

Land-use planning: an introduction for policy makers



WHY LAND-USE PLANNING?

Wherever people use land, land-use is being planned, consciously or not.

Policy-makers, and the rest of us, have an interest in planning deliberately and democratically so that land use enhances local and national goals including rural development, wealth creation, food security, sustainability of resources and equity.

Ideally, land-use planning is a countrywide effort, from grassroot villages through districts and provinces, harmonizing local needs with national priorities (Box 1).

In practice, it tends to get scant attention. For instance, an official objective of the Government of Tanzania is for all districts to have their own land-use plans, including all villages, by 2010. However as of 2009 only an estimated 1,000 villages out of a total of 8,000 have such plans.

Yet planning is no luxury: it is essential to achieving national as well as local objectives. For instance, official Tanzania goals include:

- increasing the returns from livestock;
- increasing returns from wildlife through tourism;
- increasing agricultural yields; and
- supporting rural livelihoods.

BOX 1. EFFECTIVE LAND-USE PLANNING

- Addresses local conditions in both process and content.
- Considers cultural viewpoints and builds on local environmental knowledge.
- Takes into account traditional strategies for solving problems and conflicts.
- Understands rural development to be a "bottom-up" process based on self-help and self-responsibility.
- Becomes a dialogue among stakeholders, rather than an imposed solution.
- Leads to improvement in the capacity of participants to plan and to act.
- Requires transparency and free access to information for all participants.
- Is sensitive to gender and all stakeholder needs.
- Is flexible, responsive to findings and changing conditions.
- Is geared to implementation.

Source: GTZ, 1999

Kenyan goals likewise emphasize increasing returns from tourism and wildlife, agriculture, and livestock.

Since land is not growing, only careful planning that fits the best use to each piece of land can give us hope of achieving all of these goals for land use.

WHY THIS MODULE?

Currently, however, land-use is often based on short-sighted and individual goals; policies that may not encourage sustainable use; and expediency rather than research.

This module introduces basic concepts and steps of effective, macro-level planning. It emphasizes that land-use planning is a multi-faceted exercise that works best when taking into account:

- present trends;
- options for possible future scenarios;
- needs, interests, and capacities of all stakeholders; and
- meshing local and national interests.

And it highlights research findings on current land-use trends in East Africa.

NATIONAL-LEVEL LAND-USE PLANNING: SOME BASIC STEPS FOR THE POLICY-MAKER

1. The first is to squarely face what is happening, where, and why (see below for analysis of regional trends).
2. Then project, or even just imagine, the current trends continuing five, ten, twenty, fifty years into the future. Would these trends produce a result we would want to see?
3. Visioning is critical. What in fact DO we want to see? Tanzania's MKUKUTA and Kenya's Vision 2030 are national-level visions, but there is much work to do to concretize them at local levels, harmonized with local aspirations.
4. Models and scenario-building. With the help of computer models that help predict trends, scenario-building helps to assess threats, opportunities and trade-offs of various options. Scenarios can spark discussion of possible interventions and their impacts from the village to the regional to the global level (Box 2).
5. What plans and policies could be developed to achieve scenarios with a positive influence on livelihoods, conservation and future well-being?

6. Bear in mind that plans are not set in stone: they are like hypotheses. They can and should be tested, shown to be right or wrong, and revised as necessary.

Vital questions to explore land-use change

In the 21st century, human land use is the main factor responsible for ecological change at both local and global scales. Exploring the following questions can help policy-makers understand how land-use is changing, and where the changes may be leading.

1. How is land-use changing? (What is happening?)
2. Which environmental and cultural variables are contributing to land-use change? (Who and why?)
3. Which locations are affected by land-cover changes? (Where?)
4. How fast is land-cover changing? (When?)
5. What are the impacts of these changes on pastoral livelihood and wildlife? (So what?)

As human populations and national economies continue to grow, land-use pressure will not abate in the near future. The pressure will be especially intense in countries of great biodiversity, with rapid population growth and rapid landscape transformation.

