Chapter 21

Synergies between Animal Husbandry and Wildlife Conservation: Perspectives from Zambia[1]

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Introduction

Over two-thirds of Zambia's large wildlife estate, which exceeds 290,000km^2, is on community land. As a state-owned resource, wildlife in Zambia has a history of protection that has relied largely on law enforcement by government-employed wildlife scouts. In the late 1980s, the Zambian Government recognised it could not police such a vast area and enrolled communities to help. In return, these communities received a share of safari-hunting revenues. It was the beginning of a community-based wildlife management approach that became known as the Administrative Management Design for Game Management Areas (ADMADE) programme.

Over the next two decades, ADMADE evolved its approach by improving local capacity to manage wildlife and adopt land-use practices conducive to wildlife production. Today, ADMADE is guided by Community Resource Boards (CRBs), which are made up of democratically elected leaders within single chiefdoms who have legislated powers and responsibilities to manage wildlife populations. They do this by employing their own "village scouts" to protect wildlife and by implementing their own land-use plans to control human activities that threaten wildlife. In exchange, CRBs receive 45% of all safari-hunting licenses and fees generated from their respective wildlife resources. In addition to supporting wildlife management costs from these revenues, CRBs also invest these revenues in community improvements.

Despite these advancements, a significant percentage of households residing in these wildlife areas have remained poor and frequently experience seasonal shortages of food. Many adopted coping strategies not compatible with wildlife production, such as snaring or poisoning of waterholes. Not only did these practices prove difficult to control by law enforcement, but they also accounted for significant loss of wildlife.

Many wildlife-based Community-Based Natural Resource Management (CBNRM) programmes in southern Africa have confronted such problems and have faced enormous difficulty in extending the benefits of conservation to all households in ways that could sustain community-wide commitment to conservation. These problems proved to be major challenges to conservation efforts in the region, and emphasised the need to more closely study community relationships with wildlife.

Our work in Zambia has pursued such studies and has increasingly shown that these relationships are closely tied to three variables: household livelihood needs, household-level skills, and available markets that sustain rural livelihoods. To apply this knowledge to wildlife conservation, our work taught us that it was necessary to build adaptive synergies with other disciplines that could make wildlife management more a livelihood practice and less an external management intervention imposed on rural communities. In a number of important wildlife areas of Zambia, we found that animal husbandry provided such a synergy for communities that depended on domestic animals but also shared the land with wildlife. By losing livestock to disease, affected households also lose income and food security, and to cope with these losses, households often turn to illegal use of wildlife. The significance of this simple relationship was not fully appreciated until recently.

This paper highlights two examples in Zambia in which the balance between wildlife and people was influenced by disease of domestic animals, and in which improved synergies with animal husbandry practices and rural markets can significantly influence wildlife production in and around protected areas.

Chickens and wildlife: the Luangwa Valley story

In a random sample of 1,065 households outside Luangwa Valley's four national parks (Lewis *et al*. 2001), poultry were the most common source of income but ranked only 34 of 50 income sources for relative contribution to total household income. Annual income for the head of the household was US $67 per year, with the actual contribution to household income from the sale of chickens only US $8 per year. On average, households owned at any given time 10–20 chickens, which also provided an important source of animal protein to the family's diet. Newcastle disease is endemic in the Valley and annually infects up to 60% of the chicken population with death rates as high as 80%–90%. In addition, mortality from predators and disease of young chickens often exceeded 50%.

[1]See abstract on p.xxxi.

From these results, it was clear that poultry production was well below its potential, limiting the level of income and food security that chickens could provide to communities in Luangwa Valley. We learned from household interviews that the loss of income or food from chickens that succumbed to Newcastle disease placed greater pressure on wildlife to make up for the shortfall.

Our research then turned to chicken husbandry, and we suggested that poultry production could increase 3- to 4-fold by vaccinating against Newcastle disease and by reducing mortality of young chickens using simple enclosures to reduce predation. We estimated that households that improved chicken husbandry practices could increase their income by an additional US $30 while also significantly increasing their supply of chicken protein for household consumption. With improved access to higher market prices, households could bring their total income from poultry to US $50 per year, or six times current levels.

These same communities resided in safari-hunting concessions outside national parks and on average received a revenue share from hunting of about US $55,000 for an average of 1,800 households, or approximately US $30 per household. Theoretically, income derived from poultry could exceed revenues derived from safari hunting. Our research also suggested that safari-hunting revenues were more than adequate to help households finance low-cost veterinary and husbandry support costs. This raised wildlife's value by significantly improving the security of household livelihoods while also reducing the threat of illegal wildlife hunting.

