Article

Interactions between Humans and Wildlife: Landowner Experiences Regarding Wildlife Damage, Ownership and Benefits in Laikipia District, Kenya

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Abstract: *Substantial biological diversity exists in areas outside protected areas and its survival depends on the goodwill extended by private landowners. To ensure that those landowners contribute to biodiversity conservation efforts in mutually beneficial partnerships, it is important to understand their socio-economic backgrounds and historical heritage, land use patterns and expectations, and biodiversity education needs as a basis of formulating inclusive conservation policies. 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. Interviews were conducted with 377 private landowners in Laikipia District of north-central Kenya falling in three categories: small-scale, pastoralist and large-scale. Landowners differed in many respects regarding wildlife benefits, wildlife damage and mitigation, benefits, ownership and possible solutions primarily based on their economic backgrounds, land-parcel size and land use, traditional history and knowledge about biodiversity. In all ownerships, the elephant (*Loxodonta africana*) was the most dominant animal in terms of size and its potential to cause injury or death and damage to property. The most favoured methods of deterring wildlife were traditional (in small-scale and pastoralist ownerships) including bonfires, iron-sheet beating and sound whips; while in many large ownerships modern methods were favoured, primarily the use of firearms to*

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shoot in the air. Many landowners stated that benefiting from wildlife utilisation directly, was very important to them. Suggested long-term solutions emphasised direct wildlife benefits, compensation for property damages, problem animal control, investment in development projects and biodiversity education.

Keywords: wildlife, biodiversity, conservation, wildlife benefits, wildlife damage, wildlife control, compensation

INTRODUCTION

THE WORLD CONSERVATION STRATEGY, developed over two decades ago, recognised the need to maintain essential ecological processes and life support systems to ensure sustainable resource utilisation and preservation of the earth's genetic diversity (IUCN 1980). The main challenge to implementing this strategy has been the development of appropriate tools, which includes development of policies and approaches suitable for different areas and cultures (Kiss 1990; Songorwa & Buhrs 2000). Developing such tools applicable to diverse areas requires specific local information that is not always available. Conservation of biodiversity has become more complicated than conservationists once thought, hence approaches to its conservation, as practiced today, have therefore increased in number, scope and complexity (Redford et al. 2003).

In many of the developing countries in Africa, most wildlife live outside protected areas. These protected areas include national parks, national reserves, conservation areas and privately owned land. Areas outside of protected areas fall largely within the jurisdiction of private landowners. In many countries, private landowners have full user rights of the resources on their property in the best way they deem necessary with only minor exceptions. For instance, in the protection of endangered or threatened wildlife or development initiatives whose impact extends beyond any one landowner (as in tapping river water for irrigation). With increasing human population in developing countries, human activities that are detrimental have also increased and there have been irreversible effects on the environment. Such activities have been on the increase in the last three decades. As we progress this century, we not only have to re-define the role of humans and of wildlife in the environment they share, but we must also retune our current conservation priorities with better, smarter, focused and perhaps strategic approaches (Infield 2001; Kuriyan 2002; Western 2003; Fabricius et al. 2004; Rogers 2005).

With only minor direct benefits reaching landowners at present from wildlife countrywide, and no other form of compensation to mitigate wildlife damages, public attitudes towards wildlife remain unfavourable especially among

among small-scale farmers and pastoralists. This study was based on preliminary observations by myself and others that indicated most landowners in the Laikipia District of Kenya, appeared to have become extremely intolerant of wildlife in general because of a perceived negative cost-benefit ratio between themselves and wildlife. This article, guided by insights gained from a 2-year study on landowners and biodiversity conservation in Kenya, discusses issues that appear to reinforce the notion that in the developing countries of Africa, our success in conserving biological diversity this century will be gauged by the attention given to areas outside protected areas. This means appreciating and understanding the needs, activities and aspirations of local landowners. The article particularly focuses on issues raised by landowners including human threat and injury from wildlife; wildlife damage reporting and mitigation; derivation of direct wildlife benefits and biodiversity conservation; and ends by a discussion of suggested management alternatives.

STUDY AREA

This study took place in Laikipia District in north-central Kenya, a plateau located east of the Great Rift Valley between latitudes 0°17′S–0°45′N and longitudes 36°10′E–37°3′E hemmed in the west by the Aberdares range, to the south and south-east by Mt. Kenya, and to the east by the Mukogodo hills. It averages 2000 m in altitude and rises to over 2500 m on the Aberdares slopes and 2250 m on the slopes of Mt. Kenya. With an area of approximately 9723 km^2, most of Laikipia is low country with numerous broad and generally grassy volcanic ridges cut into by two major rivers Narok and Ewaso Nyiro with various tributaries flowing down from the Aberdares and Mt. Kenya. These rivers serve as perennial water sources to the livestock-ranching activities that predominate in Laikipia district. Land use in Laikipia shows great diversity in origin, appearance and impact on society and ecosystem, and its different modes form a complex that with further examination reveals some of the most fundamental changes that have taken and continue to take place in the utilisation of land in post-colonial Kenya. The dominant land use is large-scale ranching under non-African ownership (between 50 per cent and 70 per cent of the district); African ownership (7.8 per cent) and state ownership (8.5 per cent). Small-scale farming that arose as a result of government resettlement schemes soon after political independence in 1963 today comprises less than 5 per cent of the district. Pastoralism that is more confined in the north and the north-eastern part of the district comprises about 13 per cent of the district.

