inception. Key lessons that emerge from the Tanzanian experience include:

•Natural resource management reforms in Africa face fundamental institutional challenges in terms of devolving authority over valuable resources to the local level.

•Donors and NGOs often promote such reforms without an adequate understanding of the institutional barriers to their adoption, and may therefore fail to develop effective strategies for negotiating such constraints.

• Ultimately, moving CBNRM from popular narrative to institutional practice will require greater grassroots participation in natural resource policy formulation, and popular demand for devolution; in this way, CBNRM is fundamentally tied to broader discourses on resource rights and governance in Sub-Saharan Africa and throughout the developing world.

Originally published as:

Nelson, F., R. Nshala and W.A. Rodgers. 2007. The Evolution and Reform of Tanzanian Wildlife Management. *Conservation and Society* 5(2):232-261.

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Landowner Experiences Regarding Biodiversity Outside Protected Areas in Kenya

Oscar Wambuguh

Substantial biological diversity exists on lands outside protected areas and its survival depends on the goodwill of people who own those lands. To ensure that these landowners contribute to biodiversity conservation efforts in mutually beneficial partnerships, it is important to understand their socio-economic backgrounds and historical heritage, their land-use patterns and expectations, and their biodiversity education needs, as a basis of formulating conservation policies that do not exclude them.

In Kenya today private landowners receive only minor direct benefits from wildlife. With no compensation to mitigate wildlife damages, public attitudes toward wildlife are very unfavourable, especially among landowners who practice small-scale farming and pastoralism. The goal of this study was to explore some of the issues arising from interactions between local landowners and wildlife in a prominent wildlife area in Kenya. I conducted interviews with 377 private landowners of three categories, small-scale, pastoralist and large-scale, in Laikipia District of north-central Kenya. The results give us a glimpse of important landowner perspectives regarding conservation and biodiversity in Laikipia. These can provide some direction for wildlife policy analysis and other conservation needs, including focus points for further research.

Landowners in Laikipia differed in many respects regarding benefits from wildlife, wildlife damage and mitigation, and possible solutions, depending on their economic backgrounds, land parcel size and land use, traditional history, and knowledge about biodiversity. Regardless of ownership type, over 90% of all reported cases of threats due to wildlife, and injuries and deaths caused by wildlife, were attributed to one animal, the elephant. The remaining 10% of cases were attributed to buffalo, lion and hippopotamus, in that order. Many landowners routinely reported damages to the Kenya Wildlife Service (KWS). Of the small-scale landowners, less than 30% of those sampled reported damage and up to 94% of them used an assortment of methods to keep wildlife away. Amongst small-scale landowners and pastoralists the most favoured methods of deterring wildlife were the traditional ones. These included lighting bonfires, and beating iron-sheets or cracking whips to make a sound. The large-scale land owners primarily preferred shooting in the air using firearms to deter wildlife. Compensation for wildlife damage was a major issue in Laikipia, and all landowners felt strongly about the initiation of some form of government compensation scheme. According to KWS, no wildlife crop or property damages are compensated at this time except cases of wildlife-caused human death, which is compensated at a meagre US$ 215.

Considering benefits from wildlife, more than half (67%) of all small-scale landowners believed they gained nothing directly; 19% of pastoralist and 4% of large-scale landowners concurred with this view. However, many landowners appreciated the role of wildlife in general, and the importance of conserving biodiversity for foreign exchange, for aesthetic reasons, and as a reservoir of genetic diversity. Among the wildlife utilisation methods favoured, landowners highlighted the need for programmes in wildlife cropping, safari hunting, ecotourism, and game farming. The existing wildlife utilisation programme in the district was unpopular with a majority of landowners particularly due to delays in the derivation and sharing of benefits, lack of landowner commitment to programme meetings and deliberations, general illiteracy among most landowners, organisational logistics characterised by low managerial capacity and poor operational skills, existence of more economical and dependable alternatives, and the uncertainty of the current wildlife utilisation programme.

With interactions between landowners and wildlife expected to increase in the future, some preventive and management measures that emphasize direct wildlife benefits, compensation for property damages, problem animal control, investment in development projects, and biodiversity education must be incorporated (Table 1). Those can be combined with support for some of the effective traditional methods of wildlife deterrence, provision of incentives including cash and development projects tied to wildlife conservation and training opportunities, devolution of partial ownership responsibilities to landowners, and improving access to biodiversity education materials and opportunities for local landowners.

