. 2007, Roulet 2004, UICN/PACO 2009) reviewed the main benefits of trophy hunting in Central Africa. The purpose of this article is to update the financial assessment of trophy hunting in Cameroon in order to discuss the current and future performance of this incentive-based approach.

After a brief presentation of the methods, three financial assessments are provided: (1) the financial costs and revenues of trophy hunting at national level; (2) the planned and current levels of tax revenues; (3) the distribution of revenues among stakeholders. The discussion sums up the financial performance of this model of wildlife management, concluding a few options for revitalizing this approach in Cameroon.

METHODS

Existing studies of trophy hunting are fragmented, due to the heterogeneity of practices and of ecological conditions. For instance, several hunting companies are effectively involved in managing wildlife and in anti-poaching activities to try to reduce the level of threat in their areas through adequate skills, staff and resources. Other professional guides are mostly interested in leading such a way of life, with a secondary

interest in running a profitable business, sometimes without the proper tools to correctly exploit their area. At the other end of the spectrum, some guides are more like speculators, not interested in properly managing their hunting zone and abandoning this activity after a few years of detrimental practices.

Given the diversity, complexity and opaqueness of this sector, it was not possible to quantify the benefits of the various sport hunting practices. In this study, we conducted a financial analysis for an “average” sport hunting activity in Cameroon, which was elaborated with simplistic assumptions on the basis of current economic data. This article used secondary data from scientific publications and technical reports, i.e.

- Information collected by the Department of Wildlife and Protected Areas in 2012 for a sample of nine HZs and one CMHZ. These data covered the duties and taxes paid, attendance, jobs, shooting performance, roads and social works undertaken by guides.
- Annual reports from the 1970s by the delegation of Wildlife and Protected Areas of the North region to assess the number of hunters (with ‘*permis de grande chasse*’) and hunting taxes.
- Data supplied in several reports written by WWF covering both the North and East regions.
- Information provided by six hunting guides regarding their safari packages in Cameroon, for the savannah and the dense forest areas.
- Other technical documents were consulted from two main sources: (1) websites such as PSFE (<http://www.cameroun-foret.com/>), SAILD (http://pmb.sicac.org/opac_css) and CBFP (<http://pfbc-cbfp.org/>); (2) internal documents and M.Sc. theses collected through professional relationships with institutions, universities, projects, enterprises and consultants.

Information from the scientific literature was preferred to data from technical reports. When data were different for the same variable, the smallest estimate was used in order to limit the risk of an overstatement of income or cost.

A simplified cost-benefit analysis was used to evaluate the financial benefits of trophy hunting in Cameroon. By definition, the financial benefits relate to the revenue streams to the different actors (Brent 2006). Inflows are made from sales of safari and of the products associated with this activity. They are gross financial benefits, or turnover. Outflows are the actual costs incurred by the actors to obtain financial benefits. The total financial cost aggregates investment, operating and transaction costs. The difference between the gross financial benefit and the financial cost is the net benefit, i.e. the profit that the actors derive from the activity.

In contrast with a standard cost-benefit analysis, this assessment covered one year only, without planning the evolution of the sport hunting sector over the medium and long-term. The objective was to evaluate its financial and economic importance on a national scale for one year in order to compare this assessment to macroeconomic aggregates. To do this, the added value of the sector was calculated

by conventionally aggregating net financial benefit, payroll, depreciation of equipment and taxation.

Despite a broad review of existing data on trophy hunting in Cameroon, much information was missing or only partially available to estimate the financial benefits of this activity on a national scale. Several assumptions were therefore made for the calculations. Instead of a long list of hypotheses presented in this section, they are made explicit with the presentation of the results showing how they influenced the estimations. Moreover, most data used for the assessments date from 2012 and 2013, before the negative impacts of the slaughter of elephants at the Bouba N’Djida national park and of the extension of Boko Haram in this region are fully felt by professional hunting guides. The situation of the trophy hunting sector in 2015 is probably worse than the description done in the article.

RESULTS

Evolution of the importance of trophy hunting in the North region since the 1970s

After an initial increase between 1968 and 1980 the number of sport hunters visiting the North savanna region has fluctuated between 150 and 250 a year (Figure 2). The relatively high numbers in 2010–2014 may be attributed to a shift of hunters no longer able to visit the Central African Republic, because of security reasons. The latest (2015) decline suggests that also North Cameroon is increasingly perceived as ‘insecure’.