MATERIALS AND METHODS

Primarily based on their economic backgrounds, land-parcel size and land use, traditional history and knowledge about biodiversity, I expected landowners

to differ in many respects regarding wildlife benefits, wildlife damage and mitigation, ownership and possible solutions. The landowner study population therefore consisted of three ownership types: (1) small-scale subsistence landowners undertaking mixed farming (i.e. livestock and crop agriculture); (2) pastoralist landowners and (3) large-scale landowners who mostly practice livestock-ranching in Laikipia District. For interviews, I visited fifteen of the largest large-scale ownerships, which represented about 75 per cent of the large-scale area in Laikipia District. In small-scale ownerships, I chose a randomised convenience sample, as discussed by Scheaffer et al. (1996), of 279 landowners for interviews using the following procedure: eighteen landowners were chosen in each of the eight bigger farming schemes in the District, and nine landowners were chosen in each of the fifteen other areas (for a total of twenty-three out of seventy-five small-scale ownerships in the District). In pastoralist areas, interviews were conducted in ten of the fourteen Group Ranches in the District. In each of those ranches, I chose a randomised convenience sample of eight individual *bomas* (a *boma* is defined as eight to ten Maasai houses close together in the same compound, with a total of around twenty to thirty inhabitants). For analysis, I treated large-scale ownerships in the results individually and pastoralist ownerships as Group Ranches. In small-scale ownerships, I considered the numerous small property sizes as part of a larger administrative unit called a sub-location or 'scheme', which produced mapping and analysis units of comparable area to the other two types. χ^2 tests of homogeneity and independence (Wilkinson & Engelman 1996; Zar 2006) were used for statistical analyses.

LIMITATIONS OF THE STUDY

I believe that data collected from individuals could be biased up or down because sampling could not be completely random. Sampling biases were unavoidable due to the long distances between individual households or *bomas*, the poor (or non-existent) roads and in certain areas, inaccessibility especially when it rained. For instance, landowners in poorly accessible valley bottoms and higher elevations were difficult to reach and I could therefore not interview them. Nevertheless, the study gives us a glimpse of important landowner perspectives regarding conservation and biodiversity in Laikipia, which can provide some direction in wildlife policy analysis and focus points for further research.

RESULTS

Threat of Human Injury

In small-scale ownerships, 95 per cent of landowners reported that they lived under threat of bodily harm by wildlife; while in pastoralist and large-scale

ownerships, 85 per cent and 44 per cent, respectively, reported the same (Table 1). For 1996, those reporting wildlife-inflicted injury and deaths were highest in pastoralist ownerships (Table 1). The responses among landowners in all ownerships were significantly different.

Regardless of ownership type, over 90 per cent of all cases of wildlife threats, injuries and deaths were attributed to one animal: elephant, and the rest to buffalo, lion and hippo in order of importance (Table 2).

Wildlife Damage Mitigation

Many landowners routinely report damages to the Kenya Wildlife Service (KWS) (Table 3). However, in small-scale areas less than a third (30 per cent) of those sampled reported damage and up to 94 per cent of them used an assortment of methods to scare-off wildlife (Table 3). The differences in responses among the three landowner types were significant. Responses from small-scale and pastoralist landowners correlated weakly ($r = 0.49$, $p < 0.05$); while their combined responses correlated negatively with those of large-scale landowners ($r = -0.54$, $p < 0.05$).

New Legislation

A new government policy of not compensating landowners for wildlife damages was established in 1990. Only 28 per cent of small-scale; 41 per cent of

Table 1

Percentages (with 95% CI) of landowners reporting various human-wildlife problems

Nature of the problem	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N=15)	χ^2	p-value
Threatened	95(89–98)	85(76–93)	44(33–52)	28.05	0.016
Caused injury	48(40–56)	59(51–67)	15(7–25)	12.74	0.029
Caused death	36(28–42)	45(37–53)	12(4–21)	6.37	0.015
Indifferent	0	0	29(20–39)	TNA	

TNA: test not applicable.

Table 2

Percentages (with 95% CI) of landowners identifying various problem animals

Species	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Elephant	94(85–98)	97(88–99)	92(81–97)	0.86	NS
Buffalo	5(1–13)	3(0–9)	7(1–14)	1.32	NS
Lion	0.5(0–5)	2	7(1–14)	0.07	NS
Hippo	0.5(0–5)	0	0	TNA	

TNA: test not applicable.

