

# Biodiversity conservation and wildlife management

Growing populations mean that human use is expanding into wildlife habitats, potentially sparking conflict. Human–elephant conflict is a particular problem in Laikipia, Kenya. Using an approach linking development and conservation, ESAPP helped create a highly innovative wildlife management tool.

## Sustainable development challenge

Biodiversity conservation efforts clash with rural development goals in many parts of the world, and it is still rare for decision-makers to consider and harmonize the concerns of both sides in an integrated land use planning process. Conflicts of interest are largely due to increasing pressure on natural resources. Growing populations in high-potential areas mean that new, previously marginal areas are being targeted for human use. Often, these are natural habitats home to wildlife, setting the scene for potential human–wildlife conflict.

Conflicts between humans and elephants are a major problem for small-scale farmers and wildlife authorities in Laikipia County, Kenya. Elephants raid fields and destroy crops, undermining the affected communities' food security and causing resentment among smallholder farmers. This leads to the retaliatory killing of elephants, political tension with conservation actors, and the disruption of large-scale programmes for biodiversity conservation and rural development. Despite these tensions, local and regional decision-makers have been unable, for several reasons, to integrate biodiversity conservation into regional land use planning.

## ESAPP's response

ESAPP's experiences in Eastern Africa show that nature conservation is most likely to succeed when linked to socio-economic development, involving multiple stakeholders, and applying participatory approaches. According to Wiesmann et al. (2005), this requires extending the reach of negotiations beyond the area of conservation and developing both a regional perspective and a focus on sustainable regional development. A key instrument of such a strategy is land use planning that takes into consideration the needs of both nature conservation and the development of rural communities living in and around conservation areas.

In Laikipia, ESAPP supported the non-governmental organization Space for Giants through a series of projects that started with a comprehensive scientific analysis of spatial patterns of human–wildlife conflicts (Graham 2007). Based on this work, later project activities focused on elaborating a sophisticated wildlife management system, creating awareness among local communities and a wider public, and devising and disseminating concrete conflict mitigation measures (Graham and Ochieng 2008). Among these, integrative land use planning was identified as a key measure.



## Main messages

- Long-term and high-quality applied research can inform and influence local, national, and international policymaking with regard to the management of major natural resources and associated conflicts, provided it is appropriately linked to local institutions and partners.
- Appropriate investment and capacity building on the ground can reduce human–elephant conflicts through a range of interventions from simple farm-based tools to more expensive high-cost barriers, such as electrified fences. An even better option is to prevent human–elephant conflict through appropriate land use planning.
- Mobile-phone-based technology provides a key tool in rural Africa for monitoring the status of natural resources and associated conflicts, and can help mobilize resources for its management in space and time.



An elephant bull breaking through a strong electrified fence. With financial support from the Laikipia Wildlife Forum, Space for Giants worked with local landowners to develop a more appropriate fence design and fence management protocol. It also trained fencers in skills needed to maintain the 163-kilometre West Laikipia Fence. (Photo: Max Graham)



### The project story

The main goal of the collaboration in Laikipia between the Centre for Development and Environment (CDE), the Centre for Training and Integrated Research in ASAL Development (CETRAD), and Space for Giants was to understand and mitigate human–elephant conflicts and to provide information, knowledge, and tools to advance the conservation and management of Kenya’s second-largest elephant population.

The project capitalized on the results of a PhD study funded by the University of Cambridge, UK (Graham 2007), and a Master’s study written within the Swiss National Centre of Competence in Research (NCCR) North-South programme. First, researchers analysed the spatial patterns and dynamics of human–elephant conflicts. Next, communities affected by elephant raids were trained in monitoring and reporting incidents to the relevant wildlife management authorities. These initial steps helped to create awareness, strengthen links between communities and authorities, and identify main predictor variables for human–elephant conflicts, in order to better target further interventions.

Later, an educational film was created to sensitize Eastern African wildlife managers and policymakers, and to familiarize them with tools to minimize conflict and promote peaceful coexistence. Farm-based deterrent strategies for communities living with elephants in Laikipia were collected and made available in a comic book, helping the communities to protect themselves. Fences smeared with chilli paste, watch towers, torch lights, and “banger sticks” imitating the noise of guns have shown encouraging results, especially when used in combination.

