



Elephants are not afraid of mice; bees – that’s a different story. So believes Lucy King, a zoologist based in Kenya currently researching the interaction between African elephants and bees. Why she is leading this innovative research project will become clear, but first a bit of background.

### **Human – elephant conflict**

The conservation of the African elephant provides tremendous opportunities for simultaneously conserving biodiversity and increasing benefits to local communities. Their role as a flagship species of global significance helps maintain biodiversity of the ecosystems they inhabit. In addition, the cultural and aesthetic values of elephants are also important, not only to African societies, but to the world at large. But this needs to be balanced against the fact that as the African elephant range becomes more and more fragmented and elephants get confined into smaller pockets of suitable habitat, humans and elephants are increasingly coming into contact and in conflict with each other.

Tracking and recording the actual numbers of elephants in Africa is difficult; data are collated using a wide variety of techniques from ground or aerial surveys to dung counts and informed and other ‘guesstimation’. Overlay the obvious difficulties in the range and distances elephants can travel (global satellite tracking is helping this process) means putting accurate numbers on elephant populations can be, excuse the pun, a mammoth task.

That said, counts are achieved and have shown the elephant population in Kenya has gone through various changes. In 1973, the population was about 167,000 declining to just 19,000 in 1989<sup>1</sup>. The African Elephant Status Report 2007<sup>2</sup> (AESR 2007), recently published by the African Elephant Specialist Group (AfESG), puts the definite elephant count at 23,353, up 1,317 on the 2002 survey results. Add in probable, possible and speculative counts and the 2006 figure is 31,636; a rise of 2,830 on the 2002 figures.

Alongside the elephant population growth, the human population in Africa has escalated way beyond anyone’s predictions, reaching an estimated 924 million<sup>3</sup> in 2006. This increasing human population is starting to encroach dramatically into traditionally wildlife rich areas forcing large animals like elephants (and lions, buffalos and leopards incidentally) into smaller and smaller areas. Of course, 6 tonne animals like elephants have a huge requirement for food and water and naturally migrate across the landscape searching for sustenance. This is bringing them into direct conflict with people as new villages, roads, schools, fences, bridges and farms are being

built over these natural wildlife corridors. The human-elephant conflict is becoming a serious issue in Kenya as people are now killing, spearing or poisoning elephants that come onto their land to eat their crops.

So while elephants are major economic assets in generating tourist revenue, crop raiding by elephants is a cause of increasing levels of conflict between local people and wildlife management strategies across Africa. The economic damage to small-scale farmers can be crippling. Unless a cost-effective method of limiting crop damage is found, the pressure on wildlife managers to implement radical methods such as culling, will inevitably become a reality. As Lucy herself says, “When you meet people who are affected by these invading elephants you can only feel the deepest sympathy that they have lost their entire harvest. This causes genuine stress, damage and sometimes even death to these poor rural villagers.”

### **What can be done?**

One of the methods that has been tried with variable success is the installation of electric fences to keep wild animals, particularly elephants, out of people’s farms. However, this is very expensive, requires a reliable supply of electricity and cannot be financed by the farmers so they become reliant on donors.

Lucy works with a research team called Save the Elephants<sup>4</sup>, which is headed by the elephant expert Dr Iain Douglas-Hamilton OBE; an organisation dedicated to developing a tolerant relationship between elephants and humans. Her research is furthering the aim to find crop-protection methods that can be financed and managed by the farmers themselves.

The use of chilli peppers, either as disincentive crop or as a deterrent spray has been pioneered by Osborn (2002) in Zimbabwe with promising, albeit limited, success. Other variations include light-weight fencing hung with cow bells and laced with a potent mix of red chilli and black engine oil, thought to both alarm and irritate the elephants’ huge, sensitive trunks. However, Lucy’s research, based upon Kenya folklore which says that elephants are afraid of bees, would be an innovative and socially appropriate solution.

### **David and Goliath**

The project explores the use of traditional, wooden beehives as both an elephant deterrent and a social and economic boost to poverty-stricken rural communities through the sustainable harvesting of honey.

Her earlier research has shown that elephants react with obvious alarm and retreating behaviour to bee sounds. Further, recent studies show that elephants will actually avoid trees with beehives. By setting hives in acacia trees and recording how elephants react to them, Lucy hopes to be able to demonstrate that beehives can be used as an eco-barrier protecting fields of crops.

When she isn't persuading the British Army to help her fix her overworked Land Rover, Lucy works from a green canvas tent alongside the beautiful Ewaso Ng'iro river, in the Samburu Reserve.

Day to day work involves setting up sample plots and selecting trees for beehives to be hung in. Many plots are tested which means driving through acres of park (hence the overworked Landie) and frequent encounters with elephants.

Lucy has employed a local assistant Lukas, from the Ndorobo tribe; well known for their beekeeping abilities, and Lukas has 13 hives of his own which he helps to support his family with. There are also 4 long term elephant monitors, 1 MSc student from Nairobi University studying debarking effects of elephants and 1 other Kenyan researching whether or not lions use the same wildlife corridors as elephants. In addition, a team of researchers, all local Samburu are trained to identify all the elephants in the reserve; incredibly they know about 750 elephants by sight alone.

### **Data Analysis**

As well as the bee data, data are also collected from observations into factors such as temperature, wind direction and time of day to establish if the elephant behaviours observed are due to these factors, or if the elephants are indeed responding to the presence of the bees.

Using mainly the GLM functionality within GenStat® (provided by VSN International<sup>5</sup>), large datasets are quickly and easily analysed with the results factored back into future experimental design.

### **Now, next steps and the future**

In this day and age with all the issues of environment and climate change to be able to find a way of assisting farmers without destroying the natural habitat must be of the utmost importance. Here we have an opportunity to be a part of such a programme; and additionally to prove once again to the non-statistician that data analysis and statistics are a crucial part of everyday living.

### **References:**

1. <http://www.conservationafrica.org/>
2. <http://www.iucn.org/themes/ssc/sgs/afesg/aed/aesr2007.html>
3. [http://www.mbendi.co.za/a\\_sndmsg/news\\_view.asp](http://www.mbendi.co.za/a_sndmsg/news_view.asp)
4. <http://www.savetheelephants.org>
5. <http://www.vsni.co.uk>