Table 3

Percentages (with 95% CI) of landowners who used various methods to deter wildlife

Method	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Lighted bonfires or splinters	96(91–100)	64(58–70)	33(28–38)	78.42	<0.001
Iron-sheets beating	95(90–100)	72(65–79)	20(15–25)	70.50	<<0.001
Traps and sound whips	88(82–94)	5(2–8)	0	212.99	<0.001
24-hour surveillance	42(38–46)	17(12–22)	65(58–72)	24.52	0.007
Reported damages	30(27–33)	66(59–73)	87(80–94)	49.14	0.005
Shot in the air	0	0	68(61–75)	TNA	
Shot animals	0	0	13(9–17)	TNA	
*Others	94(89–99)	72(65–79)	7(4–10)	76.34	<0.001

Notes: TNA: test not applicable.
Other methods used to deter wildlife include throwing stones, effigies, dogs, drums, opaque fences and whistles.

Table 4

Percentages (95% CI) of landowners giving various reasons why the legislative enactment was not effective

Reason	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Corruption	74(66–82)	80(72–88)	35(26–44)	12.20	0.004
Ignorance of people's needs	64(57–71)	31(26–36)	7(3–11)	44.73	<0.001
Lack of resources	8(52–64)	43(37–49)	90(80–100)	16.32	0.004
Over-estimated losses	32(27–37)	40(34–46)	7(3–11)	7.88	0.015
Did not know	25(21–29)	54(48–60)	0	23.78	0.006

pastoralist and 100 per cent of large-scale landowners stated they were aware of the enactment. Asked why the government would effect such critical policy changes affecting thousands of people, many landowners stated that the previous compensation programme was plagued with corruption, over-estimated damages, ignorance of local peoples' needs, lack of funds for compensation, and some had no idea why (Table 4). The differences in responses among the three ownership types were significant (Table 4).

Wildlife Ownership

While all large-scale landowners interviewed stated wildlife proprietorship was important to them, small-scale and pastoralist landowners stated that deriving benefits from wildlife mattered to them the most (Table 5). The differences in ownership responses were significant among the three ownership types.

Management Alternatives Suggested

To minimise wildlife-associated problems in Laikipia District, landowners had a number of suggestions directed to the KWS (Table 6). While most small-scale farmers (78 per cent) felt that KWS should keep all wildlife away from farming areas; fewer pastoralist and large-scale landowners felt so. Compensation for wildlife damage is a major issue in Laikipia, and all land-

Table 5

Percentages (with 95% CI) of landowners and the issue of wildlife ownership

View on ownership	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Ownership unimportant	84(76–92)	92(87–97)	0	4.59	0.019
Ownership important	8(4–12)	3(0–6)	100	75.27	<0.001
Undecided	8(3–12)	5(0–9)	0	0.32	NS

Table 6

Percentages (with 95% CI) of landowners advocating various solutions to wildlife problems

Proposed solution	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
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

owners felt strongly about the initiation of some form of government compensation programme (Table 6). A majority of landowners (95 per cent small-scale; 90 per cent pastoralists and 100 per cent large-scale) felt that they needed to benefit from wildlife on their property. Regarding education of landowners about biodiversity, a majority of large-scale landowners felt it was important (Table 6). There were significant differences in responses among landowners in the three ownership types, except for responses about landowner derivation of benefits from wildlife. Landowners in the three ownership types strongly differed on two issues: complete removal of wildlife from their properties and biodiversity education (Table 6).

Wildlife Appreciation and Utilisation

More than half of all small-scale landowners (67 per cent) believed they gained nothing directly from wildlife, while 19 per cent of pastoralist and 4 per cent of large-scale landowners agreed with this point (Table 7). Nearly half of the large-scale and pastoralists landowners believed they were benefiting from consumptive wildlife utilisation, while about a third of small-scale landowners believed so. None of the small-scale farmers believed they were benefiting from non-consumptive wildlife values, while 51 per cent of large-scale landowners and 33 per cent of pastoralists believed they did. A few small-scale landowners (5 per cent) stated they utilised wildlife (particularly smaller mammals) via subsistence hunting (Table 7). The differences in responses among landowners in the three ownership types regarding the perceived wildlife benefits were significant.

Many landowners appreciated the role of wildlife in general, and the importance of conserving biodiversity for foreign exchange (Table 8). A surprising number of landowners (contrary to popular opinion about the small-scale and pastoralist landowners) valued wildlife on aesthetic grounds (Table 8). Moreover, a large number of landowners appreciated the value of biodiversity as a reservoir of genetic diversity (Table 8). There was however a small percent

Table 7

Percentages (95% CI) of landowners stating ways they were tangibly benefiting from wildlife

Benefits	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
None	67(49–85)	19(5–33)	4(0–9)	72.20	<0.001
Wildlife cropping	28(19–37)	48(36–60)	45(26–64)	16.36	<0.001
Subsistence hunting	5(0–11)	0	0	TNA	
Tourism	0	33(22–44)	51(35–67)	47.79	<0.001

TNA: test not applicable.

