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Wildlife snaring – an indicator of community response to a community-based conservation project

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The use of wire snares for catching wildlife to support household needs was treated as an indicator to evaluate community support and understanding for a community-based resource management project. Data were based on snare counts in areas surrounding the targeted community as well as from interviews with individuals purported to have had a history of snaring. The high use of snares conflicted with expected behaviour for a community benefiting from the project. Snaring levels were high enough to threaten the viability of the safari industry and the derived revenues that were meant to be shared with the community. These contradictions suggested flaws in the project: an overdependence on external donor-supported management and lack of real community involvement and leadership in management of the resource. This study underscores the critical importance for monitoring land-use behaviour as an indicator of the success of community-based management projects.

Introduction

Throughout much of southern Africa impoverished rural communities living in wildlife areas are participating in community-based wildlife management (CBM) schemes (Mwenya *et al.*, 1988; Brown and Wyckoff-Baird, 1992; Metcalfe, 1994). Their involvement entitles them to revenue shares earned by wildlife industries in their area but also requires them to participate in the management of the wildlife resource to help sustain these revenues. The expectation of these schemes is that communities will become vital allies of the wildlife management effort, resulting in net increases in sustainable and commercially competitive wildlife products.

Zambia, through its National Parks and Wildlife Service, was one of the pioneers in community-based wildlife management and has promoted a variety of efforts supporting this initiative (Mwenya *et al.*, 1988). All document some degree of success in terms of reductions in poaching through employment of local village scouts (Lewis *et al.*, 1990), improvements in community welfare, greater understanding of management issues by community leaders (Nabwalya *et al.*, 1994), and stronger private sector commitment to the resource (Lewis, 1995; Mulla and Mulla, 1995). While such claims may be true and probably indicate real progress for the community-based approach, the more basic determinant of success is whether individual households are adopting appropriate land-use practices in response to the community-based management approach. Examining this question requires analysis to establish the causes of land-use behaviour. Results from this type of analysis can help guide CBM schemes to adopt policies and legal structures that will advance more compatible land-use practices on lands being managed for wildlife benefits. This study provides such an analysis by examining a community's use of wire snares for catching wildlife illegally in an area where the Luangwa Integrated Rural Development Project (LIRDP) has operated for 7 years to achieve conservation solutions through community-based management.

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Unlike firearms, snaring as a form of illegal hunting is difficult to detect by wildlife enforcement officers. This makes the use of snares extremely difficult to control unless rural communities are committed to refraining from their use. For this reason, snaring was chosen as a behavioural indicator of community support of LIRDP and for gauging the likelihood that sustainable solutions for wildlife management and community development will be achieved. Incidence of wire snares, patterns of safari hunting success, and household interviews on the use of snares provided the basis of this analysis.

Study area and background

The LIRDP has operated in Upper and Lower Lupande Game Management Areas since 1988 with substantial financial support from the Norwegian Agency for Development (Figure 1). Its goal is to provide economic incentives for wildlife conservation through improved living conditions for rural communities. It controls revenue collection from the safari-hunting industry and disburses these revenues to communities in six chiefdoms in the two game management areas. It has also used donor funds for services and infrastructures for the entire Upper and Lower Lupande area, including vehicles, roads, bridges, a maize mill, agricultural support, and a range of studies focused on local conditions of economy, resource use and agriculture.

The 258-sq-km Malama chiefdom in the south of Lower Lupande Game Management Area was the focal site for this study (Figure 1). Most of its 750 people live along the Lusangazi River, where there are fertile alluvial soils for growing maize, sorghum, groundnuts and other food crops. The 171 households are organized into 27 villages, each of which has a headman who reports to the chief any problems that require his intervention. The chief is the traditional owner of the land and by local custom administers it for the welfare of his subjects.

