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# PEOPLE-ELEPHANT CONFLICT MANAGEMENT IN TSAVO, KENYA

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## ABSTRACT

Historically, conflicts between people and wildlife in Kenya have been dealt with by a process of fragmented crisis management. The underlying causes of conflict and the ecological consequences of conflict management have not been considered or documented. Where human population has increased, wildlife has often been excluded. On land abutting protected areas, land-use has intensified and is often accompanied by pressure to degazette the protected areas. The Tsavo area is a typical example of the latter. This paper examines people-elephant conflict in the Tsavo area and describes past, current, and planned conflict management activities of the Kenya Wildlife Service. Suggestions are made for an approach which will allow sustainable, mitigative intervention to prevent the conflict crisis from developing into a disaster.

## INTRODUCTION

People-elephant conflict refers to a range of direct and indirect negative interactions between people and elephants which potentially harm both. Although the harmful effects are many in some areas (Ngure, 1992), the most publicised are crop damage by elephants and injury or death to people. There are also many negative impacts on elephants from people, but generally these only come into focus when they lead to a reduction in elephant numbers which adversely affects human interests (Douglas-Hamilton, 1988).

Whereas human interests in elephants extend beyond elephant range, the negative effects of elephants on people are usually confined within their range. Elephants, for example, also kill and injure livestock, damage property, and disrupt social and economic activities. Indirectly, elephants lead to unwarranted clearing of natural vegetation through an increased demand for fuel wood by people who guard their crops at night (Ngure, 1992). Local and external human interests tend to bring about marginalisation and even

extermination of elephants, through hunting and competitive land-use policies. Regrettably, although conflict has a negative effect on both people and elephants, its outcome is often human-dominated.

The historical and prevailing conflict management approach in Kenya is the creation of protected areas for wild animals. However, the vulnerability of protected areas is illustrated by the dramatic decline in elephant and rhino populations in Tsavo (Douglas-Hamilton, 1988), and the current pressure for degazettment of Tsavo National Park. Strategies for protecting human life and property are also inadequate as demonstrated by the increase in conflict (Ngure, 1992).

In its 1990- 1995 management and development plan (Kenya Wildlife Service, 1990), the Kenya Wildlife Service (KWS) proposed an ambitious plan for the management of Kenya's wildlife in and out of protected areas, which included the establishment of an Elephant and Community Wildlife Programme. One component of the programme was to reduce the people-wildlife conflict around key protected areas (including Tsavo) by (mostly electric) fencing. An initial Environment Impact Assessment (EIA) endorsed the proposed fencing, but suggested that a number of environmental, social, economic, technical and financial criteria be considered before proceeding with the construction of fences at Tsavo (DHV Consultants, 1992). In endorsing fencing as a solution to the people-elephant conflict in Tsavo, the EIA also had to recognise the intense political pressure, in response to public demand, to find a solution.

## The Tsavo area

The Tsavo area refers to the Tsavo ecosystem in southern Kenya. It comprises the Tsavo National Park (East and West) and the surrounding areas (Figure 1) which form part of the home range of several large herbivores (Cobb, 1976), including the elephant. It is mainly a lowland semi-arid savanna ecosystem, with

an annual average rainfall of 250-400mm, characterised by *Commiphora-Acacia* bushland or Nyika. The annual rainfall pattern is usually bimodal and soils are largely developed from basement system complex rocks (Van Wijngaarden & Engelen, 1985).

Deviation from this general description can be seen in the central localities which comprise the Taita, Sagalla and Kasigau Hills and their vicinity. These hills represent an area where the effects of increasing distance from the Indian ocean are counteracted by the influence of higher altitude and rainfall which rises to an annual average of 600-1200mm.

## Land-use in the area

Current land-use in the Tsavo area is partly the result of historical events and partly due to more recent happenings. Most information on historical land-use is derived from notes compiled by early travellers, described in detail by Corfield (1974) and EcoSystems Ltd. (1982).