In 2002, we introduced a low-cost vaccine against Newcastle to test these predicted results. We provided the necessary training for community-based technicians or "barefoot vets" to administer the vaccine throughout their community. In 2003, of an estimated total of 22,000 chickens, 8,300 were vaccinated; total purchase cost of the vaccine was only US $24. In addition, families were organized to form poultry producer groups and shared the use of a 25m wire fence enclosure to safeguard young chickens from predation and to maintain high-quality feed for promoting growth. Finally, we assisted producer groups in bulking live chickens at local depots for collection by a regional trading centre that offered a 20% increase in purchase price of chickens if purchased in bulk. The Conservation Farmer Wildlife Producer Trading Centre provides animal health support to, as well as improved market access for, poultry producers. The trading centre is a pilot initiative to develop economic incentives for producer groups to invest greater levels of effort in livelihood practices other than illegal use of wildlife.

The following preliminary results are based on informal household interviews:

- Incidence of Newcastle disease has become negligible in most areas.
- Value of chickens has increased relative to illegal game meat. This is because illegal game meat cannot be sold on the open market for its "real" market value.
- The increased value and supply of chickens is reducing local demand for game meat.
- Households recognised the value of vaccinating against Newcastle disease and, to help support the purchase and delivery costs of the vaccine, households provided one free chicken to their regional trading partner for every 50 chickens vaccinated.
- Improved husbandry skills and increased market value have elevated household interest in poultry as a livelihood activity.

Low-cost husbandry and veterinary support for poultry owners clearly can increase food security and income among relatively poor households in wildlife areas. This work also illustrates how such linkages, when understood as a basis for promoting livelihoods, can enhance rural development models for supporting wildlife conservation.

Cattle disease and poaching in Kafue National Park

Wildlife poaching in the southern border region of Kafue National Park reached unprecedented levels in 2000 and remains a serious problem today. Its consequences on tourism could well be in the tens of millions of dollars, a loss that will likely require years to recover. A preliminary analysis of the problem suggested that increased rural poverty and chronic food shortages, precipitated by large-scale, disease-related mortality of cattle and drought-related crop loss, played significant roles in contributing to this poaching crisis. In hindsight, government authorities and conservation groups could have recognised the developing problem and planned for corrective measures to avoid the high costs now being paid by the wildlife and tourism sectors.

Background – with a focus on Southern Province

Over the past two decades in the western half of Kalomo District, Southern Province, livestock numbers have declined sharply. In 1986, approximately 80% of all households owned cattle; by 2000, only 35%–40% owned cattle (O. Makondo, personal communication). Epidemic outbreaks of bovine diseases, primarily East Coast fever (a theileriasis with high mortality) and trypanosomiasis, accounted for most of the drop in livestock numbers (P.C. Mubanga, personal communication). This decline in household ownership of cattle correlated with an estimated 65% loss of total cattle numbers for this same area.

During years of drought, cattle provide a critical source of cash needed for food and other domestic requirements and thus are an important "safety net" against crop failure for rural communities in this region. When cattle losses from disease reached extreme levels during the 1990s, rural livelihoods were primed for a more total collapse if severe drought were to occur. This was the case in 1994 and 2000, and many households had few livelihood options other than wildlife poaching in the adjacent protected areas. The current estimate

of average household annual income in areas surrounding the southern end of Kafue National Park, for instance, is below US $100 (P. Ngulube, personal communication 2002).

A comparison of local hunters, regarded as poachers, from Southern and Eastern Provinces in Zambia suggest that poaching in Southern Province is more than a coping strategy – it is increasingly becoming an alternative livelihood to more traditional livelihood practices. Hunters in Southern Province consistently use more modern and destructive firearms, kill more animals annually, and market their illegal game meat more profitably than their counterparts in Eastern Province.

While the absolute magnitude of this problem is not well described, the severity of faunal collapse in areas once noted for both wildlife numbers and diversity of wildlife species in the Southern Province is generally accepted as fact. Sichifulo Game Management Area (GMA) averaged US $70,244 per year from safari hunting in animal license and hunting fee sales during 1997–1999 from an average harvest of 70 animals, representing 20 species. In 2003, Sichifulo was regarded as a depleted wildlife area with little capacity to sustain a hunting quota or the levels of revenues needed to encourage community compliance with laws protecting wildlife.