Less than 5 sq km in Malama have been cleared for settlements and farming. The large percentage of unsettled land is due to various factors that limit agriculture and village expansion: poor soils, unavailability of water, prevalent flood conditions, and high risk of crop damage by wildlife. As a result the landscape is relatively unspoiled and provides habitat for 16 species of large mammals. These assets are licensed to a safari hunting operator whose clients are foreign hunters, each of whom may pay from $8000, for a small safari that permits the hunting of up to seven animals restricted to certain species, to as much as $40,000, for a 21-day classical safari that offers a full bag of species allowed in the hunting quota. The Lower Lupande GMA, a relatively narrow zone that runs parallel to the Luangwa River to the west of the Chendin Hills is used for safari hunting because it contains relatively high concentrations of wildlife. This prime hunting area encompasses much of Malama and is considered critical to the viability of the safari concession.

Methods

In October 1995 we asked Chief Malama to allow his subjects to be interviewed about the use of snares in his area. In the presence of the chief's *ndunas* (advisors) we explained that the interviews would not lead to arrests. It was agreed that a nduna would accompany the interviewer to help reduce any anxieties respondents might have about the interviews. With the help of village ndunas, a list was compiled of heads of households known to use snares. From this list, 22 interviewees were selected that best represented the community's 27 villages (Figure 1). Interviewees were all males.

The interviews were based on pre-designed questions but were presented in an informal, discursive way to establish greater trust and dialogue, and increase opportunities for other information to emerge. Interviews took an average of 2–3 hours each and were completed in 4 weeks. All interviews were recorded with a pocket-sized tape recorder and transcribed following a structured form to ensure that answers to the set questions were recorded and coded for computer entry.

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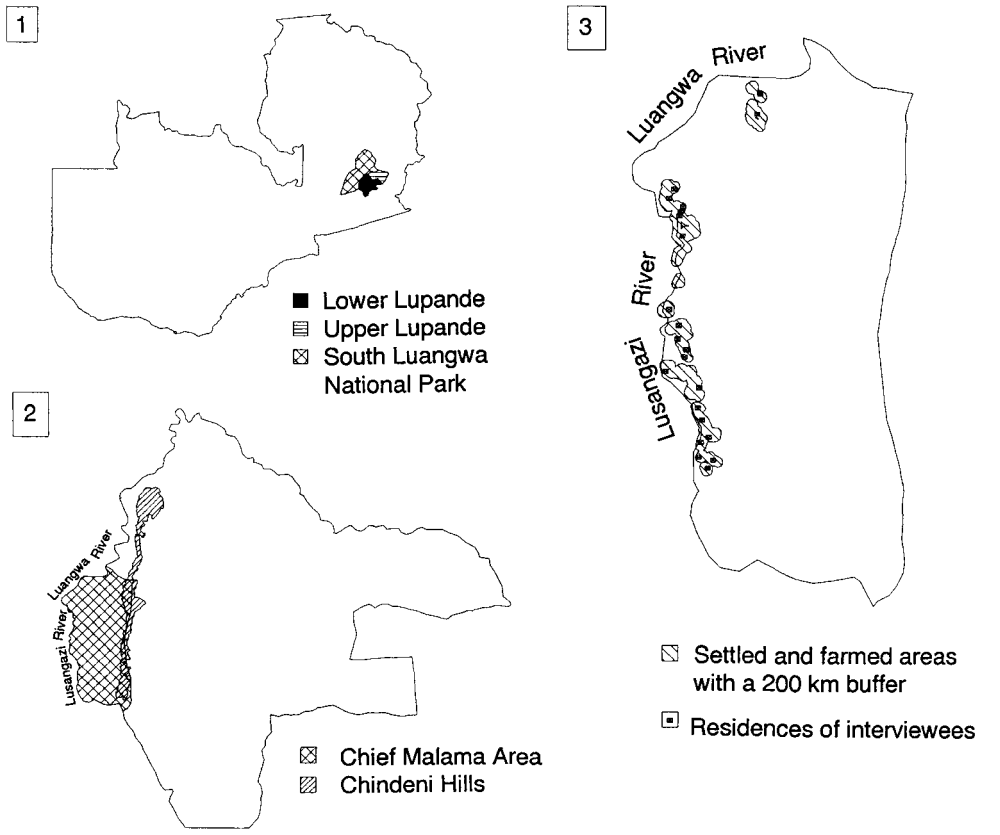

Figure 1. Maps showing: (1) Location of Lower Lupande Game Management Area in Zambia; (2) Chief Malama's area in Lower Lupande; (3) Distribution of Malama villages and location where interviewees lived.