The lowland areas of Tsavo have been used by five indigenous peoples. The Waliangulu are believed to be the original inhabitants of most of the lowlands. Primarily hunter-gatherers, they yielded to the Galla-

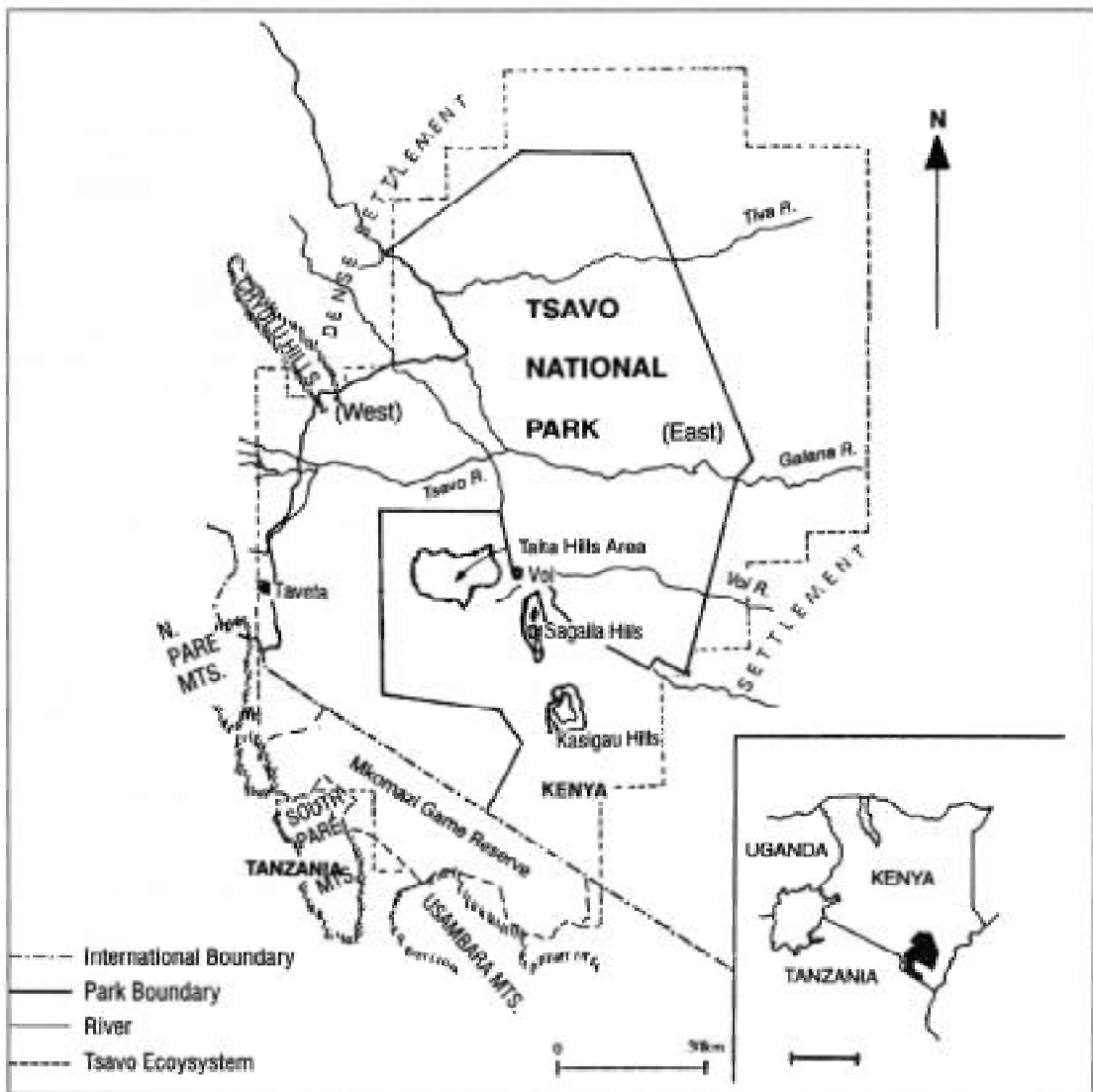


Figure 1. Map of Tsavo National/Park and surrounding areas.

speaking Orma pastoralists who invaded from Abyssinia. They became serfs of the invaders, paying one tusk per elephant killed to the Orma chief, and they also adopted the Galla language. The Orma later yielded to attacks from two other peoples (Maasai and Somali), as well as succumbing to unfamiliar coastal diseases and finally to the rinderpest epidemic in the last two decades of the 19th century. By the 1930s they only used a small part of the present north-east Tsavo National Park.