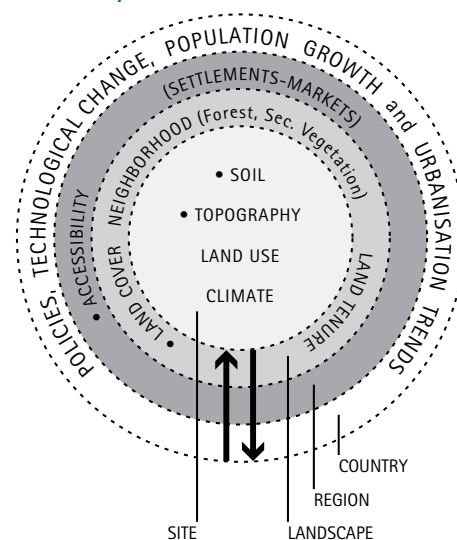
BOX 2. A USEFUL FRAMEWORK FOR MODELING LAND-COVER CHANGES

Of the many land-use change models, one in particular may be useful for considering large-scale planning in the East African context (Etter *et al.* 2006). This framework considers "drivers" of land-use change at four spatial scales: site, landscape, region and country.

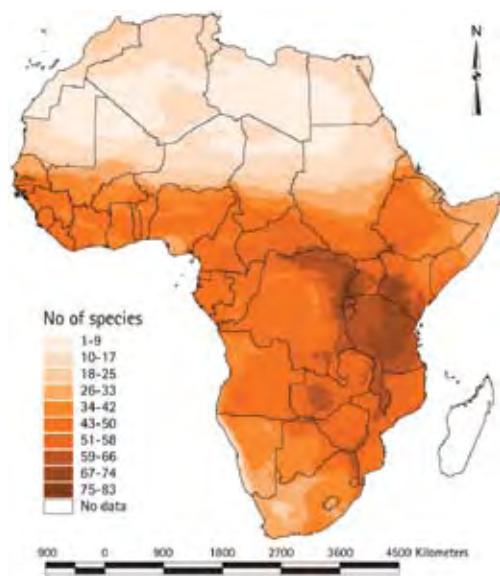
- **At the local site:** topography, previous land use and climate are the key influencers of land-use change.
- **At landscape scale:** land tenure, land cover and neighbourhood in the surrounding areas are the key drivers.
- **At regional level:** accessibility to services and markets are key drivers.
- **At the country level:** population growth, policies and technological changes come more into play.

Further, the drivers can be divided into endogenous: Present on site (e.g. soil, hydrology, neighbourhood) and exogenous: Influences from outside (e.g. policies, technology, distance, transport costs, and markets).

Drivers of land-cover change, from site to countrywide



Source: Etter *et al.*, 2006



Source: IEA, 1998

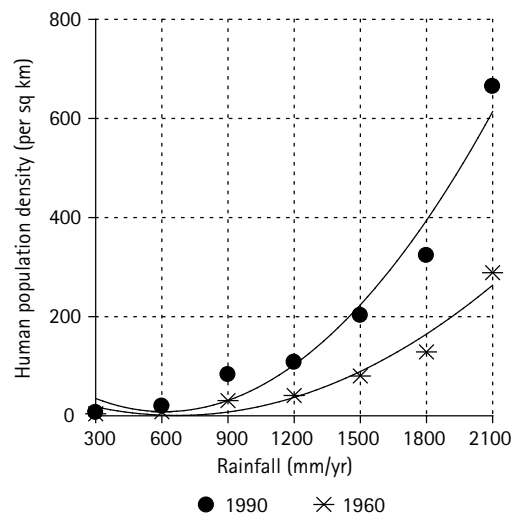
MAP 1. MAP SHOWING THE DISTRIBUTION OF MAMMALIAN SPECIES RICHNESS IN AFRICA, HIGHLIGHTING HIGH NUMBERS OF SPECIES IN EAST AND SOUTHERN AFRICA

Key findings on land use and land-use change in East Africa

People tend to prefer the same habitats as other large mammals: landscapes with reliable water sources and moderate rainfall. As human population grows, settlements and agriculture expand through the most desirable areas, and then push into increasing marginal territories. In East Africa, this means settlements and farms moving into semi-arid and arid areas that are not only wildlife rich, but have been the traditional home of pastoralists (Box 3). Conflict arises as people clear land for cultivation, destroying wildlife habitats and livestock grazing areas.

Extensive research in the region – in the field, from satellite mapping, and computer modeling – points up the following information to inform effective land-use planning.

1. **Human population is growing fast.** Tanzania's population has multiplied by nearly five, from 8 million people to 38 million since independence. Kenya's population, too, grew from 8 million in 1960 to 39 million today: nearly a five-fold increase. Rapid urbanization in capital cities as well as towns and smaller trading centres in the rural areas is a related trend. While slower than in the past, population is set to double again in the next three decades.