Table 8

Percentages (with 95% CI) of landowners and their perceptions of general wildlife

Perception	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Earn foreign exchange	74(66–82)	87(80–94)	100(95–100)	14.30	0.029
Aesthetic	44(38–50)	68(61–75)	88(83–93)	23.15	0.011
Wildlife utilisation	33(27–39)	28(24–32)	100(95–100)	33.97	<0.001
Development projects	32(26–38)	55(49–61)	64(60–68)	19.82	0.020
Nothing	31(25–37)	9(6–12)	15(11–18)	21.18	0.034
Gene reservoir	27(22–32)	41(34–48)	74(70–78)	15.87	0.005

Table 9

Percentages (95% CI) of landowners that would consider various wildlife utilisation options

Utilisation option	Small-scale (N = 279)	Pastoralist (N = 83)	Large-scale (N = 15)	χ^2	p-value
Cropping	54(37–63)	35(29–41)	75(68–82)	12.87	0.026
Game farming	31(18–41)	30(25–35)	40(35–45)	0.56	NS
Tourism	5(1–12)	95(87–100)	90(83–97)	299.30	<0.001
Safari hunting	3(0–10)	88(80–88)	86(80–86)	78.00	<0.001

age of landowners who found nothing good in the idea of conserving biodiversity (Table 8). There were significant differences in the responses given by landowners among the three ownership types.

Landowners suggested a number of ways in which they would like to utilise wildlife if allowed to (Table 9). While the majority of large-scale (75 per cent) and small-scale (54 per cent) landowners would like to crop wildlife, only 35 per cent of pastoralists were interested in this option (Table 9). Safari hunting was attractive to 88 per cent of the pastoralists and 86 per cent of large-scale landowners, but only 35 per cent of the small-scale landowners. Tourism was another popular option for most large-scale landowners (90 per cent) and pastoralists (95 per cent) (Table 9). Game farming was suggested as an option by all landowners (Table 9). A small percentage of small-scale landowners however, opposed to having wildlife on their properties, stated they would not consider any wildlife utilisation on their properties whatsoever (Table 9).

DISCUSSION

Threat of Human Injury

According to a KWS (1994) report most wildlife attacks on humans in Kenya appear to be perpetrated (in order of importance) by elephant, buffalo, lion, and occasionally by leopard, hippo and crocodile. The pattern seen in Laikipia (Table 2) closely correlated with this national ranking. Landowners in Laikipia live with wildlife threat, injury and sometimes wildlife-caused death which, according to data collected in this study, appeared to have more serious implications in small-scale and pastoralist ownerships than in large-scale ones (Irigia 1990; Mulama 1990; Thouless 1993; Table 1). In the former areas, people generally travelled from place to place on foot or by bicycle and many of those injured or killed by wildlife were adults; the rest were school children who had to travel long distances to school, or take care of livestock in the bush. Gender appeared not important in terms of risk exposure between women and men. Males were usually at risk primarily due to their social activities in the early evening that took them to neighbourhoods a distance away from their own homes, and many were also involved in off-farm income generation travelling long distances to trading centres (Kohler 1987). Females on the other hand were more exposed to dangerous wildlife when they were fetching household water from rivers, collecting firewood in the bushes, when working on their farms and when travelling for social activities (often on weekends). In large-scale ownerships, wildlife threat was present but less serious because people there used vehicles and had rifles to shoot in the air to scare dangerous animals away. Attacks came only occasionally when farm workers were off-duty and had to travel to trading centres or to their homes, which involved travelling long distances on foot. Relying on irregular vehicle rides that dropped them off somewhere along the way, added to the danger. According to KWS (2007), no wildlife crop or property damages are compensated at this time except for cases of wildlife-caused human death, which is compensated at US$215, an amount that cannot help families who may have lost their sole family income earner.