Taxes received (hunting zone leasing, hunting license tax and harvesting tax) in the North Region (in €, corrected for inflation) have increased three-fold from the 1970s to the late 2000s (Figure 3). However, since the top year 2008, a clear decline has set in, with in 2015 taxes only half the amount of 2008.

Financial costs and revenues of trophy hunting areas

Revenue from trophy hunting depends on the number of safaris organized in HZs and CMHZs that have been leased to professional guides. However, each year, several hunting zones are not allocated, as shown in Table 2 for 2012, and remain inactive.

There are several safari options that vary according to the length of stay, type of hunted animals, number of hunters, etc. In the absence of precise information on the number and types of safaris sold by professional guides in Cameroon in 2012, an average 12-day safari scenario was assumed, in which one hunter is allowed to shoot two animals of group I and four animals of group II. This “bag of game” package is offered by all hunting guides (Mayaka *et al.* 2005, UICN/PACO 2009) and is in the middle of their range of services. For such a safari, the official fee is around € 30 000 in rainforest and € 20 000 in savannah, but these prices are negotiated by the customers and usually decrease by 10%. These amounts are of the same order of magnitude as those proposed by Wilkie

FIGURE 2 Number of sport hunters in North Region, Cameroon (1968–2015)

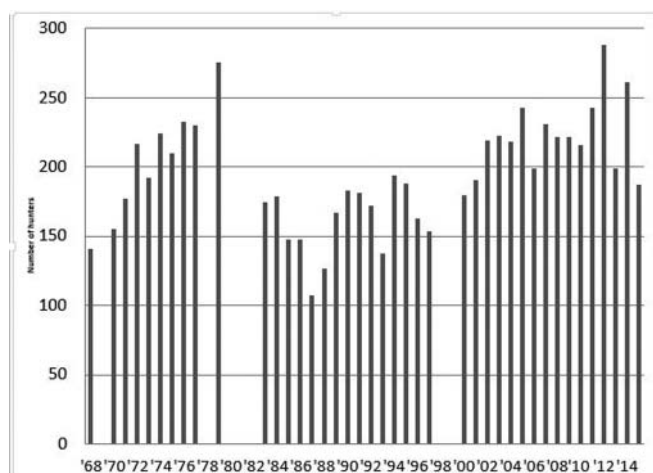


FIGURE 3 Sport hunting taxes (€ inflation corrected till 2012) in the North Region, Cameroon (1970–2015)

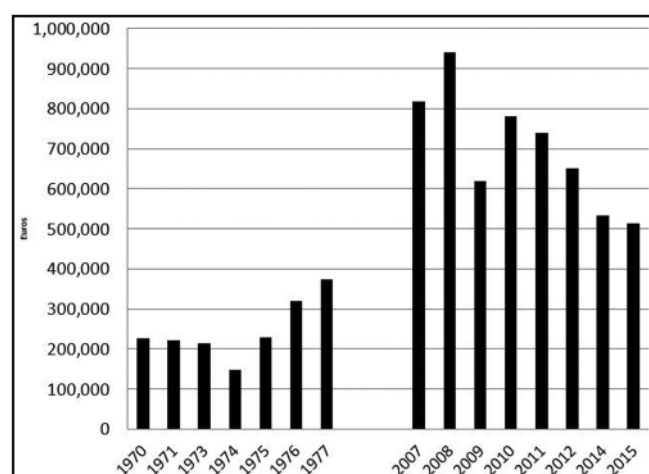


TABLE 2 Number of leased hunting zones and community-managed hunting zones in 2012 (DFAP 2013)

Types of hunting zone	% of active hunting zones
HZ Savana (North)	78% (19 out of 26)
HZ Forest (East, Centre, South)	68% (13 out of 19)
CMHZ (East, Centre, South)	32% (6 out of 19)
CMHZ (Nord)	43% (3 out of 7)

and Carpenter (1999) and Roulet (2004), once updated to 2012. These average prices of safari package are combined to the quantitative data collected for our sample of 10 hunting areas to assess the average turnover of trophy hunting per hectare.