The Maasai, pastoralists who ranged far and wide while raiding cattle in the Tsavo lowlands, were also eliminated from the area by the rinderpest epidemic. Two other peoples traditionally used the Tsavo lowlands: the Kamba and the Taveta. The latter confined their activities to cultivation in the forests, which occur in the present day Taveta region, and fringe-grazing in western Tsavo. The Kamba influence extended beyond their traditional home into northern Tsavo where they are, up to now, primarily agropastoralists. They were heavily involved in commercial ivory hunting for the established east coast ivory trade (Spinage, 1973), and in livestock trade. They also practised subsistence hunting, as do those who still live close to the national park today.

In 1933 the colonial administration set up a commission to investigate land-use and recommend allocation. The commission categorised all sparsely occupied land as crown land, or government land. This included the whole area which later became Tsavo National Park. No land was allocated to the Waliangulu who were expected to integrate peacefully with other people. This was understandable as the new hunting rules (Ritchie, 1926; Game Department, 1928) proscribed their way of life. The creation of Tsavo National Park in 1948 further marginalised them and the Waliangulu are now virtually extinct as a tribe. The Kamba and Orma were also restricted to the north and north-east of Tsavo respectively. The park's boundaries have only changed slightly since that time (Woodley, 1988).

In the 1970s the independent government allocated most of the remaining lowland Tsavo area for cattle ranching, giving the local people priority of ownership. Some of the ranches received substantial financial and technical assistance but were never successful. Others never developed at all and are now being converted for small-scale cultivation. Initial KWS extension work in the ranching areas generated considerable interest in wildlife among the owners. This interest, however,

which is based on prospects for wildlife utilisation, is precarious, especially for ranchers who are unlikely to earn anything from wildlife for a long time.

There are also some large sisal plantations in the Tsavo lowlands, but they are increasingly being converted for horticultural use.

Subsistence, rain-fed agriculture, has always been confined to the hills. Only prior to the 1880s did the Taita people, who traditionally occupied the Taita hills, cultivate lowland areas. This period of cultivation was cut short by a major famine in the 1880s, which reduced the population, estimated at 152,000, by one-quarter, forcing a retreat to the hills. The Taita continued to hunt lowland elephants for subsistence and for the commercial ivory trade. Those living close to the lowlands today still practise subsistence hunting, albeit illegally.

The recent growth in human population density in the hills, where agricultural potential is high, has put tremendous pressure on the natural resources. Soil degradation due to continued cultivation and erosion is now a major concern (Otindo, 1992). This has led to encroachment of the marginal and agriculturally low potential areas near the hills, which until the 1960s were largely uninhabited (Ngure, 1992). People from other parts of the country with similar population problems have also settled in the area. It is in these recently settled areas that people-elephant conflicts are concentrated.

## People-elephant conflicts in the Tsavo area

The major causes of conflict are crop depredation and human death and injury by elephants. Data on human deaths and injury kept by the KWS Elephant Programme indicate a worsening situation (Table 1).

*Table 1. Elephant-related human deaths and injury in the Tsavo area.*

Year	Elephant-related human deaths and injury	
	Deaths	Injuries
1990	2	0
1991	6	3
1992	5	2
1993	6	2

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In order to examine conflict in the area, a study was conducted between November 1990 and August 1991 (Ngure, 1992). Formal interviews were held with persons from randomly selected households (n=91). Elephant activity was also monitored during the main growing season, from March to mid-August. Three of the 1991 deaths occurred in the study area (344km<sup>2</sup>) to the south of the Taita hills, while the victims were defending their crops. In the same area, apparently only three people had been killed by elephants in the previous 60 years (Ngure, 1992).