In the same year, from 1 June to 28 August, we carried out six ground surveys to sample the incidence of snares set for wildlife within 2 km of garden boundaries of villages along the Lusangazi river. This distance was regarded as the probable range villagers would use to set snares and revisit them on a daily basis. Approximately 60 per cent of this sampling effort was in the national park. Survey participants were familiar with the area and transects were positioned to minimize duplication of areas sampled and also to allow the survey team to enter and leave the area without attracting attention from residents. Each survey was conducted by 10–12 people walking slowly a few metres apart in a straight line over an average distance of 8.5 km. All snares encountered were counted and removed, and their locations were recorded on maps.

The 15 foreigners who went on hunting safaris in Lower Lupande GMA in 1995 were monitored to record the species and locations of all animals shot. These data were compared with similar data collected in 1987 to detect any changes in hunting locations and target species hunted.

Results

Incidence of snares

Table 1 presents the results for each ground survey and the locations of snares are shown in Figure 2. Snares were found in clusters,

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suggesting that owners used particular sites. Snares were sometimes found to have V-shaped corrals made with cut branches to direct animals into them, while the snares themselves were often concealed with twigs and grass stems. The survey found a total of 156 snares, representing 3.1 snares/km. One of the snares contained an impala *Aepyceros melampus* carcass and another, a lesser kudu *Tragelaphus strepsiceros*. During the study

