

OPINION

Long-term management of crop raiding by elephants around Kakum Conservation Area in southern Ghana

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Abstract

The Kakum Conservation Area appears to be Ghana's most successful national park, what with 60,000 visitors each year and its role in boosting the economy of Cape Coast, the regional capital. But to the local farming community, the park is not such a blessing. Marauding elephants damage their crops, making the local community hostile towards the park and towards the concept of biodiversity conservation. Short-term methods attempting to solve the problem have been used for a long time with short-term success. This paper outlines a strategic approach that addresses the underlying causes of crop raiding as opposed to a tactical approach that tackles the symptoms. It proposes a triple-pronged strategy of managing the landscape, detecting crop raiding, and repelling the elephants—thus reducing the risk of crop damage and building an appreciation of conservation in local people around the park area.

Résumé

L'Aire de Conservation de Kakum semble être le parc national qui réussit le mieux au Ghana, avec 60.000 visiteurs par an et un rôle évident dans la stimulation de l'économie de *Cape Coast*, la capitale de la région. Mais pour la communauté locale des fermiers, le parc n'est pas vraiment une bénédiction. Des éléphants en maraude dévastent les récoltes, ce qui suscite l'hostilité de la communauté envers le parc et envers le concept même de conservation communautaire. Depuis longtemps, on utilise des méthodes à court terme pour essayer de résoudre ce problème ; elles n'ont connu qu'un succès à court terme. Cet article présente une approche stratégique qui s'intéresse aux causes sous-jacentes des attaques des récoltes, par opposition à une approche tactique qui ne traite que les symptômes, et propose une stratégie à trois volets pour gérer le paysage, déceler les attaques des récoltes et repousser les éléphants—ce qui permet de réduire le risque de récoltes endommagées et de faire apparaître une appréciation positive de la conservation chez les populations locales qui vivent autour du parc.

Introduction

The Kakum Conservation Area in Ghana's forest zone (fig. 1) now attracts more than 60,000 visitors each year, most of whom are Ghanaians. To an outsider it appears to be Ghana's most successful national park and its development has helped to boost the economy around Cape Coast, the regional capital. However, many nearby farming communities are hostile towards the park and towards the concept of biodiversity conservation because of the crop damage that elephants cause.

In April 2000 park managers and the Elephant Biology and Management team of Conservation International held a workshop to discuss crop raiding around the conservation area. Until that point all discussion on the crop-raiding problem had centred on deterring ma-

rauding elephants, but at the workshop it was decided that the priority must be to address the *causes* of the problem because that was the only way to find a permanent solution.

The crop-raiding problem at Kakum

The Kakum Conservation Area (KCA), consisting of Kakum National Park and the Assin Attandanso Resource Reserve, was created in 1992 and is managed as a national park. Covering 366 km², it is an isolated fragment of the Upper Guinea forests that once covered south-western Ghana. KCA is now a forest island in a landscape mosaic of cultivation, farm bush, secondary forest and swampland. The main cash crop is cocoa, and a few farmers also grow oil palm, coffee, citrus or coconut (Agyare 1995). The subsistence farming system is shifting cultivation (Agyare 1995). The staple food crops are cassava and maize; other crops include plantain, cocoyam, yam and vegetables such as okra, tomato, pepper, bean, eggplant and watermelon. The median farm size was 0.3 hectares in 2001 and 2002.

Elephants often leave the forest to feed in nearby farms, usually at night. Even before 1992 elephants were reported to be raiding farms (Dudley et al. 1992), but in the last decade the raids have become more frequent, and the number of complaints by farmers has increased particularly steeply during the last five years. One-third of the farms within 1 km of the park boundary were raided in both 2001 and 2002 (Barnes et al. 2003).

Causes of crop-raiding

Many farmers believe that the increasing frequency of raids is evidence of a growing elephant population. No data are available to confirm whether numbers have increased. There has been no immigration for many years because this elephant population is completely isolated. Vegetation changes caused by logging may have improved the food supply for elephants (Barnes et al. 1995), but elephant populations grow slowly, and reproduction alone could not explain the rapid increase