A follow-up intervention provided local people with tools to participate still more effectively in human–elephant conflict management and conservation planning: community scouts were trained in using a mobile-phone-based system for reporting incidents, as well as a web-based mapping platform that enables real-time viewing of this information and the movement of radio-collared elephants. Through the systematic monitoring of fence breaking and crop raiding across Laikipia, this system was eventually used to provide early warning and conflict prevention services.

Most recently, the project used the results of the spatial analysis of elephant movements and human–elephant conflict to drive policy on land use planning across the region. The integrated conflict mitigation approach (from providing simple real-time monitoring tools to developing conflict mitigation interventions) has since been adopted in other sites across Eastern Africa, including the Amboseli ecosystem.



**Top and middle:** Chilli paste is a natural way of keeping elephants at bay. Farmers mix the paste from crushed chilli peppers and used motor oil, applying it to pieces of cloth attached to rope fences surrounding their farmland. Elephants are very sensitive to the burning sensation produced by chilli, causing them to leave and possibly even avoid the route in future. (Photo: Max Graham)

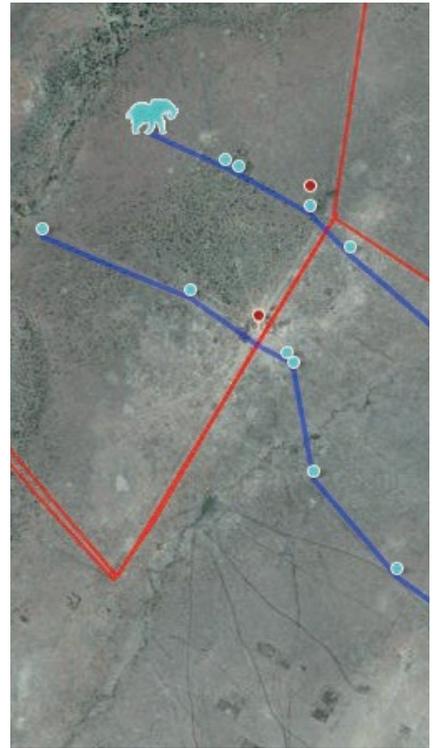
**Bottom:** Elephants not only raid farmland and destroy crops; sometimes they damage infrastructure and injure or kill people. The level of resentment among local farmers is high, as they feel they are not compensated adequately after such incidents. For this reason, the project also worked towards improving collaboration between wildlife authorities and local communities. (Photo: Max Graham)



## Innovation and relevance

The project combines the functionalities of several technologies to come up with a highly innovative wildlife management tool: Global Positioning System (GPS) receivers are used to record elephant locations; the mobile phone network helps to transfer locational data into a geographic information system (GIS), where they are spatially analysed and combined with other geographic information. Finally, the combined data are made available to wildlife authorities and community scouts via a smartphone application. This tool is invaluable to help record and analyse movements of elephants across a human landscape, and to understand their behaviour in relation to risks and opportunities. It also enables systematic monitoring of fence breaking and crop raiding across the area for a better understanding of the spatial and temporal extent of this problem, and to help inform management action and assess underlying causes.

Conflicting goals between nature conservation and the development of rural communities are a widespread challenge in Eastern Africa and elsewhere in the world. Win-win situations between both priorities are rare; more often, trade-offs have to be dealt with in the best possible way. For example, if local communities' access to protected areas is restricted, reducing their resource base, these communities have to be compensated with a share of profits from tourism in and around the protected areas. The widespread occurrence of such trade-offs makes the experiences gained in this project highly relevant at a regional and even continental scale. Accordingly, as of 2014, ideas are being exchanged and collaboration is being initiated with the wildlife authorities in Ethiopia and Tanzania. It is especially the comprehensive and coherent approach towards wildlife management and conflict mitigation – combining a technical tool with capacity development, awareness creation, and the setting-up of efficient conflict management procedures – that has a high potential for transfer to other protected areas.



**Top:** A smartphone application was designed to enable local scouts in Laikipia to enter important conservation information – such as the location of a fence break or a crop raid – and to monitor the location of the elephant herds. The information is displayed in real time on the smartphone, as well as on the Space for Giants website. The purpose of the application is to increase the timeliness of reporting and intervention.