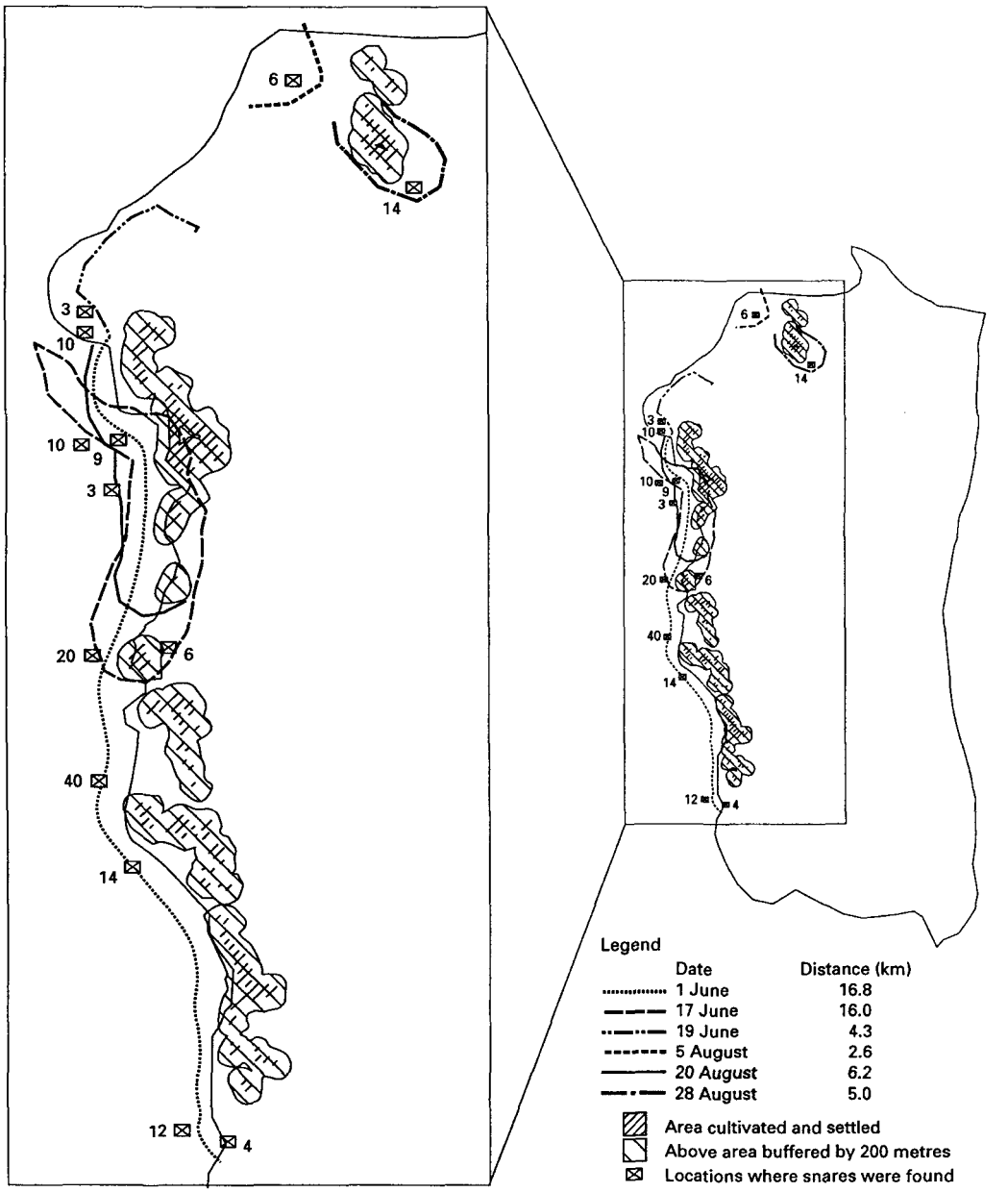

Figure 2. Survey routes used to census snares, and locations where snares were found and their respective numbers at a general site.

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Table 1. Results of snare incidence survey

Date	Distance walked (km)	No. snares found	No. snares per km	No. carcasses found
1 June	16.8	89	5.3	0
17 June	16.0	36	2.3	1 kudu
19 June	4.3	3	0.7	0
5 August	2.6	11	4.2	0
20 August	6.2	3	0.5	0
28 August	5.0	14	2.8	1 impala
Total	50.9	156	3.1	2

villagers reported four instances of animals caught in snares: two lions *Panthera leo*, a young elephant *Loxodonta africana* and a spotted hyaena *Crocuta crocuta*. The large number of snares found in this study and the diverse range of animals caught suggested that snaring levels were high and widespread throughout Malama villages.

Village interviews

Use and source of snares. All but one interviewee said that wires came from outside the Malama area, while one said he acquired them from friends in the village. Sources included a deserted refugee camp 30 km away, powerline workers who visit the area annually and exchange wire for beer and game meat, and workers at wildlife tourist camps about 40 km away. The number of snares owned by villagers varied from 6 to 30, with a mean of 17 (SE 6.4). When asked how many snares might be owned by all households in a village, only 11 respondents provided answers and gave a mean of 72.5 snares per village (SE 25.4). From these data it was estimated that Malama community possessed 1957–2907 snares. When asked whether only married men engaged in snaring, 56 per cent replied yes while 44 per cent said that both married and unmarried men engaged in this activity. All respondents were in agreement that snaring was practised by men and not women.

Figure 3 shows that the dry season was preferred for snaring. The main reason given was that animals were easier to catch due to the high concentrations of wildlife at water sources and known feeding sites. Consistent with the distribution of transects, 84 per cent said they set snares along the Lusangazi River, which borders South Luangwa National Park, and 28 per cent admitted snaring in the national park. Four interviewees (16 per cent) said they preferred lagoons and floodplains north of the Lusangazi River (Figure 1). On average, respondents set snares 1.6 km (SE 2.0) away from their village.

Numbers, types and capture rates of snared animals. Respondents consistently ranked impala as the species snared most frequently. Numbers ranged from 2 to 12 animals snared per month with a mean of 6.0 (SE 3.2). Other species snared included buffalo *Syncerus caffer*, puku *Kobus vardonii*, waterbuck *K. ellipsiprymnus* and warthog *Phacochoerus aethiopicus*. Monthly capture rates were too low to treat these species separately and instead the data were combined as 'non-impala' species. Mean capture rate for this category was 1.1 animal per month SE 0.05).