Wildlife Damage Mitigation by Landowners

Small-scale and pastoralist landowners (the majority of whom had no firearms) protected themselves against wildlife injury and damage in a number of ways, most of which were directed towards the most ubiquitous and perceived ‘most damaging’ animal, the elephant. Elephants’ known dislike of fires and sharp, loud noises by landowners had resulted in many innovative techniques of scaring them off (Table 3). The incorporation of 24-hour wildlife surveillance teams and other methods was common. For instance, small huts built with dried thatch grass in close proximity to farms strategically located in

view of the entire farm (sometimes several, depending on farm size) were a common sight. Family members and farm labourers took turns guarding the farms while taking refuge in the huts. This costly undertaking many farmers stated, was justified not only on the grounds of the potential damage elephants caused, but also the expected revenue returns if crops (such as cabbage and tomatoes) reached harvesting age with only minimal damage. In few cases, 'thunder-flashes' were issued to landowners, by local KWS offices, and only to landowners who demonstrated they had either military training or previous knowledge of using explosives to scare-off wildlife (local warden, pers. comm.). (Thunder-flashes are a form of very mild explosives that explode on impact and are usually thrown in areas with elephants.) They explode with a loud sound when they hit the ground. In recent years, many farmers have complained of frequent leopard attacks on guard dogs that have seriously reduced dog numbers. This has left farmers more vulnerable to other animals because dogs, by barking, usually warn them of impending wildlife attacks. On large-scale ownerships, where rangers and other farm workers had rifles, shooting in the air was common that scared elephants temporarily from the farms. Depending also on the extent of damage, shooting at elephants was not uncommon. Large ownership sizes and land use differences also made some techniques used by large-scale landowners of limited application in small-scale and pastoralist ownerships.

Reporting Wildlife Damages

Numerous wildlife species occur in Laikipia and the three most frequently encountered ones in small-scale areas were elephant (reported by 94 per cent of landowners), zebra (89 per cent) and jackal (56 per cent). Although elephant was rarely present year-around in Laikipia, it was the only species many landowners stated they frequently encountered. It is believed that this high frequency is more related to landowner perceptions and experiences of the intensity and extent of its damage, than to its physical presence. Many landowners did not report damage caused by wildlife (small-scale, 70 per cent; pastoralist, 64 per cent and large-scale, 83 per cent) perhaps due to a number of reasons. (1) Losses would not be compensated according to KWS policy, but delays in processing claims were also cited (KWS 1994; Wafula 1995). (2) Commuting distances involved from farms to wildlife offices were often long and landowners' farm schedules too inflexible. (3) In most cases, damage did not occur wholesale (that is all crops damaged, something that would probably encourage reporting), but in distinct periods, each of which appeared insufficient to warrant reporting by itself (although these damages added up for any given season). (4) Landowners reported being harassed (e.g. by rude commands) by personnel at wildlife offices and delayed considerably before they were allowed to leave. (5) It was very expensive to travel from the interior of district especially in the rainy season when there were no public means

of transport, and farmers had to rely on infrequent rides necessitating spending a night or two in town on rented accommodation. (6) The dangers of travel especially when elephants were abundant were also a factor landowners considered.

The small percentage of landowners who reported damage did so only when: (1) damage was very extensive, for instance when elephants caused extensive damage to maize fields, irrigated vegetables fields or to electric fencing; (2) they had their own transport and usually commuted to towns frequently; (3) they believed that should the government re-establish compensation for damages, their cases would already be on record; (4) they believed KWS needed the information for wildlife management purposes and (5) some large-scale landowners routinely met with senior KWS officials in local and international meetings, at KWS headquarters and at social gatherings. Many pastoralists reporting damage did it indirectly, through large-scale farmers who forwarded the reports to KWS headquarters or to KWS local offices. In some group ranches, local political leaders (e.g. political party activists) kept wildlife damage records of the communities composing the group ranch, all members reporting losses to him on a daily basis. The list was then compiled on a monthly basis recording type of loss; type, age and number of livestock involved; the animal responsible and where it happened. Kingoria (1996) reported similar meticulous record keeping in some group ranches in his study. Once damage was reported at KWS local offices, entries were made in the 'Occurrence Book' with date, name of reporter, the problem, responsible animal and the action recommended by a responsible officer (local warden, pers. comm.). Those records, together with the routine patrols KWS undertook, helped keep track of what was happening in their jurisdictions, and therefore allowed them to put the resources at their disposal to best use. However, it is believed by many landowners interviewed that nepotism, corruption and political interference sometimes complicated compensation issues at both local and head KWS offices.

Wildlife Ownership and Derivation of Benefits

The issue of wildlife ownership has been of central concern in many parts of Africa (Child 1991, 1996, 2002; Murphree 1991, 1993; Cumming 1993; Lewis 1993; O'Loughlin 1998; Hulme & Murphree 2001), but in no country has the government fully relinquished its responsibilities for wildlife to other authorities. At most, the central government has given statutory authority to local county councils who are under the central Ministry of Local Government. County councils on the other hand, have not been forthcoming in allowing local communities proprietorship over wildlife (Hulme & Murphree 2001). Although all large-scale landowners interviewed in Laikipia stated ownership and full responsibility for wildlife were matters very important to them, others considered it unimportant, as long as they derived benefits from

wildlife (Table 5). Reviewing the literature available on this topic, it seems unlikely that full proprietorship of wildlife will ever be relinquished to landowners, especially because of world politics, the role wildlife plays in national economies in many African nations, and because there are managerial advantages of having most conservation and management of wildlife overseen by one central organisation (Dudley et al 1999; Hulmes & Murphree 2001; Child 2004; McShane & Wells 2004). For example, monitoring migratory wildlife is best done by a central government.

