Tropentag 2008
University of Hohenheim, October 7-9, 2008
Conference on International Research on Food Security, Natural Resource Management and Rural Development

Wildlife value, trophy hunting and rural development – with illustrations from Tanzania

Andreas Bohne

Humboldt University Berlin, Chair for International Agricultural Trade and Development, Philippstraße 13, 10115 Berlin, Germany, a.bohne@agrar.hu-berlin.de

1. Introduction: The need for economic valuation

Since the late 1980s slogans like 'use it or lose it' or 'conservation through sustainable use' emphasized the economic use of wildlife for conservation and rural development. In addition, a stronger involvement of local communities instead of displacement and curtailing of their access stands behind these approaches. However, the sustainable use is facing several problems. Wildlife is threatened by a rapidly growing population, an expansion of agricultural areas and poaching. Parks and reserves are expensive to manage but overwhelmingly underfunded and economically inefficient. Hence, the challenge is to establish wildlife as an economic option and benefit for the population by using their 'comparative advantage' (CHILD, 2000). Therefore, quantification of economic values of wildlife has become increasingly important. However, as ASAFU-ADJAYE (1998: 228) remarks: "*there has been a tendency to undervalue wildlife habitats and species in public as well as private decisions*". So, lack of economic valuations impairs decision makers' ability to compare benefits and costs of wildlife options. Additionally, it is also important to clarify the relationship between wildlife related activities and benefits generated by them. It must be recognized that the potential value of wildlife has to be taken as a starting point for rural livelihoods and development. Therefore, the question is: What value has wildlife for local communities in surrounding areas of national parks and how valuable is wildlife for rural development?
One possible option is trophy hunting (tourism, sport or safari hunting) which describes hunting by paid tourists "*typically with the objective of selecting individuals with exceptional physical attributes […] and usually in the company of a professional hunting guide*" (LINDSEY ET AL., 2007: 456). Trophy hunting can and already plays a significant role for rural development and conservation. But the scientific literature and policy makers criticize insufficient and rarely existing valuations of trophy hunting (HUMAVINDU AND BARNES, 2003; LINDSEY ET AL., 2006).

2. Aim, Methods and Data

Therefore, the aim is to examine the value of trophy hunting and to investigate whether there are effects on rural development and welfare improvement in surrounding areas starting from the economic value of trophy hunting. The reference point in a typical Sub-Saharan African tourism context is the *Selous Game Reserve* in Tanzania and the *Selous Conservation Programme* between 1988 and 2003. As a further step, implications for future rural development are discussed and finally, some implications and recommendations are offered.
The analysis is embedded within the concept of 'Total Economic Value' (TEV), which embraces use and non-use values of natural resources. Here, just the use value is taken into account: The direct use value is the consumptive trophy hunting activity which measures a consumer's demand

and willingness-to-pay from market and survey data. The trophy hunting value is assessed in an ex-post, demand-side and revealed preferences manner. In contrast, indirect use values refer to the benefits of wildlife management and tourism (PEARCE AND MORAN, 1994: 90) and thus, include wildlife revenues channeled into local projects or provision of employment. Three methods are used: descriptive statistics, literature review and discussion. Data from the 'Selous Hunting Database' (BALDUS AND CAULDWELL, 2004) and secondary data from surrounding areas are used.

3. Trophy hunting in Tanzania

In Tanzania wildlife-based tourism is the heart of the country's tourism industry and trophy hunting plays a major role within. Revenues from trophy hunting range between US$ 27.6 and 36.1 million per year (LINDSEY ET AL., 2006: 283). Policies or drafts like a "Management Plan for Tourist Hunting" (1995), "Wildlife Policy of Tanzania" (1998) and "Wildlife Act" emphasize the economic role of wildlife and the sharing of benefits between communities, district councils and Wildlife Division. Like several southern and eastern African countries, Tanzania implemented a community-based wildlife use approach with the "Community-based Conservation" (CBC). Like the other programs, this approach stresses the need to incorporate rural communities and provides benefits to strengthen conservation and development.

