

# Conflicts in the Human-Elephant Border: Studying the Possible Causes in the Bia Conservation Area in Ghana

Gonzalo Griebenow, MEM 2006

Working in the field one day, my assistant asked me whether I had tried the raw cocoa fruit, and I answered no. With surprising dexterity, he grabbed a cocoa fruit and split it open with his machete. When he realized how much I liked it, a wide smile came to his lips and he said, "They like it too." He was referring to the elephants of the forest and the fact that they had become like kids in a candy store. However, their newfound treat is indirectly causing them harm.

## Introduction

The forest elephant (*Loxodonta cyclotis*), a smaller and less-studied species compared to its savannah counterpart, is an endangered species in Ghana. They are threatened by the continuous changes in land use, the illegal ivory trade, and, more recently, the conflicts with farmers.

Therefore, gaining insight into this organism's behavior and studying the actual state of its conservation has been an increasing challenge in recent years. Blanc et al. (2003) reported that 63% of West African populations include fewer than 100 elephants. Populations are plummeting because of the animal's fragile status and the increasing number of threats it faces. My research focuses on the possible causes of human-elephant conflicts and establishes con-

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nections among probable factors that may affect elephant movement patterns in the forest. The results could serve as a basis for policy-oriented alternatives that would mitigate current human-elephant conflicts in the area.

## Study Site

The Bia Conservation Area (BCA) in western Ghana (Figure 1) is composed of The Bia National Park and The Bia Resource Reserve, which are twin conservation areas with the same protection status. The park was initially created in 1935 and recognized as a Biosphere Reserve by the United Nations Educational Scientific and Cultural Organization (UNESCO) in 1984—it is the only one of its kind in Ghana. The BCA has one of the highest concentrations of forest elephants in Ghana and also serves as a refuge for other endangered species such as chimpanzees, antelopes, leopards, and a variety of plant genus (Conservation International-Ghana 2002).

The BCA is 305.62 square kilometers of forest, containing the last portions of Guinean Rainforest in West Africa (The Forest Commission of Ghana 2006). Rainfall is bimodal, occurring from March to July and from September to November, with a long dry season lasting from December to March. The average relative humidity is 85% and temperatures fluctuate between 10.2°C and 31.6°C (Forest Commission of Ghana 2006).

## Methodology

To get data about the elephants distribution along the Bia Conservation Area, an adaptation

**Figure 1.** Map of Ghana

The area studied was the protected Bia Conservation Area (BCA), which includes The Bia National Park and the adjacent Bia Resource Reserve.



Source: [http://www.siliconhotel.com/images/ghana\\_map.gif](http://www.siliconhotel.com/images/ghana_map.gif)

of the standard line transect method (Buckland et al. 2001) was employed for counting dung piles in the BCA (Barnes and Jensen 1987). A grid consisting of squares, each minute of latitude and longitude, was superimposed on the map of the study area (Sam and Danquah 2004). During July and August of 2005, fifty transects were distributed along the BCA using a stratification method—distributing more transects where elephants are known to be concentrated and less in the areas where they are sparse—to reduce the variance of the results.

Each kilometer-long transect was located in the middle of a selected grid; thus, 30, 15, and 5 transects were distributed in the high, medium, and low-density strata, respectively (Figure 2).

Positions of dung piles—easily identifiable because they resembled stacks of balls 9-12 cm in diameter—were marked on a field data sheet using a Global Positioning System (GPS), and the data was later plotted as fixed points on a map. Findings of dung piles were then associated with ecological factors that are known to influence elephant movement patterns, i.e., veg-

etation type, swamps, presence of rivers, fruiting trees, and canopy gaps. In addition, proximity of farms to the reserve was included as a possible factor influencing the forest elephant.

The study involved three groups of four people: two groups were in charge of collecting data from transects within the BCA and the third group was responsible for collect data elsewhere. The group working outside the reserve interviewed people about primary land uses in the surrounding area, such as logging, farming, and cattle ranching.

## Problem Description

In the past, the forest elephants' range has shrunk to a quarter of its original size, partly because the Sukusuku and the Bia Tawya Forest Reserves, which are near the Bia Conservation Area, have been illegally and completely transformed to farmlands (Martin 1982). These forest reserves were once around the BCA acting as a buffer zone, but even though they are still on the official maps, they no longer exist.

The proximity of farms to the conservation area has increased the possibility of clashes between farmers and elephants. As a result, farmers have resorted to using various methods to keep elephants away from their crops such as playing drums and violins for long hours into the night. It was curious to see that, while the farmers play their instruments, elephants seem to wait hidden in the forest just meters away on the other side of the reserve's border. The farmers know that once elephants enter into their farms they have no power to drive them off their land. Moreover, as soon as the farmers tire of playing their instruments, elephants steal into the farms, spoiling the crops.