Source: FAO, 2000

FIGURE 1. DENSITY AND DISTRIBUTION OF HUMAN POPULATION IN EAST AFRICA DURING 1960 AND 1990

2. **Rangeland is becoming farmland.** Partly because of population growth and the need to grow food for urban areas, rangelands are rapidly being converted to farms throughout East Africa including in areas with poor soils and frequent drought. This transformation, and the attendant settlements and fences, limit the mobility of herders, livestock, and wildlife.
3. **Conversion to agriculture is proceeding fastest in areas with highest rainfall,** where farming is most workable and profitable (Map 2). Spatial analysis reveals that in East Africa, land conversion is also most rapid near rivers, roads, towns and national park boundaries.
4. **Climate change is bringing more frequent drought.** Droughts and other weather extremes are becoming more frequent, making most types of land use – particularly agriculture – more difficult. Drought is likely to accentuate the already present conflicts among and between farmers, herders, other land developers, and wildlife. In addition, increases in temperature are causing drier habitats that can further reduce forage for both livestock and wildlife (Ogutu *et al.*, 2007; Beehner *et al.*, 2006).
5. **Pressed by the above trends as well as land tenure policies, formerly nomadic pastoralists are settling.** Pastoralists who once herded livestock hundreds of kilometres a year are now commonly limited to a group ranch, a village, or even one plot in a village, as land is privatized and subdivided.

BOX 3. LAND-USE TRENDS IN THE TARANGIRE-SIMANJIRO ECOSYSTEM: WHAT'S HAPPENING? WHAT'S COMING?

Researchers conducted extensive fieldwork as well as statistical models of land use to study the dynamics of the last thirty years of unplanned agricultural conversion in the Tarangire-Simanjoro ecosystem (in Simanjoro and Monduli Districts).

They found that people were likely to turn rangeland into farmland in areas that receive relatively more rain, and/or are located:

- near a town
- near a road
- near a river
- or near a national park.

Other major findings include:

- Agriculture increased five-fold between 1984 and 2000 in the Tarangire-Simanjoro ecosystem, traditionally a pastoralist area rich with wildlife (Map 3). Cultivated hectares jumped from around 17,000 to about 88,000. And the rate of conversion has been growing exponentially, from 0.6 percent/year to 3 percent a year by 2000.
- 35 percent of the rangeland remaining in this ecosystem now has a medium, high, or very high probability of being converted to agriculture in the foreseeable future. Those probabilities are respectively 21, 10 and 4 percent.
- Conversion already seriously threatens three of the five wildlife corridors that remained in 2000. There were nine traditional wildlife routes in 1964.
- Wildebeest experienced a population decline of about 88% within a period of less than 15 years in the Tarangire-Simanjoro ecosystem, since their calving areas are now being farmed (TAWIRI, 2001).

- Farming appears unsustainable in the Tarangire-Simanjoro soils. Fully 70 percent of acreage under the plow in 1984 had been abandoned by 2000, and nearly all of what was being farmed in 2000 was newly converted. The abandoned acreage was fit for neither livestock nor crops (Msoffe, *et al.* in prep.).
- Climate is also unfavourable to agriculture here. An analysis of long-term rainfall patterns show that severe droughts arrive in one year out of three, though not in a predictable fashion (Msoffe, *et al.* in prep, unpublished data). Future forecasts of climate warming and substantial reductions in rainfall in East Africa (Hulme 2001; Thuiller *et al.* 2006; Ogutu *et al.* 2008) imply further adverse effects of climate change on wildlife and in Tarangire-Simanjoro ecosystem.
- Recurrent droughts and diseases have contributed to the declining livestock economy over the years due to livestock loss and the unpredictable and erratic rainfall has limited their recovery.
- Human population has expanded exponentially in this region during the past 25 years, with an annual increase of 3.8% p.a. between 1978 and 1988 to 5.2% p.a. between 1988 and 2002.

Conclusions of the research include: Land use change is being driven by policies and land tenure, socio-economic (demography, micro-and macro- economics), biophysical and climatic conditions.