**Bottom:** The ESAPP-supported human–elephant conflict project implemented by Space for Giants attracted the interest of scientists, development practitioners, and the broader public at a science fair of the Swiss Agency for Development and Cooperation (SDC), and at the annual sustainability day of the University of Bern. (Photo: Corina Lardelli)



**Max Graham, PhD**  
Chief Executive Officer  
Space for Giants  
Nanyuki, Kenya



**Boniface Kiteme, PhD**  
Director  
Centre for Training and Integrated  
Research in ASAL Development  
(CETRAD)  
Nanyuki, Kenya



**Albrecht Ehrensperger, PhD**  
Head of Innovations Cluster  
Centre for Development and  
Environment (CDE)  
University of Bern, Switzerland

### References and further reading

Graham MD. 2007. *Coexistence in a Land Use Mosaic? Land Use, Risk and Elephant Ecology in Laikipia District, Kenya* [PhD dissertation]. Cambridge, UK: University of Cambridge.

Graham MD, Douglas-Hamilton I, Adams WM, Lee PC. 2009. Elephant movement in a human-dominated landscape. *Animal Conservation* 12(5):445–455.

Graham MD, Gichohi N, Kamau F, Aike G, Craig B, Douglas-Hamilton I, Adams WM. 2009. *The Use of Electrified Fences to Reduce Human Elephant Conflict: A Case Study of the Ol Pejeta Conservancy, Laikipia District, Kenya*. Laikipia Elephant Project Working Paper No. 1. Nanyuki, Kenya: Laikipia Elephant Project.

Graham MD, Notter B, Adams WM, Lee PC, Ochieng TN. 2010. Patterns of crop-raiding by elephants, *Loxodonta africana*, in Laikipia, Kenya, and the management of human elephant conflict. *Systematics and Biodiversity* 8(4):435–445.

Graham MD, Ochieng T. 2008. Uptake and performance of farm-based measures for reducing crop raiding by elephants *Loxodonta africana* among smallholder farms in Laikipia District, Kenya. *Oryx* 42(1):76–82.

Wiesmann U, Liechti K, Rist S. 2005. Between conservation and development: Concretizing the first World Natural Heritage Site in the Alps through participatory processes. *Mountain Research and Development* 25(2):128–138.

### Highlight profile

This highlight is based on the achievements of 5 ESAPP priority action projects.

**Implemented during:**  
2003–2014

**Total funds contributed by ESAPP:**  
CHF 187,500

**Implemented by:**  
Space for Giants, Nanyuki, Kenya; Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**With support from:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**Main beneficiaries:**  
Farming communities in Laikipia County, Kenya’s wildlife authorities, and elephants living in the area

### This highlight

Language editing: Tina Hirschebuehl, Marlène Thibault (CDE)  
Design: Simone Kummer (CDE)  
Proofreading: Stefan Zach (z.a.ch GmbH)

### Citation

Graham M, Kiteme B, Ehrensperger A. 2015. Biodiversity conservation and wildlife management. In: Ehrensperger A, Ott C, Wiesmann U, editors. *Eastern and Southern Africa Partnership Programme: Highlights from 15 Years of Joint Action for Sustainable Development*. Bern, Switzerland: Centre for Development and Environment (CDE), University of Bern, with Bern Open Publishing (BOP), pp. 39–42. <http://doi.org/10.7892/boris.72023>.

© 2015, the Authors and CDE  
This work is licensed under a CC BY-NC 4.0 licence (<http://creativecommons.org/licenses/by-nc/4.0/>).



Funded by



### What is ESAPP?

The Eastern and Southern Africa Partnership Programme (ESAPP) is a research implementation programme funded by the Swiss Agency for Development and Cooperation (SDC), coordinated by the Centre for Development and Environment (CDE) of the University of Bern, Switzerland, and implemented jointly by CDE and a network of partner institutions in Eastern and Southern Africa. Launched in 1999 and completed in 2015, ESAPP implemented over 300 priority action projects in the programme region, which included Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar.

### What are ESAPP Highlights?

ESAPP Highlights are a series of 24 project descriptions providing insights into ESAPP’s research and implementation partnerships. Each Highlight describes a succession of demand-driven priority action projects addressing local and regional sustainability issues. The 24 Highlights are collected in a publication that includes additional background information on ESAPP (see citation above). The individual Highlights and the entire publication are also available for download on CDE’s website: [www.cde.unibe.ch](http://www.cde.unibe.ch) (keyword search: “ESAPP”).