

# The Mali elephants: a complex socio-ecological system

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## TOP PRIORITY LAKE BANZENA

During the 8-month dry season, the elephants move from lake to lake. These dry out as the season progresses, forcing a retreat towards the only permanent water accessible to elephants: Lake Banzena. It is, therefore, the lynch-pin of their survival strategy

By the end of the dry season, elephants, herders and livestock are concentrated in this area. Livestock pressure has increased greatly in recent years, and in 2009 the lake dried completely.

## SOCIOLOGICAL STUDY

- Every household consulted, and results discussed at community meetings to (1) agree the problem and (2) plan a solution. Surprise findings :

- 96% of the cattle were "prestige herds" belonging to urban middle-class Malians.
- >50% of the population suffered from water-borne disease

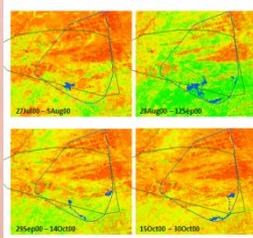
## THE PLAN

- The population relocates outside the elephant range & boreholes are provided

- Rules of resource use including elephant needs are devised & enforced by the community
- Outsiders can use resources if they pay
- A pasture reserve protected by fire-breaks that was the only part of the north not to lose its pasture in fire this year

This unique population of around 550 elephants has evolved a nomadic strategy that involves an annual migration circuit of around 650km to cope with the widely dispersed and variable nature of the Gourma's resources, but recent drought and increasing human impact are changing the relationship between elephants, people and the Sahelian ecosystem. Research first focused on understanding how the elephants' use of space enables them to cope with the dispersed and variable nature of the Gourma's resources and identify the threats to their survival (centre panel).

Subsequent research, focused on the wider socio-environmental context to tease out the exact nature of the threats and how they operate in space and time (RHspanel). Community engagement helped to understand local perspectives, develop effective tools for action, and craft appropriate messages for outreach. The project is now addressing the priority threat areas, beginning with the most urgent: Lake Banzena (LHspanel).

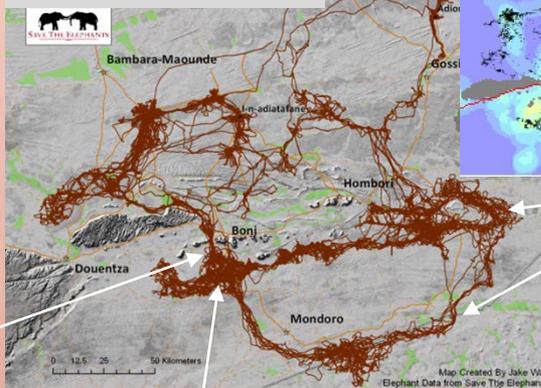


As soon as it rains the elephants leave Banzena to go south to richer pastures. The figures below show vegetation biomass (satellite derived NDVI) through the wet season (red = low and green = high) in relation to elephant location (blue). The polygons show the limits of the 1970 range (black) and current range (blue).



There is now only one pass free of human occupation

Satellite data showed that elephants spend more time in the drainage-ways & their associated thicket, where they can move easily & find water, shade and cover. They spend little time on the open plains & dunes.



The tight cluster of points immediately to the south reflects the fact that elephants use an area left open for pasture by adjacent villages. The surrounding area is increasingly farmed with incidences of elephants trampling crops & raiding grain stores . From here they move quickly across a fossil sand dune & through fields

Map model showing the intensity of human activity from high (red) to low (blue) → the south-east is a priority for conservation measures.

At the end of the wet season the elephants frequent the salt deposits of Hamngiganda

Human activity decreases towards the international boundary which has become a natural feature with more woodland, leading to the protected areas along the north of Burkina. This is therefore the preferred elephant route to the relatively unoccupied south-east.



## THE MAIN THREATS

- Population & agricultural pressure from the south, while dispossessed herders try shifting agriculture that ultimately results in soil erosion and loss.
- Well intentioned development interventions e.g. financial incentives to develop market gardens around water holes attracting agriculturalists from elsewhere.

For example, before the late 80s, the herds used the permanent Lake Gossi, but a dramatic increase in settlement along the east bank and gardens along the west bank means that now only a few bull elephants visit the lake

- Livestock pressure from huge "prestige" herds, owned by urban middle classes & tended by dispossessed herders

- Urban commercial interests cutting trees and gathering wild foods

- The disinclination to respect the resource management systems of another ethnicity.



**METHODS** – To understand the migration, GPS collar data were obtained by *Save the Elephants* for 12 elephants over 2-3 years. These data were overlain on a series of GIS data layers that included satellite imagery (Landsat, MODIS), plus environmental features such as topography, water, roads, and derivative data layers created from combining census, land use and social survey information with maps of administrative boundaries and locations of settlements.