To organise hunting safaris, a professional guide who has leased a hunting area faces seven types of costs:

- Initial investment to lay out the hunting area, to purchase equipment and to construct buildings, is estimated at \$ 200 000 by Mayaka (2005). This investment is depreciated over a 10-year period.
- The leasing rights vary between € 0.07–0.23/ha/yr with an average of € 0.15/ha/yr for the forest area (Moaza and Gwet 2007), and around € 0.1/ha/an in the northern regions (DFAP 2013, Yasuda 2012).
- The harvesting tax varies from species to species. Its average value is € 0.1/ha/yr in forest area and € 0.2/ha/yr in savannah (DFAP 2013). In the southeast area, there is also a 10% surcharge paid to communities (Defo *et al.* 2010).
- Other taxes related to firearm licence, penalties, etc. are estimated around € 4 200/yr for each HZ and CMHZ (DFAP 2013).
- Each HZ and CMHZ recruits 15 people, 60% of whom are temporary and are paid only from April to July and 40% permanent (DFAP 2013). The payroll is about € 0.21/ha/yr for savannah HZ, € 0.32/ha/yr for forest HZ, and € 0.60/ha/yr for CMHZ. Mayaka (2002) evaluated the cost of local labour at € 0.28/ha/yr and Croes *et al.* (2011) estimated the annual revenue from HZs at around € 0.39/ha/yr for local populations.
- Social contributions by lessees for the benefit of communities amount an average cost of € 0.03/ha/yr (DFAP 2013).
- The lessee must also support many other operating expenses related to the reception of clients and to hunting: maintenance of access roads and camp, fuel, maintenance of vehicles, public relations, food, etc. It was not possible to have quantified information on these operational expenses. However, the standard estimate for managing a protected area amounted to € 1.5/ha/yr (UICN/PAPECO 2009). This figure was increased by 10% to update this data and to integrate HZ specific running costs. The figure of € 1.65/ha/yr was used as a proxy to assess the operating costs in HZs and CMHZs. There is no estimate of the informal cost of transactions supported by the professional guide to lease a hunting area, which was therefore not included in the calculation.

The assessment of revenues and costs is summarized in Table 3 for the three categories of hunting area. The results are presented initially in € per hectare per year, and then extrapolated to all active hunting areas in 2012 in Cameroon.

The aggregated amount of turnover for sport hunting was found to be around € 7.5 million in 2012. This estimate was 20% lower than those reported by Roulet (2004) and Mayaka (2002). Net annual profit for professional guides was found to be € –0.76 million, with negative profit rates except for the forest HZs, which differed much from the diagnosis made by Mayaka *et al.* (2005) and Roulet (2004) a decade ago. The added value of the sport hunting sector was estimated at € 2.5 million per year, or 0.0001% of Cameroon's GDP (non-oil) for 2013.

TABLE 3 *Financial benefits and costs of trophy hunting in Cameroon*

<i>average in €/ha/yr</i>	HZ savannah	HZ forest	CMHZ	
<i>Private benefits and costs</i>				
Turnover	1.78	2.18	2.18	
Starting investment	0.17	0.17	0.17	
Payroll	0.21	0.32	0.60	
Social works	0.03	0.03	0.03	
Other operating expenses	1.65	1.65	1.65	
Profit for the hunting guides	-0.29	0.01	-0.27	
<i>Specific taxes</i>				
Right of lease	0.10	0.15	0.15	
Harvesting tax (State)	0.21	0.09	0.09	
Surcharge of the harvesting tax (communities)	0.00	0.01	0.01	
Other taxes (penalties...)	0.05	0.05	0.05	
Surfaces leased in 2012	2,127,274	1,117,523	583,669	
<i>in €/yr</i>	HZ savannah	HZ forest	CMHZ	TOTAL
<i>Private benefits and costs</i>				
Turnover	3,779,758	2,439,267	1,274,000	7,493,026
Starting investment	368,212	193,433	101,028	662,673
Payroll	452,922	361,504	351,653	1,166,079
Social works	64,860	34,073	17,796	116,729
Other operating expenses	3,504,881	1,841,223	961,649	6,307,753
Profit	-611,118	9,034	-158,125	-760,209
<i>Specific taxes</i>				
Right of lease	214,039	170,365	88,980	473,384
Harvesting tax (State)	456,065	98,481	51,435	605,981
Surcharge of the harvesting tax (communities)	0	9,848	5,144	14,992
Other taxes (penalties...)	100,533	52,813	27,584	180,930