4. Case study: Selous Game Reserve and Selous Conservation Programme

The Selous Game Reserve (SGR) is the largest protected area in Tanzania with a long history of trophy hunting. Between 1988 and 2003, the 'Selous Conservation Programme' (SCP) was established and supported by the German Technical Cooperation Agency, the Tanzanian Government and others. Overall aim of the SCP was to link a development cooperation program for the long-term conservation, sustainable use and rural development in the buffer zones (Wildlife Management Areas/WMA) around the game reserve. And trophy hunting played a major role within it.

4.1 Direct use value: Demand for trophy hunting

Monetary assessment of the trophy hunting value - or a valuation of the SGR on the basis of trophy hunting - can carry out on the basis of different fees. Every hunting tourist or client is forced by law to pay different fees and also every safari company must pay a block fee to lease a hunting block. Thus, as a market good trophy hunting can be valued through the willingness-to-pay (WTP) for these fees (F) and hence, the trophy hunting value (V_H) for the last year of the SCP 2003 can be estimated through:

$$V_H = F_{1(\text{Permit})} + F_{2(\text{Conservation})} + F_{3(\text{Observer})} + F_{4(\text{Trophy})} + F_{5(\text{Trophy handling})} + F_{6(\text{Block})}$$

$$= \sum_{i=1}^{6} F_i = 3{,}576{,}040 \ US\$$$

The direct use value was US$ 3,576,040 in 2003. Within the frame of the SCP project the "entire" direct use value was US$ 37,968,715 and hence, the average value was at US$ 2,373,044.7 clearly below the final year value. In figure 1, the development of the value is documented. On the one hand a long-term increasing trend is visible; on the other hand up and down movements also exist in the shorter term. If the hunting value of 1988 is taken as 100 percent the value of 2003 revealed an increase up to 347.7 percent.

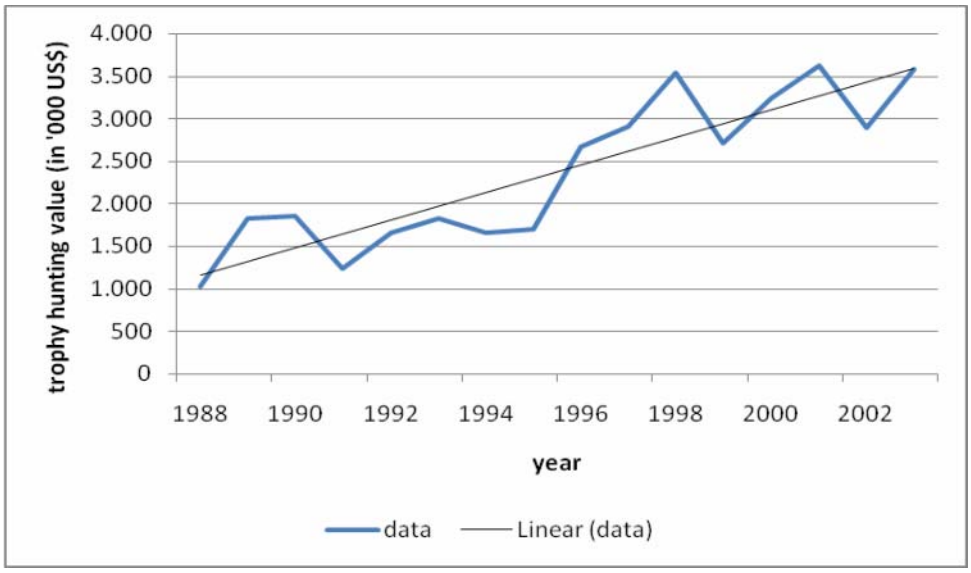

Figure 1: Development of the trophy hunting value in the Selous Game Reserve.
Source: BALDUS AND CAULDWELL, 2004. Own calculation and graph.

Results of a simply OLS regression analysis is presented in table 1. On average, the hunting value increased yearly about US$ 162,296. The statistical variables indicate that the demand and value is affected through a linear trend. Therefore, it can be argued that the establishment and the consolidation of the project clearly enhanced the trophy hunting value.

dependent variable	hunting value (in US$)
independent variable	time t
intercept[1]	993530.0 (4.60541)
slope[1]	162296.0 (7.27445)
R^2	.791
F	52.92

Table 1: Regression results ([1] t-values in parenthesis)
Source: Own calculation.