To achieve success in biodiversity conservation outside protected wildlife areas in Kenya and elsewhere, multiple partnerships

Percentages (with 95% C. I.) of landowners advocating various solutions to wildlife problems in Laikipia District of north-central Kenya. Relative preferences for various solutions differed among categories of landowners.

	Small-scale (N=279)	Pastoralist (N=83)	Large-scale (N=15)	$\chi 2$	p
Benefits to landowners	95 (88-99)	90 (82-98)	100 (93-100)	4.01	NS*
Keep wildlife away	78 (72-84)	32 (27-37)	23 (20-28)	71.64	<0.001
Compensate for losses	72 (66-78)	88 (81-95)	68 (62-72)	10.43	0.022
More ranger outposts	41 (36-46)	15 (11-19)	8 (4-12)	28.42	0.009
Developmental assistance	38 (33-43)	45 (39-71)	12 (9-15)	5.98	0.018
Biodiversity education	12 (8-16)	9 (6-12)	85 (78-92)	43.52	<0.001

* Not Significant

must be developed with local landowners emphasizing direct benefits, transparency, trust, patience, and indeed, some sacrifices. Our ability to conserve habitats and their biodiversity will be judged by what we have done in practice, rather than by what we have found theoretically possible. As the conservation of wildlife outside protected areas will ultimately depend on the goodwill extended to wildlife by private landowners, it is imperative that as information becomes available from research, it is evaluated and translated to guide future policies that are sensitive to the needs of people, wildlife, and the environment.

Originally published as:

Wambuguh, O. 2007. Interactions between Humans and Wildlife: Landowner Experiences Regarding Wildlife Damage, Ownership and Benefits in Laikipia District, Kenya. *Conservation and Society* 5(3):408-428.

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Photos: Oscar Wambuguh

Reducing Negative Impacts of Road Paving in the Amazon

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Infrastructure projects are crucial for regional development, but they also bring negative social impacts such as land conflicts, as well as ecological impacts such as deforestation along with carbon emissions and loss of biodiversity. A reason for these negative impacts is that large-scale infrastructure projects lack a process to incorporate public participation. The result is marginalized communities, and consequent degradation of the ecosystems on which these communities depend.

To address this problem we organized participatory workshops with stakeholders in municipalities along the Inter-Oceanic Highway in the southwestern Amazon. This area is a biodiversity 'hotspot' and the Andes-Amazon interface has particularly high species diversity. Approximately 30 indigenous groups are located along the Inter-Oceanic Highway, as well as rubber tappers, *castaña* ('Brazil nut') collectors, and other groups who have long managed local natural resources.

The Inter-Oceanic Highway passes through the tri-national 'MAP' frontier, where Madre de Dios (Peru), Acre (Brazil) and Pando (Bolivia) meet. Concerns about cross-border impacts of the Inter-Oceanic Highway stimulated the emergence of the MAP Initiative, a grassroots movement that integrates stakeholders on all three sides of the MAP region (www.map-amazonia.net). Since 2000, the MAP Initiative has organised tri-national meetings for dialogue and planning activities, which are open to the public. Imperative in this process is the need to work with local communities. Workshops provide a means for communities to receive information about potential changes as well as to articulate their preferences about possible futures. The Scenarios programme of the NGO, IPAM (the Institute for Amazon Environmental Research), features public workshops that incorporate the perceptions of local peoples into planning for road corridors receiving new infrastructure investments (www.ipam.org.br).

We adapted the IPAM Scenarios workshop process to the case of communities along the Inter-Oceanic Highway in the southwestern Amazon. This allows for comparisons of stakeholder perspectives among the three sides of the MAP frontier. This is especially important, for the Inter-Oceanic Highway has been paved in Brazil, allowing Peruvians and Bolivians to see what problems Brazilians face after road paving.

We conducted workshops in 18 municipalities in the MAP region through which the Inter-Oceanic Highway passes. In each municipality, 25 to 30 local leaders participated, including municipal government representatives, local representatives of national environmental agencies, and diverse community leaders.

We asked participants to list concerns regarding infrastructure, social problems, environmental damage, economic difficulties, and local politics. Tabulations of concerns showed which problems were mentioned most often. We also asked participants to rank the problems they mentioned. Such rankings showed which problems were considered the most serious, and provided a means for prioritizing planning around specific concerns. In addition, the multi-stakeholder workshops included a participatory mapping exercise. This allowed participants to identify locations where they expected problems due to paving of the Inter-Oceanic Highway.

Data from workshops in Brazil demonstrated that not all problems are resolved by road improvements, and, in fact, new social, environmental, and economic problems (drugs, alcoholism, and violence;