Moreover, since 2012, several factors have tended to further reduce the profitability of trophy hunting in Cameroon. On the one hand, the declining numbers of lions and elephants in hunting areas as well as the recent European Union ban on imports of lion and hippopotamus (*Hippopotamus amphibious*) trophies have driven down the price of hunting packages. On the other hand, hunting areas are under increasing pressure from both the expansion of large-scale poaching (Maisels *et al.* 2013), encroachments by rural people to develop agriculture (Mayaka *et al.* 2005, Omondi *et al.* 2008), and climate of insecurity in the northern part of Cameroon. These threats have probably increased the operational cost involved in managing hunting areas.

Actual versus potential tax revenues

Two factors reduce the level of tax revenue derived from sport hunting in Cameroon: (1) many hunting areas are not claimed

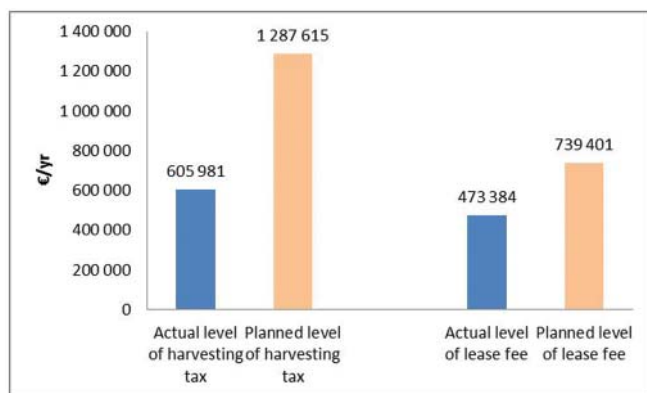
by professional guides; (2) in leased hunting areas, shooting plans are never fully carried out (DFAP 2013). Figure 4 compares the maximum tax level, when all HZs and CMHZs are leased and subjected to the payment of the leasing fee and when all shooting programmes are fulfilled and subjected to the harvesting tax, with actual tax revenues.

The full application of the sport hunting plan as programmed by the administration, albeit for some species such as lion with unsustainable high numbers till 2015, would lead to an increase in direct tax revenues of about € 1 million per year.

Distribution of trophy hunting revenues

There are several taxes applicable to sport hunting, but two of them make up the bulk of the payments made by the hunting guides: (1) the right to lease, a fee based on the size of the HZ or CMHZ; (2) the harvesting tax depending on the number

FIGURE 4 Planned and actual tax levels on a national scale (€/yr)



and type of animals killed. Part of these taxes and fees is redistributed to communities and councils (Table 4).

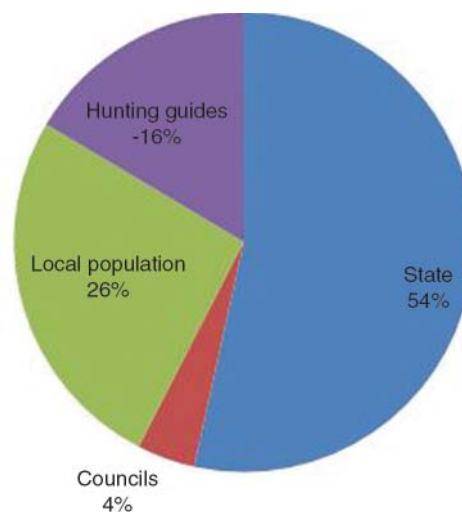
In addition to direct taxes, there are four other sources of revenue derived from trophy hunting: profit, payroll, indirect taxes and the cash contribution to build local infrastructure. All these revenues are shared among four categories of stakeholder:

- The State recovers 50% of HZ leasing rights, of the harvesting tax and of various other taxes related to sport hunting, 20% of payroll in the form of social contributions, and 19.25% of other current expenditure through the value added tax.
- Councils are entitled to 40% of the HZ leasing fee;
- Local people – composed of communities neighbouring HZs, communities involved in CMHZs and employees of hunting guides – receive 10% of HZ leasing rights, 100% of CMHZ leasing rights, 100% of the harvesting tax surcharge in the forest area, 80% of the payroll, and all social works carried out in the villages;
- The lessees of HZs and CMHZs make a profit from this activity.

