**Main image and inset:** *in Africa, Institute research has investigated the effectiveness of traditional and new approaches in reducing livestock losses to large carnivores*

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# Fostering coexistence between people and nature

**Institute research improves our understanding of the relationships between nature and people, and develops and evaluates mechanisms to support coexistence.**

Human development, as explicitly acknowledged in the UN Sustainable Development Goals, can only be sustainable if it does not destroy the ecosystems on which people and wildlife depend. Yet human populations continue to grow and anthropogenic impacts are increasingly affecting every corner of the globe. The global human population is expected to reach nearly 10 billion by 2050, and rising per capita consumption will place unprecedented pressures on the planet's support systems. Maintaining biodiversity in the face of these pressures is an enormous challenge and depends on knowledge of the complex interdependencies between people and nature.

## Assessing natural capital

Evaluating the state of nature in relation to human wellbeing underpins our ability to sustainably manage natural resources while delivering development goals. Recent work at the Institute has focused on the use of satellite remote sensing data in the assessment of natural capital and ecosystem services. This research demonstrates that satellite remote sensing-based methodologies can be used to provide a wide array of metrics that can inform conservation in data-deficient areas, such as the Sahara (Pettorelli et al. 2016). It goes on to make an urgent call for scientists in biodiversity and satellite remote sensing to work together in order to agree on standardised measures that can be used to hold national governments to account on their national and international commitments to biodiversity conservation.

## Human-wildlife conflict

The Institute has ongoing research programmes that seek to understand the relationship between wildlife and local communities in order to develop mitigation strategies to reduce human-wildlife conflict. New research in this area has involved an assessment of the socio-economic correlates and management implications of livestock depredation by large carnivores, as well as an analysis of local attitudes to livestock husbandry practices and approaches to reducing livestock loss in the Tarangire-Simanjiro ecosystem, northern Tanzania. These results demonstrate the importance of fortified bomas as a long-term solution to reduce night-time livestock depredations, while adult herders help to prevent losses during daytime grazing at pasture. This research is key to developing effective strategies to foster coexistence with large carnivores (Mkonyi et al. 2017a,b).

## Sustainable agricultural development

The need to feed a growing human population means that more food will need to be produced from the limited amount of land available globally that is suitable for agriculture. Finding ways to increase agricultural production, while maintaining biodiversity, is a mounting challenge. We investigated the impacts of different wildlife-friendly production schemes on biodiversity and ecosystem service delivery on farms in the UK. By comparing organic farming with two non-organic wildlife-friendly farming schemes – one prescriptive (Conservation Grade, CG) and one flexible (Entry Level Stewardship, ELS) – and sampling a representative selection of crop and non-crop habitats, we were able to show that pollination services were higher on organic farms overall compared to CG or ELS. These findings support organic farming practices that increase floral resources in crop habitats, such as sowing clover or reduced herbicide usage, as mechanisms to enhance pollination services (Hardman et al. 2016a,b). Understanding how different farming approaches can better foster biodiversity will help improve the sustainability of agricultural development.

## Fencing policies for people and wildlife

In dryland ecosystems, mobility is essential for both wildlife and people to access unpredictable and spatially heterogeneous resources. In Africa there have been growing calls to increase fencing to separate wildlife and people as a means to protect wildlife populations from overhunting, poaching, human-wildlife conflict and human encroachment.

However, research led by the Institute shows the need to exercise caution in the use of fencing, as fences can prevent connectivity vital for the mobility of wildlife and people. This research identified six research areas that are key to informing evaluations on fencing initiatives: economics, edge permeability, reserve design, connectivity, ecosystem services and communities. Implementing this research agenda to evaluate fencing interventions will enable better management and policy decisions (Durant et al. 2015). Our research underlies a proposed concerted action to investigate the impact of linear barriers on wildlife movement in Africa, which is under consideration at the 2017 Conference of Parties of the UN Convention for the Conservation of Migratory Species.

Future priorities for our work in this area include developing a better understanding of the social and cultural dimensions of conservation and development interventions. Our ultimate aim is to contribute to the development of effective mechanisms to foster biodiversity and human wellbeing, helping to attain sustainable development goals alongside improved nature conservation.

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