A crude approximation for the total number of animals snared in the year was calculated using conservative assumptions from the results described above: a 6-month snaring season, two individuals per village who used snares (or 57 individuals for the whole community), and 7.1 animals snared per individual per month. This gave a total of 2428 animals per year, of which 2039 were impala and 389 were other species.

Economic value of snared animals. Eighty-four per cent of interviewees stated that they sold snared animals or exchanged them for maize or other essential commodities, while 16 per cent said they used the animals only for household consumption. The higher use of

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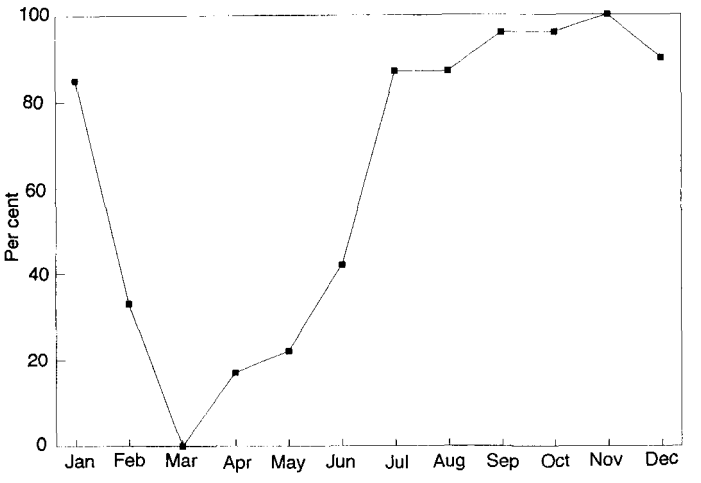

Figure 3. Seasonal use of snares based on percentage of respondents who said they used snares for certain months.

impala for cash or barter ($\chi^2 = 12.98$, d.f. = 1, $P \leq 0.001$) suggested that economic needs were the primary reason for the high level of snaring in Malama.

The actual income from snared animals was calculated for both impala and non-impala species. From a sample of 12 respondents, an impala was valued at $9.63 (SE 2.4) and non-impala species averaged $8.00 (SE 3.1). The lower value for the non-impala species is probably attributable to the practice of selling only a limited quantity of buffalo meat because this is the preferred meat for local consumption. Total income potentials from impala and non-impala species were $19,635 and $3112, respectively.

When asked if skins were saved and later sold, 84 per cent of respondents said they were discarded in the bush. This was probably because, without a government licence to hunt an animal, skins would have been regarded as evidence of poaching. Only 12 per cent said they sometimes used skins for making drums or chairs. Lost revenue from discarded skins was calculated on the basis of the $5 per untreated licensed skin paid by a local tannery. The total lost income for all species combined was $12,140.

Cultural background and social factors contributing to snaring. To gain an historical perspective to snaring, respondents were asked how long snaring had been practised in the area. Twelve were unsure, 62 per cent believed that snaring started in the 1980s and the rest thought that snaring started in the 1970s. Among the 18 interviewees who expressed an opinion, 95 per cent said that snaring was not a traditional method of killing large mammals. Before the advent of snaring hunters used pit traps with spears set in the bottom (S. Njovu, pers. comm.). Eighty-eight per cent of respondents said they preferred snares because they were cheap, less risky and were easy to obtain. Seventy-two per cent said that more people were using snares now than in previous years. Only two reasons were given for this change: food shortages and a greater need for income.

Finally, interviewees were asked what they thought should be done to encourage people to stop snaring. While 16 per cent could not offer suggestions, 24 per cent recommended increased employment for local residents and greater access to free game meat. Another 52 per cent recommended more assistance to farmers to protect crops from wild animals so that protein crops such as beans could be grown.

Safari hunting trends in Malama

To investigate what influence LIRDP might be having on safari hunting through its effects on land-use by Malama residents, a comparison

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of safari hunting kills was made for 1987, the year prior to the introduction of LIRDP, and 1995. In both years safari hunting was conducted from a single safari camp by resident hunting guides having comparable hunting experience in the area.