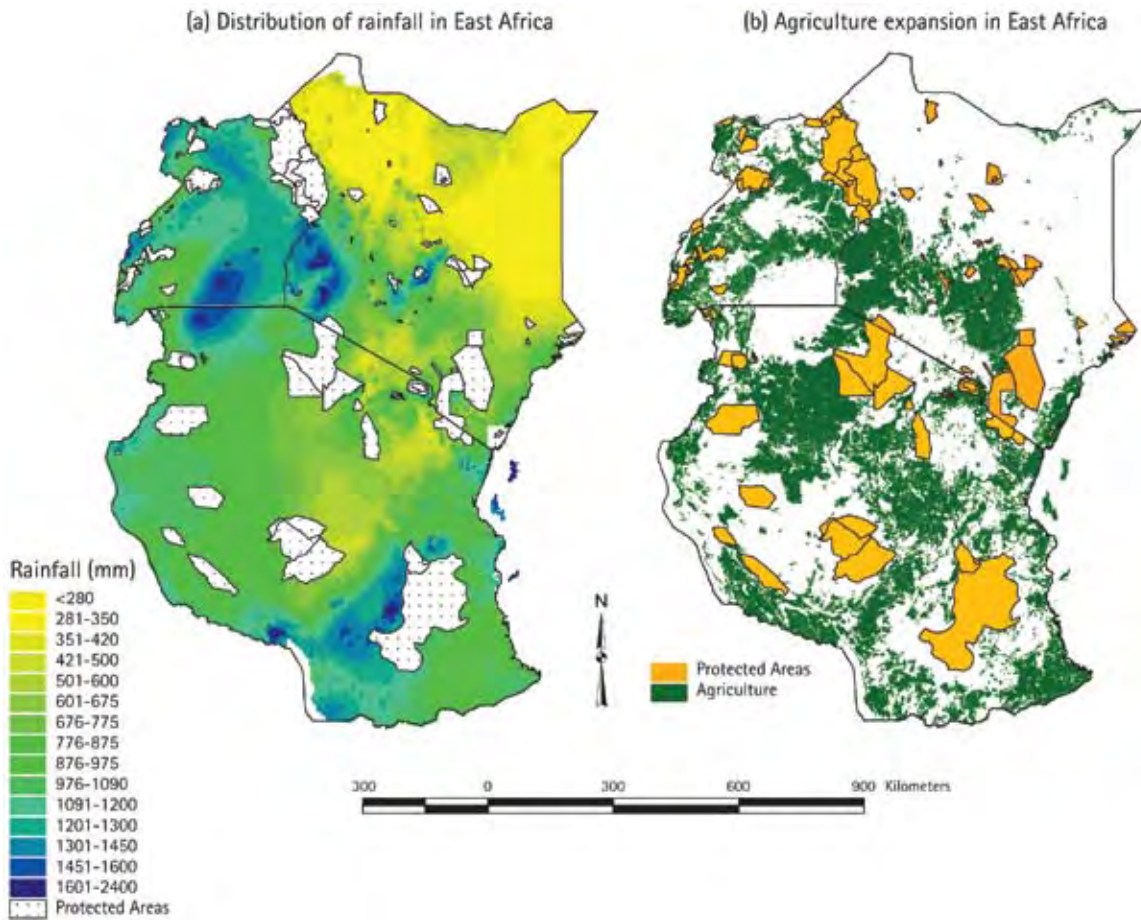
Reversing unsustainable cultivation and illegal use of wildlife in the study area would require rigorous land-use planning. In addition, community-based wildlife tourism projects could provide tangible benefits at the household level. Sustainable livelihoods need urgent support.

Adequate resources may not be available in that space, so pastoralists too are beginning to farm even in those semi-arid areas where pastoralism with mobility remains the most suitable land-use option (ACC, 2005; Reid *et al.*, 2003).

Pastoral landholders are also able to increase returns to land by investing in land development and production. Enabling these conversions are improved market and transport networks, information networks about market conditions, and access to financial services (Norton-Griffiths and Said, in press).

6. Contrary to popular perception, livestock numbers have not grown over the last couple of decades across the East African rangelands as a whole. Livestock has shifted location, however, with numbers increasing significantly in places of medium rainfall (500-800 mm) and decreasing in areas of higher rain. (Norton-Griffiths and Said, in press; GoK 1995; de Leeuw *et al.*, 1998).

Per capita, then, livestock has declined – particularly cattle. The pastoralist livelihood is becoming harder and harder to sustain, and pastoralists are among the poorest groups in East Africa.