If only fees are taken into account which hunters have to pay, an insight in the WTP of hunting tourists is possible. With 479 clients in 2003 (BALDUS AND CAULDWELL, 2004: 114), the single hunter was willing to pay on average US$ 6,774.72 just for fees related to hunting. A decomposition of the hunting value reveals the major contribution of tourists compared to safari companies. While in the initial years of the SCP the relationship between tourists and block fees was still about 5:1, the ratio increase in the course of the consolidation with a relationship at the end of 10:1 (BOHNE, 2007: 49). While the most highly valued game species on basis of trophy fees are elephants, carnivores and rare species, the off-take and percentage use quota revealed demand preferences for herbivores like particularly buffalos, followed by antelopes and gazelles. However, buffalos as the most valued animal created a monetary value of more than a half million US$ in 2003 (BOHNE, 2007: 53). Overall, the results illustrate that the SGR is largely dependent on trophy fees.

4.2 Indirect use value: Effects for rural development

Under 'rural development' the improvement of living conditions of the local rural population and welfare improvements in buffer zones is comprehend. The question is: Could the economic value of wildlife be transferred to local communities? The indirect use values can be divided into *direct* and *indirect* benefits.

One direct benefit are revenues which must be subdivided between revenues for the state (national level), district (regional level) and directly to communities (local level). Trophy hunting contributes to the budget of several districts. Exemplarily, for the Morogoro District in the north of the SGR, 3.5 percent of the entire District Council income was derived from hunting tourism.

Theoretically, hunting income shall be transferred to the local level for projects, but practically a gap is recognizable. In contrast, a case of direct payments for institutions provide the so-called 'Jukumu-Society', an inter-village association that coordinates 19 villages on the northern border of the SGR. This association got annual fees from a Dar-es-Salam based hunting company.
Job opportunities play a further important aspect of direct benefits. However, they are limited on three categories: in hunting operations, as (village) game scouts or other jobs. During the half-yearly hunting season just a few vacancies are filled by local people, most of the jobs are filled by more experienced people from tourist centers. Overall, local people only fill approximately 100-150 vacancies. Both other categories are important for trophy hunting and influenced by them, however they cannot reduce only to duties related to trophy hunting. Tasks of game scouts are wildlife observations, anti-poaching activities as well as managed harvests. Villages employ between ten and twelve village game scouts on a temporary basis. "Other" jobs include casual labors like during managed harvests or salaried employees working in the management of the SGR or in project frames.
At first sight, managed harvests and controlled culling are not linked with trophy hunting, but often named as benefit of community approaches. In the course of the establishment of CBC/WMA each village received an annual hunting quota of 6 to 13 animals for the village's meat supply, which can be bought by the people and contribute to the village income. During the SCP the sold meat and village income increased and thus "*transfers a resource of tangible value, and provides a visible benefit*" (ASHLEY ET AL., 2002: 32-33). Critical is that the benefits are small with a game quota of approximately 800 kg of meat per village and 3,000 people of a typical village.
At the beginning, the SCP initiated self-help-projects for indirect benefits to reduce tensions and overcome mistrust between local population and game guards as well as to enhance conservation acceptance. Visible development projects included building, renovation and repair of communal infrastructure. Furthermore, projects in agriculture and forestry or creation of alternative income sources were established. The financing of such projects came from the SCP and from villages. Together with the district administration the SCP used income for infrastructural improvements like (re)building of roads or secondary schools. These projects had substantial impacts on livelihoods (ASHLEY ET AL., 2002; BOHNE, 2007; HAHN AND KAGGI, 2001; JUNGE 2004).