Scale of veterinary problems and history of services provided

Until 1990, the Zambian government provided free veterinary services for livestock owners and, in Kalomo District, this included dipping to reduce tick-borne diseases such as East Coast fever and red water fever (babesiosis) and efforts to prevent trypanosomiasis. Cost for this service in the communities surrounding Sichifulo GMA was estimated to vary from US $10,000 to US $20,000 per year (P.C. Mubanga, personal communication).

Following 1990, policies regulating government-supported veterinary services changed, and households assumed responsibility for their own cattle. This hardship was compounded by a drought in 1994, and infection levels increased. Limited donor assistance was provided from 1989 to 1994 with the introduction of 4,500 tsetse fly traps provided by the European Economic Commission but the government of Zambia did not sustain such tsetse control efforts after 1994. Similarly, Swedish International Development Aid provided assistance for 26 dipping tanks from 1987 to 1990, but the government of Zambia again did not sustain these after 1990. During the ensuing years, disease-related mortality increased progressively in livestock populations in rural communities throughout much of Kalomo District. In 2002, for example, in 603 cattle sampled from four selected areas outside Sichifulo GMA, 63.4% were infected with trypanosomes, whereas in the late 1980s, less than 1% were infected (P.C. Mubanga, personal communication).

Realizing the severity of the problem, the Zambian Government created a special loan fund in 1998 to assist livestock cooperatives' purchase of their own drugs. Unfortunately, a number of the participating cooperatives defaulted on repayment, and the local bank administering the funds closed the programme. In 2002, the government provided limited assistance to purchase drugs used to treat sick cattle. In the same year, World Vision introduced a cost-recovery programme that allowed livestock owners to purchase drugs to treat 1,600 head for trypanosomiasis.

In addition to the lack of drugs and preventive treatments, frequent droughts led to wild animals drinking from pools used by cattle, thus increasing the likelihood of disease transmission at this more intensive interface. Growing numbers of households relied on poaching to cope with lowered food production and loss of livestock. When returning from the bush with meat and animal skins, hunters also brought tsetse flies back to their areas of residence and livestock areas.

Lessons learned and a "win–win" strategy

The Kafue story underscores the critical linkages between cattle, disease, household livelihoods, and wildlife. It also demonstrates the need for improved dialogue among potential partners that have complementary stakes in both cattle and wildlife populations. If such partners had collaborated and coordinated their needs and potential sources of help, the collapse of both livestock and wildlife populations might have been prevented. Such synergies typically work best at the local level, where economic consequences are most easily recognised and where stakeholders can complement support most effectively. To improve outcomes of future similar scenarios, the following arrangements are recommended:

- Safari operators, community leaders, local veterinary officers, and Zambia Wildlife Authority officials coordinate information and ideas for developing a workable, low-cost programme for treating livestock against key diseases.
- Private sector, government, and community stakeholders share veterinary costs and promote household appreciation of the idea that revenue from safari hunting can help cover these costs only if wildlife is conserved.
- Local residents, trained as "barefoot vets," administer treatments and vaccinations while promoting public awareness that disease control and prevention is supported by wildlife-generated revenues.
- Revenue shares from safari hunting are set aside to support veterinary costs and are administered jointly by collaborating parties, possibly seeking matching funds from government.
- Community leaders convene community meetings to build consensus for proposed veterinary solutions while seeking commitment from households to not poach or degrade wildlife habitat.
- Community leaders organize livestock owners as producer groups to oversee the work of "barefoot vets" and as leaders in wildlife production by reducing potential conflicts between wildlife and livestock.

- Veterinary officers monitor and supervise interventions and report back to collaborating stakeholders.

Conclusions

This paper illustrates the potential for synergies between animal husbandry and wildlife conservation in rural areas around Africa's national parks. Rural development models have largely ignored such linkages, especially where institutional barriers have historically reduced dialogue and collaboration between different disciplines. In turn, this has limited opportunities to pursue more adaptive approaches to resource management and rural development.

The examples in this paper underscore the importance of analysing rural livelihood needs and their relationships to environmental threats as a basis for developing practical management interventions for conservation. The two examples provided in this paper emerged after research helped clarify how such relationships influenced rates of illegal wildlife use and what disciplines and synergies were necessary to apply an effective wildlife management response. Veterinary interventions, such as supporting rural capacity to vaccinate chickens against Newcastle disease, with the cooperation of an external trading partner who helps subsidize veterinary costs, can clearly have a role in conservation that has not been fully appreciated previously.

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Reference

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