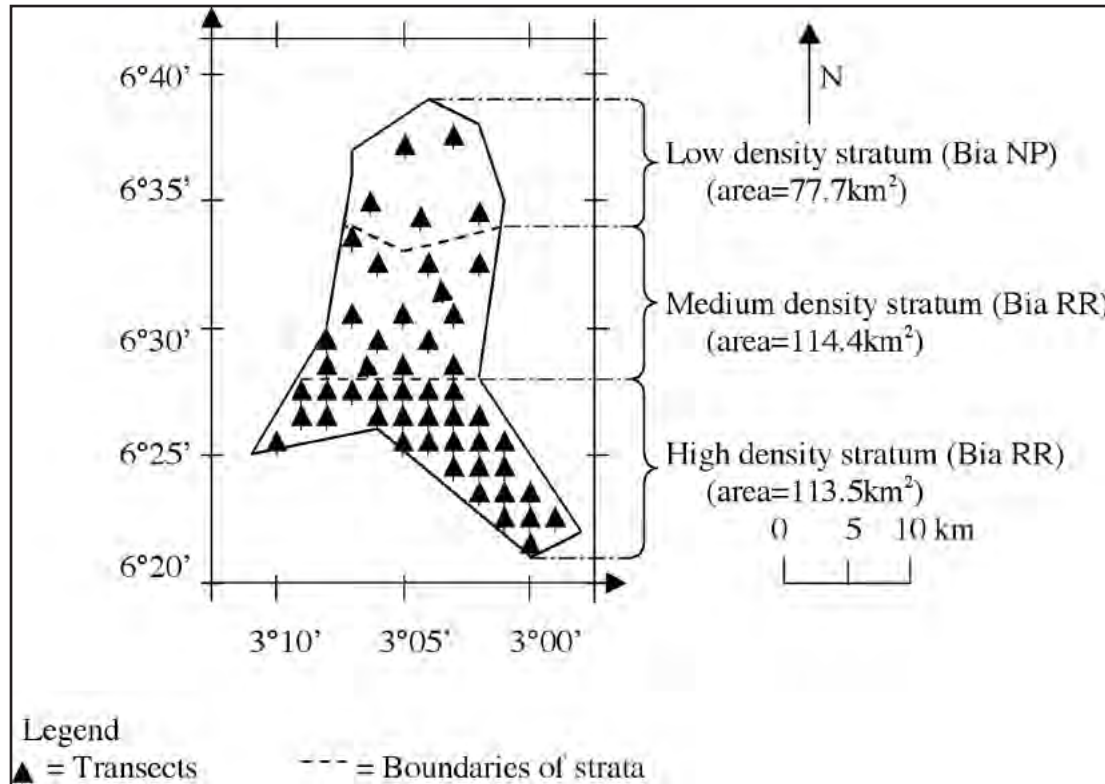
### Results

Dung pile data collected in the field was analyzed with Stat View to get a quantitative understanding of the current factors affecting

movement patterns of forest elephants. The data collected was correlated with the presence of any of the ecological factors mentioned in the methodology that may influence the elephants' moving patterns. These variables, with the exception of the presence of rivers, did not show a typical pattern, whereas raphia swamps and fruiting species were strong attractors for elephants in the forest.

Therefore, I proceeded to correlate the dung pile data collected with the presence of cocoa farms in the southern area of the BCA to possibly link human activities to changes in the elephant movement patterns. This analysis showed a better correlation with the fixed points obtained in the field. The strongest level of correlation found was between the dung piles and the presence of farms (0.781), then between dung piles and the presence of rivers, at 0.659; while the rest of correlations values ranged from 0.433 to 0.05. When correlated with dung piles,

**Figure 2.** Bia Conservation Area showing transect distribution in the various strata



Source: Sam and Danquah 2004

raphia swamps and fruiting species (natural attractors of forest elephants) showed a value of 0.167 and 0.05 in the correlation matrix.

## Discussion

There were a number of human activities around the southern border of the BCA, such as logging, ranching, and farming. Since buffer zones have been cleared for these purposes, humans and elephants are now coexisting in a small area with little separation, which creates a serious threat to the species due to increased conflict with humans.

While I was working in the area, farmers told me that, at times, they hire a specialized elephant poacher to “get rid of the problem.” They secretly divide and consume the meat, sell the ivory, and bury the body deep in the forest. These remarks were unexpectedly confirmed by one of the park rangers on my research team, an important admission given that it significantly increases concern for the viability of elephants in the area.

This covert activity creates a tremendous impact on the herd, since poachers typically take the head of the herd. In matriarchate social organizations, such as that of the forest elephant, the leader is a female. This elephant is usually the best specimen for reproduction and is the one that passes knowledge acquired through generations to the rest of the herd (Vidya and Sukuma 2005).

## Conclusions

According to the study, elephants are spatially correlated with the presence of farms, concentrated in the south part of the BCA. Far from being disturbed by the presence of humans, forest elephants seem to be attracted to farms as food sources. Reports of crop raiding by elephants has increased in the vicinity of national parks in Ghana, particularly at cocoa farms (Sam and Danquah 2004).

Thus, there is an urgent need for further studies to complement the understanding of the BCA forest elephant conservation status and the causes of the human-elephants conflicts. These studies will serve as a basis for improved policies adapted to local needs. Studies must be focused on economic and ecologic zoning, on the conservation status of the forest elephant, and on economically viable revenue generators that do not threaten the species. Hence, solutions must include not only an improvement in regulations, monitoring, and enforcement, but also an incorporation of a social approach that provides the farmers with profitable alternatives. Any viable alternative should mitigate the actual conflicts and serve as a platform for future changes.

There are successful experiences in other protected areas in Ghana that can serve as a guide to follow. The Kakum National Park is similar in extent and number of species, but in contrast to the BCA receives more visitors. This allows locals to develop proposals for new business opportunities like ecotourism and non-timber forest products, among other alternatives.

Elephant populations in the BCA have been isolated for a long time and their future viability will depend on realistic conservation policy recommendations. The implementation of these policies in the context of the social and economic dimensions will also contribute to population stability and mitigate the human-elephant conflicts at the border of the Bia Conservation Area.

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Source: Rhind, William. 2004. *The Vegetable Kingdom*. Fine Rare Prints. Available at: [www.finerareprints.com](http://www.finerareprints.com)