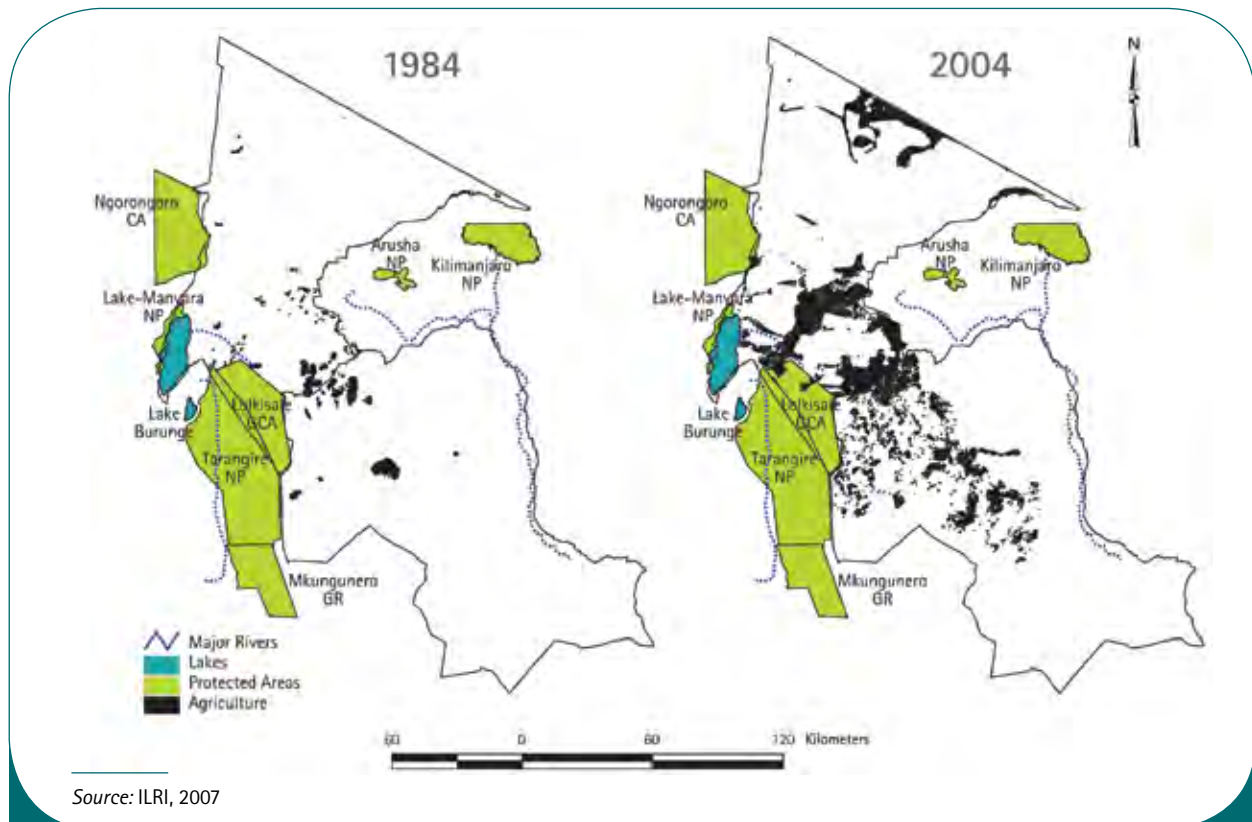
Source: ILRI, 2007

MAP 2. MAPS SHOWING RAINFALL AND AGRICULTURE IN RELATION TO PROTECTED AREAS

7. **Wildlife populations are dropping dramatically.** Due largely to unplanned conversion of habitat to farmland, East Africa has lost more than half of its wildlife in the last 30 years. The trend is continuing. In fact by some estimates, Kenya has lost more than 70 percent of all large mammals over the last 30 years. Of the 12 most common wild herbivore species surveyed, only ostrich showed no population declines in the past three decades (Norton-Griffiths, in press; GoK, 1995; de Leeuw *et al.*, 1998). Declines are high even in protected areas (Western *et al.*, 2007). The only places where wildlife is holding steady or increasing is on large private holdings, conservancies or group ranches that are profiting from tour operators (Norton-Griffiths and Said, in press). In Tanzania, the best scientific data likewise show wildlife sharply declining in all of the nation's major wildlife areas and ecosystems, including those with national parks and game reserves. Aside from giraffes and elephants, most large mammals

have seen widespread population declines since the mid-1980s. These losses are occurring despite about 30 percent of total land area is set aside as national parks, game reserves, and forest reserves (TNRF, 2008).