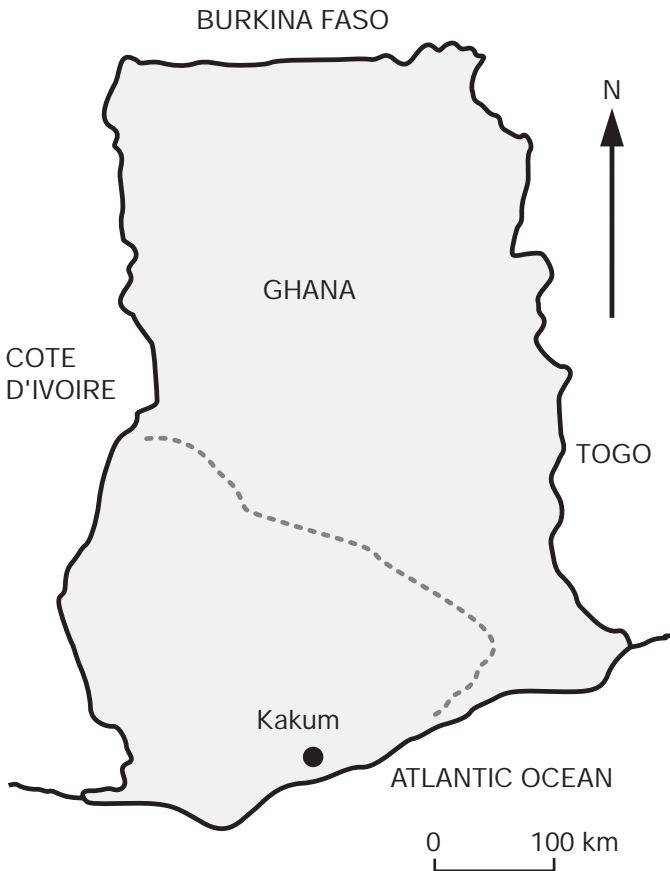


Figure 1. Map showing the location of Kakum Conservation Area in southern Ghana. The dotted line shows the boundary of the forest zone.

in the number of complaints in recent years. This sharp increase is more likely explained by a change in elephant behaviour.

Our analysis of the Kakum situation indicates that the increasing rate of crop raiding is a symptom of the changes in the landscape around Kakum over the last century (Barnes et al. 2003). Ghana's human population increased rapidly during the 20th century (United Nations 2000). In 1900 this part of Ghana was covered by lowland forest, but since then—and especially following the Second World War—roads, railways, villages and towns extended into the forest zone, and in addition many immigrant farmers moved into the south-western forests to grow cocoa (Barnes et al. 1995). The high forest was progressively replaced by farms and farm bush—a mosaic of newly abandoned farms, herbaceous tangle, thicket and young secondary forest (Ahn 1961). This type of vegetation is especially attractive to elephants (Nchanji 1994; Barnes 2002).

Small farming communities expanded rapidly, thus accelerating the landscape transformation during the last few years (Barnes et al. 2003). The shortage of land has caused more clearing close to the park boundary, where farms are at greater risk. We also found that elephants were attracted to farms with a variety of crop types. As a consequence of the expanding of food crop cultivation close to the park boundary, the landscape adjacent to the park has become increasingly attractive to elephants, and their crop-raiding behaviour is therefore a symptom of these changes. Similarly, Sitati et al. (2003) showed that the area under cultivation was the strongest predictor of crop raiding by both male and female elephants at their site in south-west Kenya.

Strategic versus tactical solutions

Methods for tackling crop-raiding problems can be divided into those that address the underlying causes of the problem (the strategic approach) and those that tackle the symptoms (the tactical approach). These are analogous, respectively, to tackling a brain tumour with surgery or giving aspirin to the patient (Barnes 2002). A headache today may be cured by aspirin, but it often returns the next day, and meanwhile the tumour continues to grow. In this case aspirin is a palliative or short-term solution. As time passes, one must give stronger and stronger aspirin, but the patient will eventually die.

Many of the methods used in the past for deterring elephants around KCA—firing shots in the air, shouting, banging drums, lighting fires—are examples of the aspirin approach (Barnes 2002). They do not address the underlying problem, but the temptation has always been to seek such deterrents because they are cheap and they give farmers the impression that their concerns are being addressed. Furthermore, they often appear to be a solution because elephants do not like novel features in the environment and will at first avoid a new deterrent tactic. But once they realize that this tactic or feature is harmless they ignore it. For example, in 1997 some farmers around Kakum built fences made with wire from car tyres. Elephants avoided those fields and the villagers assumed a cheap and simple deterrent had been found. But after a few months the elephants pushed the fences down and returned to the fields. They are now accustomed to the acetylene-and-bamboo bombs that are used locally to scare them from the fields. Similarly, many of the Kakum elephants now ignore the disturbance shooting (shots fired overhead) that has long been the Wildlife Division's main deterrent. We are dealing with intelligent animals that learn to adapt. Once elephants have learned that a particular tactic is harmless, that tactic can never again be used effectively against those elephants.

A risk of these aspirin tactics is that they may bring farmers and elephants into close contact, thus increasing the probability of human deaths. Also, tactics that annoy or inflict pain may make elephants aggressive.