From the results of this study it is clear that the majority of small-scale landowners perceived no benefits from wildlife, while other landowners did (Table 6). Owing to their farming background, many small-scale landowners (and probably the other landowners to a small extent) may have less faith in wildlife utilisation programmes for a number of reasons. (1) Benefits from wildlife utilisation programmes are substantially delayed by technical, marketing and organisational problems that are expensive and must be overcome. (2) Lack of attendance and interest to programme meetings for most landowners. (3) The general illiteracy among most landowners may not allow the appreciation of the need to utilise wildlife as a sustainable resource. (4) The nature of settlements with most still relatively new; and with large distances from each other, forces that would cement communities with common needs, problems and aspirations are still in the making (Sottas & Yvan 1995). (5) Organisation—to most small-scale landowners, benefits that must filter through committees and depend on individual initiative are discouraging because of past high failure rates caused by low managerial capacity and poor operational skills, lack of financing, insufficient commitment and poor technical assistance (Leonard & Marshall 1982). These can further be complicated by financial misappropriations, unjustified expenditures and partisan politics. (6) Alternatives—some landowners stated they did not need wildlife because they had so many productive, dependable and predictable alternatives for income that require no special skills to perform, and which depended only on their own initiatives particularly crop and dairy farming. As found by Kohler (1987) and Wiesmann (1993) agricultural crop potential is enough for most landowner needs, at least over the short term, especially if supplemented by other income. (7) Uncertainty—wildlife utilisation, not only in Laikipia but countrywide, is currently plagued by a multitude of problems (logistical, policy and marketing) that will require substantial resources to solve (KWS 1991, 1994, 2007). There was uncertainty amongst landowners in some areas about wildlife availability. Further, technical problems of wildlife capture, processing and product marketing aggravate the problem of sustaining landowner interest and faith in utilisation.

Most landowners however, agreed on the need to conserve biodiversity in Laikipia for the general benefits they bring to the country especially the much needed foreign currency (Table 8). Nonetheless, many landowners disagreed that the best way to ensure continued national benefits was *status quo*; there-

fore, substantial resources must be expended not only to encourage landowner participation and derivation of benefits from wildlife utilisation, but also to minimise the costs of living with wildlife in this region.

Suggested Management Alternatives

Landowner suggestions for possible wildlife management alternatives in Laikipia differed in nearly all respects among the three ownerships (Table 6) which can be accounted for by the various differences between the three landowner types. These include: (1) Landowner traditional culture—for instance, small-scale landowners come from a crop-cultivation tradition, pastoralists come from a livestock pastoralism tradition and large-scale landowners come from a livestock-ranching background. (2) Education and economic interests—knowledge about multiple land uses and how they could be combined to further landowner economic interests appeared to be influencing choices landowners made. (3) Availability of investment capital—availability of funds was important in determining what landowners suggested as solutions. (4) Land holding sizes—land availability was important in determining what landowners considered practical and worth pursuing economically.

Due to the importance of developing, strengthening and sustaining partnerships with local landowners (Rutagarama & Martin 2006) outside protected areas where most wildlife resides, a more detailed discussion of these management alternatives suggested is necessary. Infield (2001) has noted that although initiatives to encourage and partner with rural people in biodiversity conservation have received wide support, they have largely remained ignored in practice.

Wildlife Damage Compensation

A large number of landowners believed that lack of government resources more than any other reason, was the cause of slow progress in resolving issues (Table 4). This proposition has merit because resources cannot be available to cater for all government programmes, even in highly affluent western nations like the United States. However, some other propositions discussed below, point more to a feeling amongst rural landowners of a lack of genuine commitment to their problems by the Kenya government, and therefore a strong feeling of alienation. The issue of compensation, where all losses to wildlife are paid for at the individual farmer level, generates a lot of controversy, excitement and mixed responses nationwide (KWS 1994). Because most landowners interviewed in Laikipia strongly advocated it (Table 8), a brief historical perspective to this issue is necessary.

For many years prior to 1990, farmers in Kenya were compensated for losses they incurred as a result of wildlife depredation. The policy was changed in 1990 as the organisation responsible for wildlife affairs in Kenya

was converted from a wholly government-run department [Wildlife Conservation and Management Department (WCMD)] to a state corporation, the KWS. This brought more independence to KWS from government red tape in most important decisions affecting its operations, finance and hiring (KWS 1991). Compensation for wildlife damage is only done by the government today in cases where people have been injured or killed by wildlife. The impetus behind the enactment was that compensation to landowners for wildlife-related damages was introduced by the colonial government specifically for white farmers in the years before independence (KWS 1991). The practice was continued by the Kenya government after independence in 1963 for all farmers, until the practice was discontinued in 1990. Having been practiced for less than 30 years, there was hope that the new policy would only remain an issue for a short while. Landowners would then revert to pre-compensation days, when wildlife damage was considered a fate of life as was rocky soil or drought.