The places were animals were hunted, species killed and total number of animals killed were used to evaluate possible changes during the period (Figure 4). Two lions were hunted along the Lusangazi River in 1987 and 28 per cent of the total number of animals shot in Malama were within 2 km of this river. In addition, animals shot in Malama represented 49 per cent of the total number of animals hunted in Lower Lupande; the remaining 51 per cent were killed on adjacent land belonging to Chief Kakumbi where only one village of three households was situated in the hunting area. In contrast, in 1995 no lions were shot along the Lusangazi River, only 8 per cent of the animals killed in Malama were within 2 km of this river and animals hunted in Malama represented only 31 per cent of the total number killed in Lower Lupande. Although the total number of animals killed in Lower Lupande in 1987 and 1995 did not differ appreciably – 94 in 1987 and 87 in 1995 – hunting locations shifted away from Malama, specifically from areas near settlements.

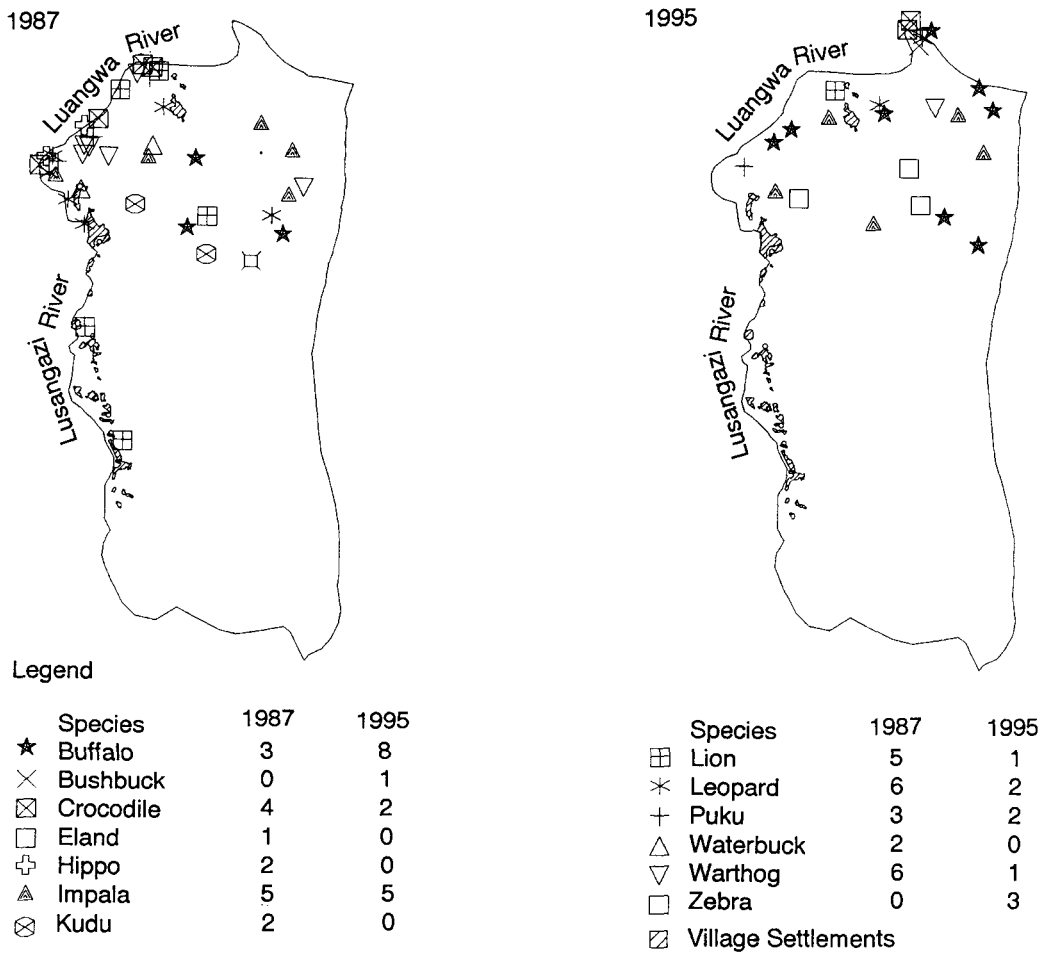

Figure 4. Locations where animals were killed by safari clients for 1987 and 1995 in Malama with specific marker symbols for each species. The shaded areas represent villages.