The distribution of revenues from sport hunting among these four stakeholders is shown in Figure 5.

Contrasting earlier publications (Mayaka *et al.* 2005, Wilkie and Carpenter 1999, Yasuda 2012) which ranked hunting guides first, the State has become the main beneficiary of the trophy hunting activity with annual revenues reaching

FIGURE 5 Distribution of revenues accruing from trophy hunting among 4 stakeholders



€ 1.6 million. This difference is due, on the one hand, to the fact that this estimate integrates general taxation and not only the specific taxation related to sport hunting. On the other hand, the level of profit made by private guides has substantially decreased over the last decade.

This distribution of revenues is more favourable to communities than in previous studies as our assessment included local wages and not only reassigned taxes. The wage paid to individual people amounts to 76% of the total amount that communities receive from trophy hunting. However, the total redistributed amount of 0.8 million to local population remains very small with regard to the number of inhabitants neighbouring the hunting areas of Cameroon.

DISCUSSION

Trophy hunting has become a weak incentive-based conservation scheme, which is based on an inefficient business model and on a questionable governance.

A declining business model

Despite its potential local importance in sparsely-inhabited areas, the trophy hunting industry remains a very minor economic sector on a national level, when judged by its contribution to GDP. Previous assessments by Mayaka *et al.* (2005)

TABLE 4 Distribution scheme of the main taxes accruing from trophy hunting

	Right to lease	Harvesting tax
HZ	<ul style="list-style-type: none"> - 50% for the state - 40% for the councils - 10% for the communities 	<ul style="list-style-type: none"> - 100% for state - Surcharge of 10% for the local wildlife management committees (in East region)
CMHZ	<ul style="list-style-type: none"> - 100% for the local wildlife management committee 	<ul style="list-style-type: none"> - 100% for state - Surcharge of 10% for the local wildlife management committees (in East region)

indicated that this activity was profitable for private operators, with a return rate of between 18% and 36%. Updated estimations of the turnover, costs and profit of trophy hunting in Cameroon show that this activity has become unprofitable for many professional guides.

With a decreasing level of profit for private operators, the State of Cameroon has become the main beneficiary of sport hunting through the collection of direct and indirect taxes. Nevertheless, hunting tax revenues are far from what was planned by the administration, with a shortfall of € 1 million per year.

Local communities have received around € 0.8 million from trophy hunting per year but this amount is not enough to generate local support for this land use, for two reasons. On the one hand, most of these benefits come through individual wages and not through collective institutions which might commit themselves to supporting trophy hunting. On the other hand, hunting-based land-use remains, at least at short term, 200 times less profitable than cotton planting in northern Cameroon (Mayaka 2002) and therefore generates substantial opportunity costs for local actors.

The overall distribution of trophy hunting revenues is more beneficial to the State and local communities than fifteen years ago, but this condition is not sufficient to guarantee the acceptance of this activity by stakeholders. Today, the weak financial legitimacy of the sport hunting model comes not so much from an inequitable process of income distribution but from a smaller amount of distributed income. Except for the State which keeps collecting direct and indirect taxes, trophy hunting is no longer an incentive-based approach for professional guides nor for communities.

The good overall number of hunters still visiting Cameroon (Figure 2) should not be interpreted a sign that sport hunting is a healthy business. The declining sport hunting taxes (2008–2015, Figure 3) and the recent abandoning of sport hunting zones are clear signs of the declining performance of the sector. The evolution of sport hunting seems to follow a rent-seeking model where the hunting areas are gradually over-exploited and then abandoned once large animal species have disappeared, as it has been seen in several logging concessions with valuable timber species (Karsenty 1998).

An incentive-based approach flawed by the state's failures

It is commonplace to compare the incentive-based schemes for biodiversity conservation whose success relies on the economic behaviours of private actors with the command-and-control approaches implemented by the administration. In fact, the success of incentive-based approaches also depends on an appropriate legal framework and governance in which the State plays a major role. Thus, the business model of sport hunting in Cameroon would be more efficient if the State fully assumed three of its prerogatives.

Firstly, the allocation of HZs and CMHZs to professional guides does not meet minimum conditions of transparency. Unlike the logging sector which underwent a governance

reform in the 1990s (Karsenty 2006, Topa *et al.* 2009), sport hunting in Cameroon is still characterized by the establishment of accommodating relationships between private operators and representatives of the administration (Lindsey *et al.* 2006, 2007, Mayaka *et al.* 2005, UICN/PACO 2009).