Prior to the 1990 legislative amendment, landowners reported to their district's wildlife office when they experienced wildlife damage. Damages were then assessed with the help of wildlife wardens based in the district and forwarded to the Ministry of Tourism and Wildlife Headquarters for processing. Subsequently, payments were then made by the Treasury. With time, massive corruption escalated such that farmers could bribe their way into having their losses over-estimated, and non-farmers in the district (even district non-residents) could submit claims. After what seemed like lengthy 'deliberations', the government would eventually pay all reported claims. Claim documents were reported to accumulate in the Ministry Headquarters for as long as 8 years, and even then farmers still expected (and some did) obtain payment. It gradually became obvious to landowners that reporting wildlife damage was not worthwhile, unless losses were indeed overwhelming (Woodley & Snyder 1978; KWS 1991, 1994).

Landowners believed there were a number of factors that led the government to amend the compensation policy (Table 4). Whilst over-estimation of damages and corruption on the part of landowners has been cited (KWS 1991), many landowners interviewed believed most landowners were fairly accurate in their estimates, but there could have been over-estimates. Corruption plagues many government operations especially in developing countries for several reasons (reviewed by Price 1975), which he believes emphasises the culture of the people and the political and economic character of developing nations. Nevertheless, corruption probably promotes some economic development by capital formation, and promotes peace and stability although it generally retards overall development, and compromises goals of modernisation (Price 1975).

So distant were landowners in Laikipia from the present situation regarding compensation for wildlife damages that, up to 78 per cent (small-scale) and 59 per cent (pastoralists) of them were still not aware of this enactment 7 years

later. The type of compensation landowners anticipate today, involves payment for all losses incurred from wildlife. This type of compensation could come in two ways: one, direct, where KWS helps assess all damages for all reported cases, and then takes prompt action in liaising with the Ministry and Treasury towards settling these costs; and two, indirect, where wildlife benefits are used for compensation, and the remainder shared amongst landowners (Child & Peterson 1991; Child 1996; Hulme & Murphree 2001). Surprisingly, although they called for it, many landowners on closer reflection appeared skeptical of the first type of compensation because they believed that the organisational and management capacity required to make such a comprehensive programme regular, dependable and efficient was currently unavailable both within the KWS or within the central government. So, most landowners opted for the second alternative, where wildlife utilisation is liberalised and at the end of each year, local wildlife committees meet and disburse some of their yearly wildlife returns, first to those who have incurred damages during that particular year, and then deliberate on how to use the remainder. This programme has worked reasonably well in some places, especially in the southern African states of Zimbabwe and Zambia, where community wildlife utilisation programmes have been in place for relatively long periods (Child 1991, 1996, 2002, 2004, 2006; Murphree 1991; Lewis 1993). One advantage of this method of compensation is its facilitation of community cohesion in planning, organising, prioritising and making choices (Berger 1989). Compensating landowners for wildlife-related damages has become such an issue that, many studies have called for adoption of a comprehensive compensation scheme as part of a conflict management strategy for wildlife areas (see for example Kiss 1990; KWS 1991, 1994; Lewis & Carter 1993; Murombedzi 1999; Hulme & Murphree 2001; Infield 2001; Rutagarama & Martin 2006).

The lack of government commitment towards rural people was also suggested to explain the Kenya government's compensation policy enactment. This suggestion may have some merit, especially considering the number of authors in the last three decades, who have analysed, discussed and recommended various ways of directing more assistance, via reforming and restructuring services given to rural people (for example Uphoff & Esman 1974; Korton 1980; Moris 1981; Leonard & Marshall 1982; Hofstede 1983; Chambers 1983; Leonard 1993; Peterson 1999; Western 2001; Berkes 2004; McShane & Wells 2004).

Removing all Potential Problem Wildlife

The issue of human security in wildlife areas in Kenya is a sensitive matter nationally (KWS 1994, 2007). There is no amount of benefit from wildlife that could make landowners sacrifice their own lives. Currently, the government compensates US$545 for the loss of one human life and US$273 for injury to humans attributed to wildlife. Due to the lengthy process of

documentation from the local KWS office through the headquarters and the Ministry, compensation may take approximately 5 years to process (KWS 2007). Threat of human injury therefore, together with the property damages wildlife cause, along with few tangible benefits reaching landowners must be the reasons why an overwhelming majority (78 per cent, Table 6) of small-scale farmers wanted wildlife removed from their property. Only if these threats are mitigated would landowners in this category reluctantly consider other alternatives.