8. **Currently, wildlife at the local level cannot compete economically with agriculture.** Wildlife is being displaced mainly by land conversion to agriculture (Norton-Griffiths *et al.*, 2008; Ottichilo *et al.*, 2000; Serneels *et al.*, 2001). Economic analysis shows that in the current policy environment, farming reaps higher returns per hectare than wildlife even in areas that see the highest numbers of wildlife tourists (Norton-Griffiths and Said, in press; Norton-Griffiths *et al.*, 2008). Without policy change, economics will continue to drive out wildlife (see Box 4).
9. **Many national parks in East Africa are becoming "islands" in a sea of farms** (Map 3). Rapid land conversion around national parks sometimes reflects agricultural potential. But it can also reflect



MAP 3. MAPS SHOWING AGRICULTURE IN RELATION TO PROTECTED AREAS IN 1984 AND 2004

BOX 4. FROM THE CONSERVATION FRONTLINES OF KENYA

Recently, researchers calculated land returns for various uses in the Maasai Mara region of Kenya, based on land-cover observations and household surveys. The Mara receives higher rainfall than the Tarangire-Simanjiri ecosystem, although it is not uniformly distributed. Results show that agriculture and livestock receive higher returns per hectare than wildlife and these differential returns create incentives to develop rather than conserve the land. They explain much of the pattern of land-use change in the Mara and other regions of East Africa (Norton-Griffiths *et al.*, 2008).

Unless local communities see that wildlife benefits them at least as much as farming, they will continue to farm and/or lease or sell their land to others who will farm, either for subsistence or commerce.

WMAs, conservation-based businesses and payment for environmental services (PES) schemes are all methods to level the economic playing field and enable the survival of pastoralism and wildlife, before all since these two can survive together (Modules 3 and 4 address these further).

In the Mara, for instance, communities are partnering with private investors to set up reserves such as Olare Orok Conservancy (OOC). A wildlife conservancy next to the Maasai Mara National Reserve, Olare Orok is owned by 154 Maasai landowners and covers an area of 23,000 acres of land. Formed in 2006, OOC is managed by Olpurkel Ltd, a private management company established by four tour operators who own camps in the conservancy.

Olpurkel Ltd leases the land from the OOC under a five-year agreement and is responsible for wildlife management and infrastructure development while guaranteeing a fixed monthly sum of US\$ 160 to each landowner with 150 acres of land. Part of the agreement is also to use the conservancy as a livestock grazing grounds during dry seasons. This ensures that the local communities benefit from both conservation and pastoral livestock husbandry, still the economic mainstay of the local Maasai community.

Conservation-based enterprises are also increasing in Tanzania, encouraged by the establishment of Wildlife Management Areas (see Module 4).



Crop cultivation

communities' desire to prohibit any future extension of the parks into their land.

Cultivating near park boundaries has severely restricted wildlife movement. It also points up the need to pursue land use that is profitable for communities and also compatible with wildlife.

Complete loss of dispersal areas and corridors will reduce protected areas to ecological islands where sustainable conservation of wildlife species may not be possible even through active management strategies (Ottichilo *et al.*, 2000; Newmark, 1996).

10. Yet wildlife is one of East Africa's most valuable resources. In Tanzania it is the key attraction for a tourism industry that drew over 700,000 visitors in 2007, and over one billion U.S. dollars. Tourism in turn has been vital to economic recovery and growth of the past two decades. Visitors to Kenya totaled over two million in 2007, and accounted for about 12 percent of the Gross Domestic Product.

Key points to remember

1 Land-use planning at both the macro and micro levels can harmonize national and local goals. It can contribute to rural development, wealth creation, equity, food security and sustainability of resources.

2 Land use is changing dramatically in East Africa in an unplanned way, with often deleterious and unsustainable results. Increasingly rapid conversion of rangeland into farmland is leading to 1) the decline of pastoralism as a livelihood, despite its sustainability in semi-arid regions; and 2) a plunge in wildlife populations, despite their national economic importance. Urgent planning is needed to alter these trends and ease cohabitation of different land users.

3 In the current policy environment, agriculture is often the most lucrative land use in the short term. But in the semi-arid areas of East Africa, it is often unsustainable and ends up degrading soils to the point that neither farming nor grazing can continue.

4 Policies and actions that could help sustain pastoral communities as well as the wildlife they live with include:

- Changing policies so that communities can manage and benefit from their own resources, including wildlife.
- Permitting and encouraging communities to earn high returns and be paid directly from sustainable businesses on their land.
- Other means of payment for ecosystem services, such as easements and leasing for conservation.
- Education and support for improving rangeland.
- Recognition that pastoralists need extensive area to move – and pastoralism is often the most sustainable livelihood in semi-arid lands.
- Support for livestock corridors as well as wildlife corridors.

Some of these methods are covered in detail in Modules 3 and 4. For land-use planning at the local level see Module 2.

Key points to remember

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