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Another change was a decline in the number of species hunted, from 12 in 1987 to 9 in 1995 ($\chi^2 = 0.7636$, d.f. =1, NS). This decline also paralleled a decrease in the total number of animals hunted in Malama, from 39 in 1987 to 25 in 1995 ($\chi^2 = 13.5455$, d.f. = 1, $P \leq 0.001$). This reflected a substantial decrease in safari income from Malama. Using current safari licence fees for both years, animals hunted in 1987 were valued at $31,110, while only $16,780 were earned in 1995.

Discussion

CBM projects: evaluation and monitoring

As unspoiled ecosystems in Africa become increasingly isolated and fragmented, the importance of finding sustainable solutions for their future protection cannot be overemphasized. Such urgency is raising expectations for CBM projects, especially because there are few alternatives beyond the traditional approaches of fencing and police enforcement, which have generally failed (Leader-Williams and Albon, 1988; Gibson and Marks, 1995). Evaluating CBM projects at the early stages of development is an important way of reducing the risk of a project failing to achieve its objectives.

Reducing the risks requires objective appraisals based on quantifiable indicators that gauge a project's performance and its level of support by a community (Kremen *et al.*, 1994). As Gibson and Marks (1995) pointed out, traditional rural communities in Africa are built on social and spiritual structures, which CBM projects might not fully take into account and, as a result, households may not respond as predicted to the economic incentives provided. Hence, it is essential for CBM projects to have an ongoing monitoring programme for studying such responses to identify potential problems and ways the project can be adapted in order to improve its performance.

Malama: a CBM project evaluation based on the use of snares

Under the LIRDP, a sustained income from wildlife through safari hunting was intended to be the principal source of benefits for promoting acceptance by and involvement of Malama residents. The high use of snares in the area, however, conflicts with the expected land-use practices of a community assumed to be supportive of the LIRDP. The historical background and cultural reasons given for this high use suggest that there are fundamental flaws in the way the project was designed. Residents most commonly gave hunger and economic hardship as the main reasons for using snares. Ironically, the total revenue generated from licence fees for 1995 in Malama was more than twice the total annual income for all households in this community (Atkins, 1985).

The study also revealed significant negative hunting trends for safari clients, who, apart from donor funds, were the primary source of revenue for sustaining this CBM project. Other than snaring the possible causes were population declines of prey species due to climatic changes or disease, inexperienced hunter guides, illegal hunting and hunting quotas that exceeded sustainable limits. Census data were typically incomplete when setting safari hunting quotas during the 1987–95 period and declining population numbers would not have been detected easily. This leaves open the possibility that safari quotas were unsustainable and contributed to negative hunting trends. On the other hand, illegal hunting with firearms can probably be ruled out as a factor because this has been at low levels in Malama since 1985 (Lewis *et al.*, 1990; W. Banda, pers. comm.). Inexperienced hunter guides also seemed to be an unlikely cause because hunting guides for both years had previous experience in Lower Lupande with over 6 years of guiding experience in Zambia (M. Faddy, pers. comm.) No outbreak of wildlife disease was reported in Malama during the years preceding the 1995 hunting season nor was there any apparent change in climatic factors.

The shift in hunting locations away from Malama supports snaring as a factor causing the negative hunting trends in this area. Expansion of villages or increases in the human population size might have contributed to such a shift, but population size

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has remained stable at about 800 since 1987 and there has been little change in settlement patterns (S. Njovu, pers. comm.) A shift in hunting effort away from Malama because more desirable trophies were found elsewhere is an alternative explanation. This does not rule out the possible effects of snaring. For example, in 1995, five lions (sexes not recorded) were snared in Malama according to wildlife scouts (W. Banda, pers. comm.) and such mortality could have affected both lion numbers and hunting effort patterns.