Among large-scale and pastoralist ownerships, the proportion of farmers suggesting removal of all wildlife were relatively low (23 per cent and 32 per cent, respectively) most likely because: (1) most landowners in this category have been in Laikipia longer or were born there and wildlife presence has become an important part of their lives; (2) the level of benefit from wildlife is higher in those larger ownerships than in small-scale ownerships (Table 7); (3) most landowners acknowledge the potential in wildlife utilisation especially if it is facilitated by legislation and other government support; (4) a variety of wildlife remains abundant and; (5) land-parcel sizes are large enough to form unfragmented conservation habitat. In the final analysis, the option of removing wildlife is unrealistic because, besides being operationally and financially impossible to move all problem animals, there is simply nowhere to take them to and the world community would not be eager to see all animals mass slaughtered outright. The total elephant population alone in and around Laikipia is about 3000 animals (Thouless 1993, 1994). Finally, removing all the animals (were it economically and politically possible), would only create room for more animals to move into Laikipia which is part of a huge ecosystem that encompasses Samburu, Isiolo, Meru, Nyeri and Laikipia Districts.

Assistance in Development Projects

Development projects, which include building dispensaries, tap-water projects, cattle dips and roads, and which the KWS Wildlife Partnerships Department has been introducing to local people as inducements to value wildlife (KWS 2007), may not be a popular option to landowners, according to the results of this study. This could be due to several reasons like: (1) development projects are regarded as government endeavours that would still happen if given enough time (cutting short this waiting time by KWS does not seem to sensitise the community in the desired direction); (2) many small-scale landowners do not consider KWS actions any different from those of the central government, and perceptions are that the central government is simply acting through KWS, hence many landowners are not able to translate or link the goals of KWS to development projects (this points to a prime need for education about biodiversity to local landowners); (3) development projects help everyone including those experiencing no damage from wildlife, hence issues of inequity among landowners arise; (4) a significant number of people

interviewed did not like the idea of KWS handing-out money for local development, fearing this might subtly encourage dependence and promote suspicion that KWS may have a hidden, probably devastating, agenda for landowners and finally, (5) the priorities of development projects are biased by both KWS and local elites that may not always reflect the views of the majority of landowners. However, developmental projects that help the community, administered correctly and in a timely manner is a promising way that has the potential to realise substantial biodiversity conservation benefits (Newmark & Hough 2000).

Biodiversity Education and Wildlife Utilisation

Although only a relatively small proportion of landowners in small-scale and pastoralist ownerships (Table 6) agreed on the importance of biodiversity education as an alternative; education is needed to ensure that landowners are able to recognise biodiversity and its importance, appreciate the need to conserve it and know how to conserve it. Biodiversity education must ensure that a long-term conservation ethic is established amongst present landowners and also in future generations. Aggressive wildlife extension programmes, like the KWS Wildlife Community Wildlife Service has been doing with its rural appraisal programmes in the District (KWS 2007), are one way of achieving this. However, it needs to be expanded with follow-ups, tangible results, and cover wider areas. Further, the Laikipia Wildlife Forum (LWF), as an organisation established to encourage biodiversity conservation via utilisation, should be supported more strongly by KWS because it presents a 'near grassroots' avenue where KWS needs and objectives can be gradually incorporated to influence landowners. According to LWF (2007), over the last 5 years there has been substantial progress in such partnerships with the development of many ecotourism and cropping opportunities whose revenues directly benefit the community.

In conclusion, as wildlife interactions with people in areas outside protected areas like Laikipia cannot be eliminated, some preventive and management measures must be emphasised. Such measures might include the above landowner-suggested management alternatives in combination with: (a) problem animal control where problem animals like rogue elephants can fairly be contained by elimination or capture as KWS does today (KWS 2007); (b) support for some of the effective traditional methods of wildlife deterrence as found in this study; (c) provision of incentives both direct and indirect that allow communities to value wildlife that might emphasise cash, development projects tied to wildlife conservation and training opportunities for local people; (d) devolution of partial ownership responsibilities to landowners to sustain their support but monitored to prevent abuse and (e) improving access to biodiversity education materials and opportunities for local landowners.

It is clear from this study that if we have to achieve success in biodiversity conservation in many fronts in the District, multiple opportunities to form partnerships with local landowners who emphasise direct benefits, transparency, trust, patience and indeed some sacrifices might be the only way to go. It is important to remember that many landowners in the District and many other areas in the country have other wildlife issues to worry about including other economic losses attributed to wildlife such as livestock predation, property damage and wildlife-livestock diseases. Our ability to conserve habitats and their biodiversity will be judged by what we have done in practice than what we have theoretically found possible. As the conservation of wildlife in Kenya will ultimately depend on the goodwill extended to wildlife by private landowners, it is imperative that as more information becomes available from research, it is translated to policies that are sensitive to the needs of people, of wildlife and that of the environment.

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