5. Incentives for rural development: Caught in a dilemma

For future incentives it is of interest how trophy hunting can contribute (1.) to promote and enhance rural development and (2.) simultaneously not reduce the resource wildlife in accordance to the sustainability paradigm and as basis of trophy hunting. By drawing back on own results and experiences from other Tanzanian reserves and parks it is discussed and argued that possibilities for rural development starting from trophy hunting are caught in a dilemma of trade-offs between development and conservation as well as characterized by other difficulties (see also BOHNE, 2007).
Job opportunities directly connected with trophy hunting are small and restricted on simple jobs during safaris and more promising for game scouts. However, this limited creation is critical because job opportunities will improve the economic conditions and thus, may fulfill the aim of promoting wildlife conservation and local welfare (BARRET AND ARCESE, 1998; JOHANNESEN, 2003a).
As a high-value tourism industry, trophy hunting offers the possibility to transfer money to the local population, whereby the share and the target group of revenues is important for the success. But the dilemma is that money transfer as part of income can work against conservation because marginal cost of hunting is reducing and an increasing illegal hunting effort is stimulating (JOHANNESEN, 2003a). Furthermore, the problematic of 'lump-sum'-transfers is urgent if

revenues are not directly linked to conservation. Additionally, distributed household dividends can be small because of a high population density.
Quotas for managed harvests as by product are a major benefit. However, increasing incomes, growing population and environmental shocks may lead to increased demand for wildlife products. Therefore, they are feasible in a short-term frame but it is questionable whether they can be controlled within a sustainable limit over a longer period (BARRET AND ARCESE, 1998).
Indirect benefits are characterized by the channeling of money, e.g. to strengthen agricultural productivity through extension or crop diversification. It is often assumed that this will divert labor from illegal hunting to agricultural production and trophy hunting can contribute to promote and support agricultural development. But effects for conservation and wildlife can be diametric: On the one side, increasing crop yields can work against illegal hunting offtake (BARRET AND ARCESE, 1998; JOHANNESEN, 2003b). In contrast, a permanent shift in profitability of the alternative production can result in less wildlife in the long-term (SKONHOFT, 1999). Additionally, problematic are also infrastructural improvements which do not benefit all community members equally and tend to encourage free riding. Under the aspect of rationality people would choose on the one side continual poaching, but on the other side enjoying advantage of benefits.

6. Implications and recommendations

A wide range and several recommendations are necessary to use the value of wildlife through trophy hunting in an economic and ecological viable way and make it more valuable for local communities.
Despite the problems mentioned above, revenues from trophy hunting should be used for agricultural development to counteract poor food security which would lead to continual poaching. Some options are the support of ‘non-land-intensive’ agricultural options like poultry, horticulture or bee keeping. Also, revenues should or can be used to offer possibilities to begin small enterprises like shops or ‘backyard enterprises’. All approaches can contribute to rural development.
Managed harvests as a ‘by-product’ have to be taken into account because they are one of the visible benefits and can constitute a source of village income and legal protein source.
Also, under the consideration that photo tourism was not part of this short article it can be stated that photo tourism and trophy hunting should be combined under the condition of careful management. Photo tourism provides more effects in job opportunities or support industries (e.g. food, accommodation). Depending on the view of ratios photo tourism in the SGR is also high valued (BOHNE, 2007).
Trophy hunting schemes should be on a sustainable basis with quotas on levels that are appropriate for a long-term sustained exploitation - to ensure direct use values - and hence, sustained economic revenues from tourist hunting to secure indirect use values.
To enhance both values there is a need for institutions which can be reached through the establishment of a project like the case of the SGR show and through an adequate legal framework.
Furthermore, there is a need for scientific research: According to the above-described dilemma investigations about effects of benefits are necessary. It must be examined, whether forms of benefits contribute to welfare implication as well as conservation and how synergies can be emphasized. Furthermore, studies about opportunity costs of wildlife use and cost-benefit-analyses to compare alternative land uses are necessary.
In addition, scientific methods like bio-economic modeling with realistic scenarios or methods of economic valuation of environmental goods have to apply directly to trophy hunting that results can be incorporated into wildlife management.

7. Conclusion

Trophy hunting in the SGR is a high-valued tourism industry from which incentives and effects for rural development come from. However, there are limited and opportunities are less in income or employment creation and more in 'managed harvests' and indirect benefits like supporting development projects. It must be recognized that possibilities and impulses for rural development and welfare from trophy hunting are not easily to reach and depend on several implications and recommendations. Special key concerns are distribution and channeling of revenues especially into projects, managed harvests and strengthening of scientific research.

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