Malama: a CBM project critique

The high level of snaring suggested that Malama is unlikely to become self-reliant in meeting community needs through sustainable legal use of wildlife under the LIRDP. Instead, the results of this study suggest that residents have adopted snaring as a solution to economic hardship and food shortages. Ironically, the LIRDP was intended to discourage illegal use of wildlife through economic incentives from the safari hunting industry. The paradox may lie in LIRDP policy.

The project recovers 100 per cent of safari licence fees and gives 40 per cent to the communities of six local chiefs in Upper and Lower Lupande GMAs. The remaining 60 per cent is retained by the project administrators to support wildlife management costs in these two areas. Project employees rather than members of the community are responsible for financial accounting of both shares. The programme employs a number of people to supervise wildlife management in the area and the funds needed for this purpose. The real authority, therefore, for executing the management of the resources rests with LIRDP administrators, who are non-residents of of the area. The level of community involvement in managing the resource is limited to periodic meetings of selected local leaders called by project administrators to ask their views on management problems. Community initiatives in resource management are not promoted because project staff are employed for this purpose, thus reducing any sense of community responsibility for solving management problems affecting wildlife numbers and revenues.

In addition, safari revenues are shared among all the six chiefdoms, yet only three produce safari revenues from their areas. In the case of Malama, for example, with a population of just under 800, potential revenues from safari hunts could easily meet household needs. Under current LIRDP arrangements this is not possible because revenue shares are allocated equally to all six chiefs, who between them govern a total population of over 36,000 residents (Dean, 1995). This loss of income to Malama residents, the wildlife producers, may be perceived as LIRDP failing to provide the full benefit of living with wildlife. If so, it was compensated by household decisions to snare, which earned the equivalent of over $22,000 in 1995.

Without increased food and financial security, Malama residents are unlikely to relinquish snaring. Community-based management projects may not have the capacity to satisfy these needs for each household, given the limitation of sustainable offtakes of wildlife. This seems apparent in the LIRDP case. However, highly visible social facilities can usually be more effectively financed than immediate household needs and still give households direct incentives not to snare if such facilities are chosen by the community and are recognized as being financed from legal wildlife uses. By 1995, however, Malama had not initiated a single community facility from its wildlife revenues, even though it lacked such basic needs as health care, food security and roads. This underscored a basic weakness of LIRDP in encouraging local leaders to use revenues to meet community needs.

Current levels of snaring raise immediate concerns for the viability of this CBM project. Ironically, donor support itself may be contributing factor to its demise. Donor funding, which far exceeded safari earnings, supported a number of expensive capital projects, including road networks and bridges (not in Malama), communication improvements, offices, workshops and numerous vehicles. Such obvious indicators of development are 'donor provided' rather than 'wildlife earned'. It may

be that this high visibility of donor money undermined the perceived value of wildlife and thereby created disincentives to conserve wildlife for sustained benefits.

Implications for achieving CBM project objectives

The results from this study suggested several lessons that might help guide CBM efforts elsewhere in Africa. Communities need well-defined legal rights that guarantee entitled revenue shares from wildlife produced on their land. In addition, well defined responsibilities for managing the resource by the producer community need to be supported by capacity building rather than by external management. Proprietorship of the CBM project should, therefore, be institutionally developed as a programme owned and driven by the community. Otherwise programme managers not accountable to the community or not community-based may take advantage of their particular social and political status and erode any sense of community proprietorship for wildlife. The potential for this problem was seen in this particular CBM project in 1995 when irregular supply of donor funds forced project authorities to withhold safari revenues meant for the community. Instead these funds were used to support the costs of managing the project until donor money was able to repay the community some 6 months later (K. Phiri, pers. comm.).

Wright (1988) argued that it is better to use CBM models that are relatively simple, have low recurrent costs, draw heavily from local leadership, and are supported from income generation by stable, reliable markets. The converse model is one that requires extra reliance on external inputs and donor support at the expense of building and motivating local leadership linked to the management of the natural resource. The LIRDP appears particularly flawed in this regard. If CBM projects are to provide a realistic approach for rural development and conservation in Africa, they will need to remain focused on their primary objective of supporting human needs from sustained resource use with guarantees that such support is legally protected and derived by community involvement in the management effort.

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