Recommendations

Strategy to reduce crop-raiding

We propose a triple-pronged strategy of landscape management, crop-raiding detection, and elephant repulsion to reduce the risk of crop damage around KCA. If crop raiding is a symptom of landscape change, then the problem must be addressed by managing the landscape. However, there will always be some elephants that leave the park and those animals must be effectively detected and then effectively repulsed. One will never eliminate the problem, but one can at least reduce it to tolerable levels (Hoare 2001).

We recommend that a task force be created, consisting of officers from the Wildlife Division, the Ministry of Food and Agriculture, the Forest Research Institute of Ghana and the Forest Services Division.

The task force will work with farming communities, district assemblies, traditional chiefs and the local religious institutions to implement the strategy.

Landscape management

We propose a zoning system with two concentric bands around KCA, each 1 km wide. In the first zone, the land within 1 km of the park boundary, farmers should be discouraged from growing subsistence crops because it is the cultivation of such crops that creates the mosaic of farm and bush that attracts elephants. Instead, farmers should be encouraged to grow cash crops like pepper, ginger and teak. Encouraging the farmers to cooperate in community-level forestry and agroforestry would have the further effect of reversing the decline in tree canopy cover. They should also be encouraged to try other forms of generating income such as fish farming and snail farming. In this zone, therefore, the goal is to move away from the mosaic of constantly changing herbaceous and palatable plant types towards a landscape of unattractive perennial species.

In the second zone, lying between 1 km and 2 km from the park boundary, subsistence crops should be grown in a manner that does not render farms attractive to elephants: only two or three crops per farm, vegetables should be discouraged, maize should not be grown at all, and only modest amounts of cocoyam should be cultivated (Barnes et al. 2003).

A change in land management cannot be introduced overnight and may take up to a decade. In the meantime, it will be necessary to use deterrent tactics to keep elephants away from farmers' fields (Osborn and Parker 2002; Parker 2003).

Detection

Many farmers around the park do not protect their crops. Some are afraid of the nearby forest at night, some argue that the elephants belong to the government and therefore it is the Wildlife Division staff who should stand guard over their fields, while others say that they work hard all day and they lack the energy to stay out in the fields at night. Farmers should be encouraged to do more to protect their fields. Their options are discussed by Osborn and Parker (2002) and Parker (2003). Indeed, the mere presence of humans in fields is still a significant deterrent to marauding pachyderms. The risk of raiding varies with

the phase of the moon (Dickinson 1998; Barnes et al. 2003), and so farmers must be alert especially during the critical new moon and waxing phases; they can afford to be less vigilant around the full moon.

Repulsion

Farmers must be trained in the most appropriate deterrent techniques for driving elephants away (Osborn and Parker 2002; Parker 2003). If landscape management is successful, then deterrent tactics will be needed only infrequently, and so elephants are less likely to become accustomed to them.

Discussion

Crop raiding by elephants is a major problem for wildlife managers in Ghana (Wildlife Division 2000) and elsewhere in the Upper Guinea forest zone (AfESG 1999). At each site in West Africa where we have seen crop raiding by elephants, park managers have been concerned only with addressing the symptoms of the problem, not the underlying causes. Radical changes in land use will be necessary to address crop-raiding problems at other sites in the Upper Guinea forest zone, in the same way that radical surgery may be necessary for a tumour. Overemphasis on aspirin may distract attention from the need for surgery. However, we emphasize that short-term deterrent tactics will be necessary to reduce farmers' suffering until resources can be mobilized to implement the land-use changes (e.g. Parker 2003).

To return to the medical analogy, one must keep the patient sedated while the preparations are made for the surgical operation that will remove the tumour. The point is to get the right balance between addressing the symptoms and the causes, between the aspirin and the surgery. Land-use management is the first line of defence in this proposed strategy. It will reduce the need for using deterrent methods to repulse the elephants, and using deterrents less frequently will lessen the risk of the elephants growing accustomed to them. Those tactics will therefore be more likely to remain effective in the long term.

The idea that protected areas can be managed as islands is now obsolete. KCA must be managed as a component of the regional landscape. Ideally, a large area around the park should be managed to reduce its attraction for elephants. To begin, we have proposed land-use changes of the area within only 2 km of the

park boundary (an area of about 250 km²), recognizing that such changes in the lives of the populace will not be easy. Also, the risk of crop damage for a farm located 1 km from the park boundary is less than 10% of the risk adjacent to the park boundary (Barnes et al. 2003). Thus changes in land use and farming practices within 2 km of the park should result in a dramatic reduction in risk. Nevertheless, we recommend that a second phase, to expand the area covered by the land-use changes, be implemented later.

This problem is major and it can be tackled effectively only by large-scale changes.

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