In the study area, 75% of the households had been affected by elephant damage in 1991, and 858 families cultivating 772.8ha recorded 4,036 incidents of elephant visits in the 1991 three-month growing season. Affected plots may receive 4.6 attacks by elephants per growing season. Crop losses per family ranged from a few individual plants to loss of the whole season's crop. Using current official prices for the area, these families lost US\$ 64,975.00; maize accounted for 54% of the losses. Two other localities in the Tsavo area suffered the same level of crop deprecations by elephants. In order to avoid damage, many farmers were observed to harvest crops before they were ready, which consequently reduced the quality of their produce.

As well as raiding crops, elephants damage water pipes, cattle sheds, houses, and also stores, which they occasionally break open while looking for harvested produce.

Apart from physical damage, elephants disrupt social and economic activities. In 81% of the households surveyed in 1991, school attendance by children was adversely affected by elephants. The perceived presence of elephants, even when none is near, also affects execution of social and economic activities. The 1991 survey showed that for 83% of the households, cultivated plots were guarded at night. Guarding is usually an all-night activity which can involve several members of a family.

On the other hand people also have negative effects on elephants. The negative effects from local people are, however, few. For example, the widespread poaching of elephants from the mid- 1970s to late 1980s (which reduced the Tsavo elephant population from about 35,000 to about 7,000) was mainly driven by external interests (Douglas-Hamilton, 1988). Furthermore, only about 5% of the area available to elephants in 1975 has since been converted for arable use by the local people, but this is where most crop-raiding by elephants occurs.

This in turn leads to other negative effects from the local people to elephants: crop destruction sometimes provokes people to harm elephants, and there is pressure to degazette Tsavo National Park, which would consequently greatly reduce the habitat available to elephants and other species.

## Past conflict management activities

Residents and wildlife authorities in the Tsavo area have in the past adopted several measures to reduce crop depredation and sometimes death and injury from elephants. Residents try to prevent death and injury by avoiding elephants. In 83% of the vulnerable households studied in 1991, crop-raiding was deterred using several methods: noise, from banging metal objects together; fire, either lit at the edges of plots, or as glowing wood missiles thrown by hand; use of any other available missile; and assistance from wildlife authorities. These strategies can have heavy social and economic costs.

Wildlife authorities have used three main methods to reduce elephant-related conflict in Tsavo. Collectively called problem animal control (PAC), these methods are thunderflashes, blank and live bullets. The latter are either used to kill elephants or to scare them. Thunderflashes, blanks and shooting in the air are used to drive elephants from specific areas. Although elephants may in fact move, this is usually temporary, and in some cases elephants are known to defy these bluffs.

The shooting of elephants to reduce conflicts with people, also referred to as control shooting, has been carried out for many years in Tsavo. Its use is poorly documented prior to 1990 and in general, its effects are not well known (Taylor, 1993). It is usually believed that the killing of one or more elephants in a certain area deters others from visiting the same area. Elephants are sometimes shot to quell hostility amongst the affected people, especially after extensive damage or when a person has been killed. When the decision to shoot follows a human death, it is often claimed that the "culprit" elephant has been identified. In other cases it is assumed that the most troublesome "ring leaders" are identified. Unless an individual elephant is already well known, the tendency to charge at people is used as the criterion to identify a "culprit". Since charging and bluff charging may represent a survival strategy (Dawkins, 1989), it is possible that the real "culpits" are rarely identified. A total of eight elephants have been shot in Tsavo since 1990 (Table 2).