Secondly, the multiplication of procedures imposed on COVAREFs since 2009 is contrary to an effective delegation of wildlife management by local populations in the CMHZs (Defo *et al.* 2010). Rather than being dedicated to improving local livelihoods or to managing CMHZ, a significant portion of these funds is spent in operating these COVAREFs (Bigombe 2010, Assembe Mvondo 2006). The improved performance of these local committees would require a significant simplification of procedures, especially as they apply to small amounts of money.

Lastly, the State devotes very few resources to enforcing regulations and monitoring the practices of managers of hunting areas. For instance, management plans, social specifications, or monitoring protocols are almost never drawn up and even less so applied or controlled in the Cameroonian HZs (Roulet 2004), although these are legal requirements. In the south-east CMHZs for example, abundance indices for the main species of large mammals were estimated in the early 2000s by Nzooch *et al.* (2002), in 2007 and 2015. Those inventories showed a decline in the population of medium and large mammals in 80% of the south-east CMHZs (Defo and Tchamba 2012), although the 2015 survey suggests this decline has stabilized (Nzooch, pers. comm., 2015). The only overall wildlife monitoring for the savannah HZ was done by WWF ten years ago, indicating low animal densities (Omondi *et al.* 2008). We are aware of only five HZ managers who have commissioned wildlife surveys of their respective zones, and not more than once since 2005. This lack of wildlife monitoring hides the decline in key animal populations (lion, elephant, buffalo, large antelopes) in many sport hunting zones (Croes *et al.* 2011, Scholte 2011), with off-take quotas being based at best on guesswork, and at worst established to maximize tax revenue or to meet customers' requests (Lindsey *et al.* 2007).

The difficulty for the State in enforcing its own rules is not specific to the sport hunting industry. The fight against climate change and the sustainable production of timber face similar obstacles. But in these two sectors, the control of compliance by operators is now exercised by private organizations, like the Verified Carbon Standard for the initiatives of Reducing Emissions from Deforestation and forest Degradation (REDD) or bureau Veritas and SmartWood for the legality of timber. Several authors have argued for the establishment of a similar process of private certification for sport hunting to ensure the legality and sustainability of practices (Lindsey *et al.* 2006, 2007). But, unlike other incentive-based schemes for biodiversity conservation, the killing of emblematic animals, as ecologically sustainable as it may be, is little tolerated by a large share of American and European populations (Brown and Williams 2003), which would reduce the social acceptability of such a certification process.

CONCLUSION – TWO PROSPECTS FOR TROPHY HUNTING

As locally dominant land-use option, sport hunting has shown a declining profitability in Cameroon over the last decade, mainly due to poor governance, external threats and recent insecurity of many hunting areas. With the entire trophy hunting sector internationally under pressure (UICN/PACO 2009) and with growing pressures on rural areas, a pragmatic two tier approach may regain the legitimacy and the performance of this option of sustainable wildlife management. Firstly, nowadays several HZs are of limited value due to the scarcity of the species sought by trophy hunters. These HZs should therefore be downgraded and re-allocated to other more realistic land-uses. Trophy hunting would no longer be considered as the dominant purpose of a specialized area but as a secondary objective of a specialized land-use in agriculture, logging or ranching (Lindsey et al. 2007).

Conversely, many sport hunting zones remain promising and justify the specialization of these areas. The purpose is to strengthen their socio-economic and environmental performance, as well as cater for the payment of other ecosystem services, to better compete with other land-use options. The major challenge is to re-establish the attractiveness of the Cameroonian HZ, notably through the restoration of security in the Northern region. Several technical improvements are also possible through a clarification and an improvement of the State's role in this incentive-based approach. Firstly, the transparent, competitive and fair allocation of HZs would refine the relationships between private operators and the administration (Baker 2007). Secondly, rather than diluting responsibilities and multiplying procedures, it is for the State to operate a pragmatic devolution of wildlife management to actors. Lastly, the State representatives must be urged to enforce regulation and laws regarding hunting areas, notably for monitoring management and harvesting practices. Beyond merely increasing operational means, the main requirement is to establish incentive schemes in which law enforcement provides more benefits to administrative staff than the current lack of official control.

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