*Table 2 Number of elephants shot as problem animals in the Tsavo area since 1990.*

Year	Number of elephants shot
1990	0
1991	4
1992	3
1993	1

A former way to appease farmers who lost crops to wildlife in Kenya was to pay compensation. This system was abandoned in 1989 amid allegations of blatant corruption. The scheme was also difficult to administer, thus incurring expenses and causing delays. By the time it was abandoned, less than 5% of affected farmers had received some compensation, which was not even to their satisfaction (Ngure, 1992). By that time the compensation scheme had existed for 12 years. Many people never launched claims, citing official insensitivity.

In 1989, wildlife authorities in conjunction with the Kenya Army, used two helicopters to drive elephants out of human settlements. The two drives were in the same locality and separated by about a month. In 1990 a three to four kilometre electric fence was put up to protect a large sisal plantation and a few subsistence agro-pastoralists. This fence lasted only two years. Initially, local people cut the insulators and lifted the wires to allow livestock into the national park and the energiser was later vandalised. The fence is reported to have been effective for the time it lasted.

A recent conflict mitigation initiative aims to use part of the revenue that accrues to Tsavo National Park to support development in areas which suffer elephant-related problems. A total of KSh 1.9 million has been spent on community projects since 1990 and a further six million has been allocated for this purpose. The consensus of opinion is that when revenue from wildlife is seen to benefit an area, residents are likely to tolerate some level of wildlife-related damage. A problem with this approach is that people suffer crop depredations as individuals, whereas it is the community which benefits from revenue.

National park authorities use law enforcement to curb poaching and encroachment by either people or livestock. Although this has helped in preventing settlement in the park, poaching for meat continues, as well as livestock incursions into the national park. However, there are no recent reports of elephant poaching by local people.

## Planned people-elephant conflict mitigation activities

A reduction in crop depredations by elephants is viewed as the first step in mitigating conflict and several activities towards this end have been proposed. The main suggestion incorporates a combination of electric fencing and traditional PAC. The purpose of fencing will be the protection of cultivated land rather than confining elephants to the national park. The exact way to proceed has not been finalised, but ongoing activities are focused towards this aim and include:

1. A baseline survey is being undertaken of all major land holdings to establish details of current land-use activities and any likely changes to be expected in the future. The survey is being followed with discussions on how to obtain a consensus from the major landowners to conflict mitigation and future land-use that will not render the proposed activities obsolete.
2. Discussions are also being held with small-scale cultivators to obtain a consensus on their likely contribution to the conflict mitigation exercise and how it can be sustained.
3. The cost of current conflict mitigation activities is being analysed.

These exercises will help to evaluate the feasibility of the proposed conflict mitigation activities. The major land-holding survey will, for example, determine the direction for future land-use planning in areas abutting Tsavo National Park. This will help to ensure that fences do not become obsolete by the spread of cultivation on both sides. It will also determine the acceptability of the proposed activities to the landowners and small-scale cultivators and their possible role in any conflict mitigation exercise.

The survey will assess the cost-effectiveness of the proposed activities, and it will also consider the costs of not implementing them, which includes the risk of degazetting Tsavo National Park.

## DISCUSSION AND CONCLUSIONS

The above description of people-elephant conflict in Tsavo suggests a worsening situation and emphasises the need to find solutions. The underlying causes of conflict in Tsavo can be concluded as: 1) encroachment

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and cultivation of the Tsavo lowlands; and 2) the concentration of elephants close to human settlements following intense poaching in the interior of the parks (Ngunjiri, 1992). It is also evident that increased political awareness and better channels to communicate complaints have brought the issue of conflict into the limelight.

Three types of solution are envisaged: 1) those which relocate, human settlements and change land-use patterns in cultivated areas; 2) those which prioritise the control of elephant distribution and behaviour; and 3) those which attempt to modify human attitudes.

It is unlikely that any shift in human settlements or land-use systems would gather the required political support even if it was practically feasible. It is also difficult to address human attitudes without first reducing elephant-caused problems, although revenue sharing should help to placate the already negative attitudes of local people towards elephants and wildlife in general. The best option is to use solutions which address the control of elephant distribution and behaviour. The proposed fencing and PAC are examples of such solutions and it is hoped that the planned activities will pave the way for their successful implementation.

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